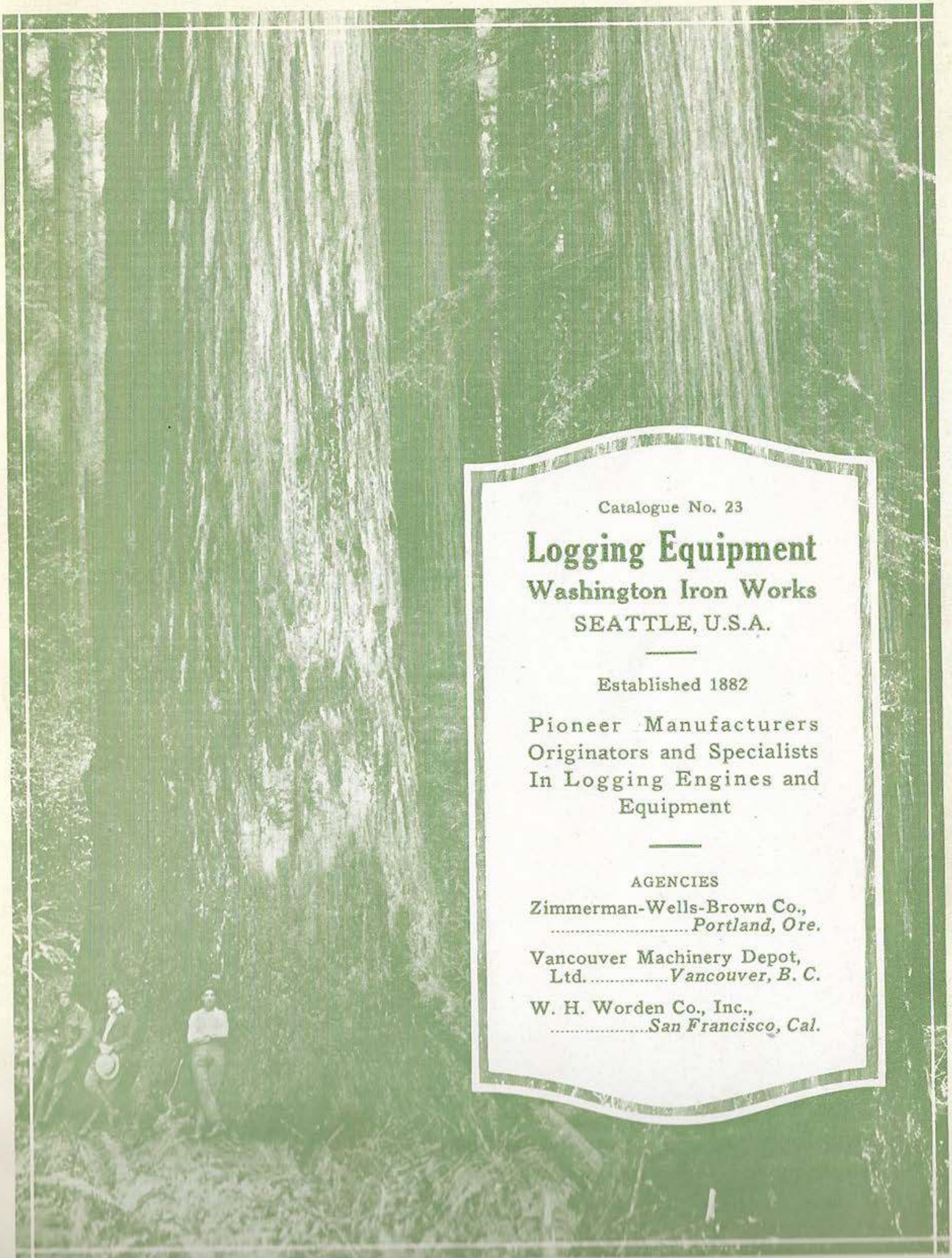
WASHINGTON LOGGING EQUIPMENT

CATALOGUE NO. 23



Catalogue No. 23

Logging Equipment

Washington Iron Works

SEATTLE, U.S.A.

Established 1882

Pioneer Manufacturers
Originators and Specialists
In Logging Engines and
Equipment

AGENCIES

Zimmerman-Wells-Brown Co.,
.....*Portland, Ore.*

Vancouver Machinery Depot,
Ltd.....*Vancouver, B. C.*

W. H. Worden Co., Inc.,
.....*San Francisco, Cal.*


EST'D 1882
A KNOWN REPUTATION

Introductory

NOT only is our new plant equipped with every modern facility and special machinery for the manufacture of logging machinery and equipment, but it has been the single endeavor of our Engineering Department to keep pace with every development in the logging industry from the days when logging was done by oxen to the highly efficient systems of today, with the result that Washington logging equipment is recognized as the leader in its class and has "a known reputation" for long, honest and faithful service under the most exacting requirements.

Illustrated in this new catalogue are improved blocks, carriages, etc., made to answer the demands which the present standard of severe usage and high speed logging put upon them.

In addition to the equipment shown in this catalogue we manufacture many special types of carriages and blocks.

Our Engineering Department will be glad to advise with you as to suitable equipment for any special logging problems.

WASHINGTON
IRON WORKS
Cable Address: Frink

Washington High Lead Blocks

(Patented)

AUTO LUBRICATING TYPE

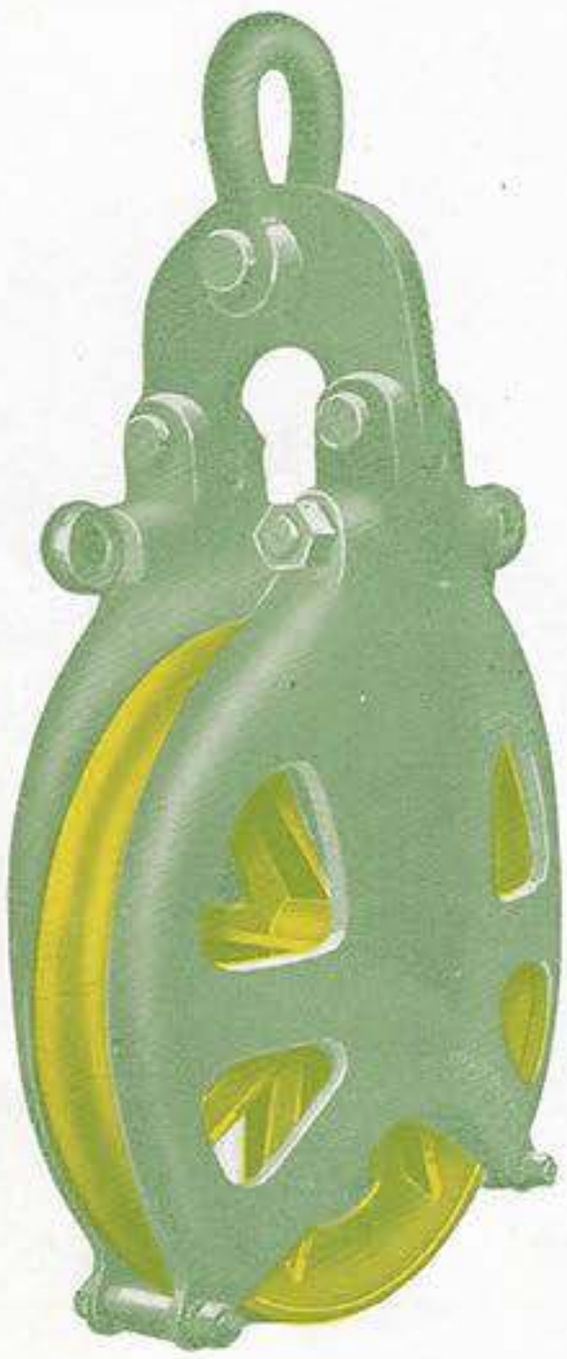
This is an unbeatable block for any kind of high lead work of any severity.

Extra large oil chambers are enclosed in the smooth sides.

The sides are made of Electric Open Hearth Steel carefully heat-treated for strength and toughness.

Pins and bearings are extra large, turned from forged high carbon steel.

A special feature of the improved block is the patented safety ring bolts as shown. From these ring bolts placed on both sides of the block safety lines are carried to guy wires which prevent the block from falling in case the fastening rigging breaks.



36-C
Plain Shackle Type

36-C
Swivel Shackle Type

All bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

PLAIN SHACKLE TYPE

Code Word	Number	Size		Weight	List
Brain	24-C	24"x5	Manganese Steel Sheave	725 lbs.	$220.00
Buzz	30-D	30"x5	Manganese Steel Sheave	915 lbs.	300.00
Byrum	36-C	36"x5	Manganese Steel Sheave	1295 lbs.	385.00

SWIVEL SHACKLE TYPE

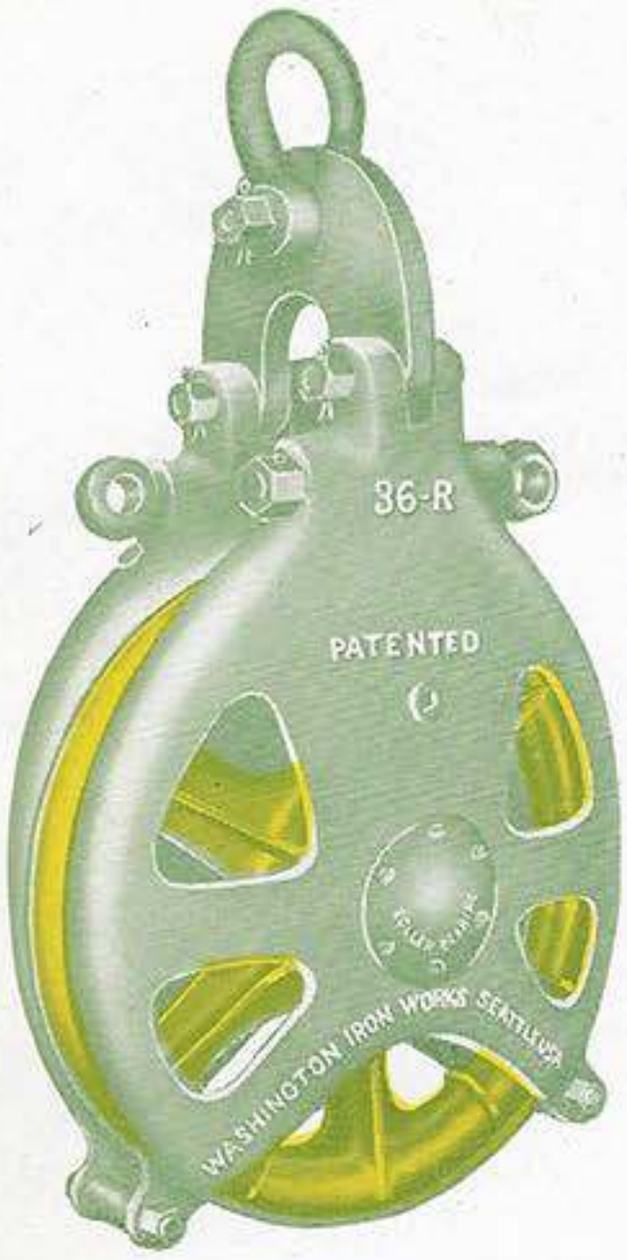
Boxer	24-C	24"x5	Manganese Steel Sheave	740 lbs.	$260.00
Brace	30-D	30"x5	Manganese Steel Sheave	930 lbs.	350.00
Brag	36-C	36"x5	Manganese Steel Sheave	1435 lbs.	435.00

Seattle price 15% off list. Vancouver Price is approximately list plus 17%

Washington High Lead Blocks

ROLLER BEARING TYPE

(Patented)



No. 36-R
Plain Shackle Type

Our engineering department has perfected a roller bearing High Lead Block which we guarantee to meet the severe service and high speed requirements of up-to-date logging operations.

FEATURES

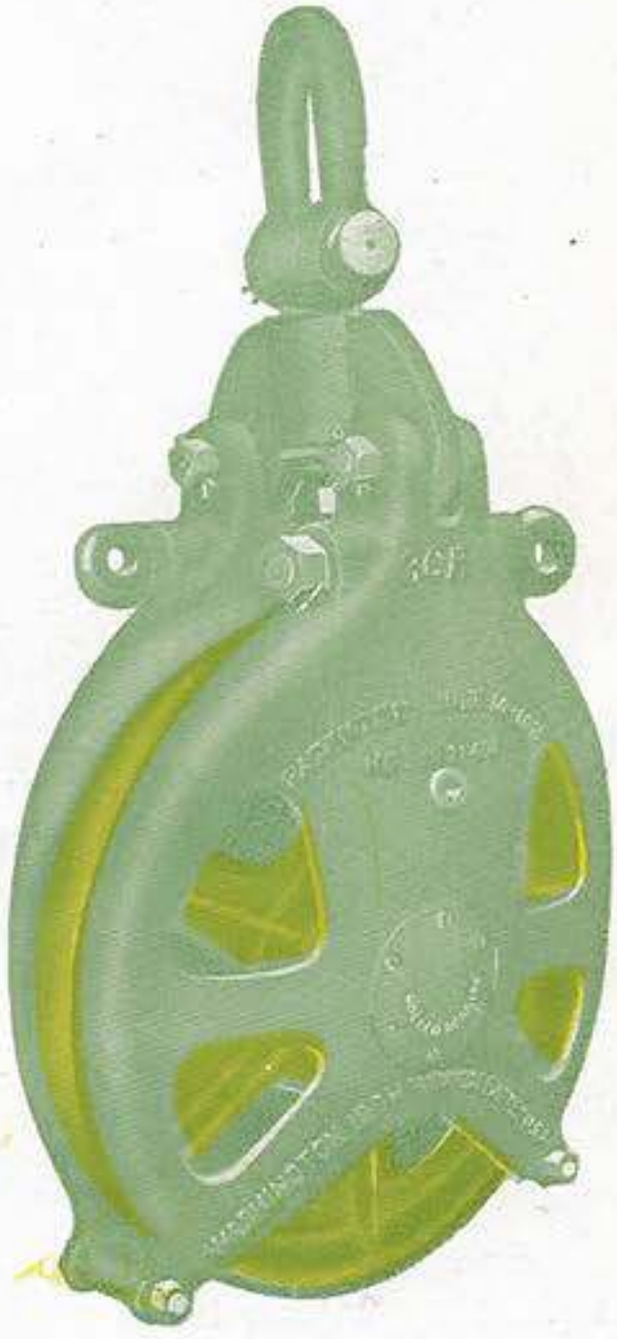
The chief feature of this block is the use of the latest and heaviest type of Hyatt Multiple Roller Bearings in connection with improved pin design.

Another important feature of this improved block is the safety ring bolts as shown. From these ring bolts placed on either side of block side safety lines are carried to guy wires, which prevent the block from falling in case rigging breaks.

With proper lubrication, which is only necessary at long periods, maintenance expense of this block is almost negligible.

Block pins made of alloy steel.

Sides are interchangeable and made of heat-treated Electric Open Hearth Steel.



No. 36-R
Swivel Shackle Type

PLAIN SHACKLE TYPE

Code Word	Number	Size		Weight	List
Rogue	36-R	36x5	Manganese Steel Sheave	1510 lbs.	$625.00
Roman	30-R	30x5	Manganese Steel Sheave	1230 lbs.	525.00

SWIVEL SHACKLE TYPE

Rompe	36-R	36x5	Manganese Steel Sheave	1550 lbs.	$675.00
Ropye	30-R	30x5	Manganese Steel Sheave	1255 lbs.	575.00

NOTE: Roller Bearings in Blocks 36-R and 30-R Interchangeable.

Washington High Lead Blocks

(Patented)

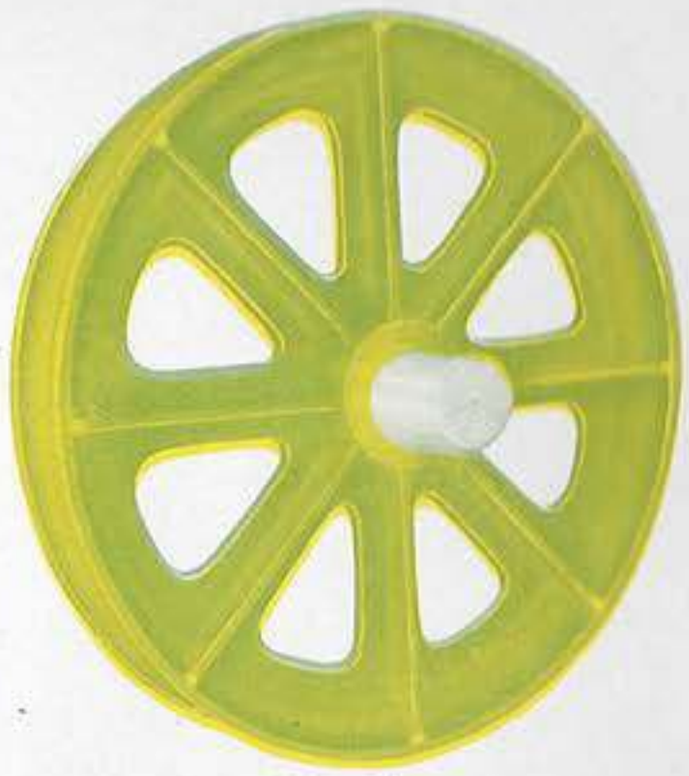
JOURNAL BEARING TYPE

No. 36-G

This block is made for the hardest type of usage.

FEATURES

The large sheave pin rotating in the bronze journals carried by the block sides is afforded a large bearing surface and is fitted for service under heavy loads and high speeds.



No. 36-G Sheave

A special feature, in addition to the five 1¼ bolts giving rigidity at the bottom of the block, and the smooth side construction, is that journals can be replaced without dissembling the block, by merely taking off the cover plates.

Large oil chambers feed the waste-packed journals, and if accidentally allowed to run dry, the oil-soaked packing will take care of lubrication for some time.

Journals are made of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

Another feature of this improved block is the patented safety ring bolts as shown. From these ring bolts placed on both sides of the block, safety lines are carried to guy wires, which prevent the block from falling in case the fastening rigging breaks.

PLAIN SHACKLE TYPE

Code Word	Number	Size		Weight	List
Badge	36-G	36x5	Manganese Steel Sheave	1640 lbs.	$600.00

SWIVEL SHACKLE TYPE

Code Word	Number	Size		Weight	List
Berry	36-G	36x5	Manganese Steel Sheave	1690 lbs.	$650.00

Washington Special High Lead Block

(Patented)

AUTO LUBRICATING TYPE

No. 30H

A Special High Lead Block with extra wide throat for use with short high lead trees (especially in pine districts logged under government supervision where small trees must not be pulled down) where it is necessary to pull butt hooks and choker hooks through the block, as is done in ground yarding.

Extra large oil chambers are enclosed in the smooth sides.

Sides are interchangeable and made of heat-treated Electric Open Hearth Steel.

Pins and bearings are extra large, turned from forged high carbon steel.

A special feature of the improved block is the patented safety ring bolts as shown. From these ring bolts placed on both sides of the block safety lines are carried to guy wires which prevent the block from falling in case the fastening rigging breaks.

All bushings are of our special non-heating bronze, successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

PLAIN SHACKLE TYPE

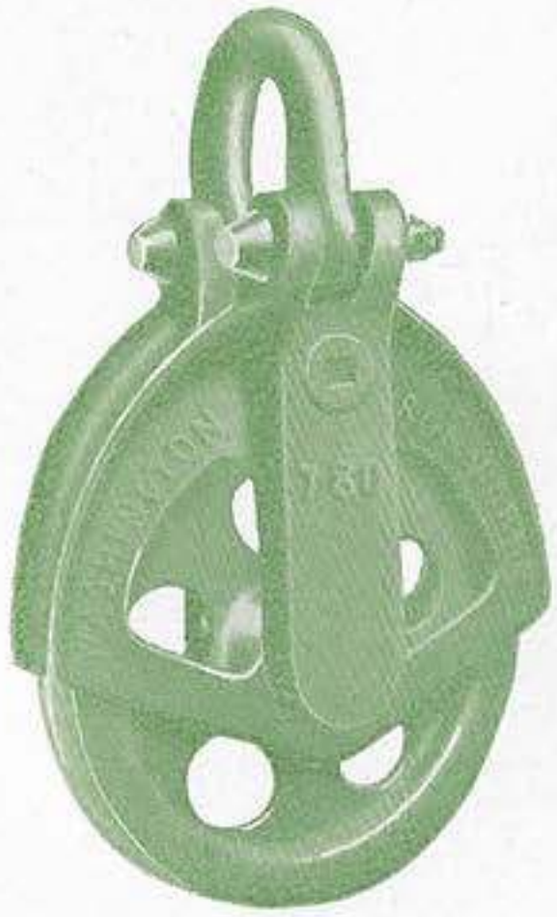
Code Word	Number	Size		Weight	List
Bleed	30H	30x5	Manganese Steel Sheave	1250	$350.00

SWIVEL SHACKLE TYPE

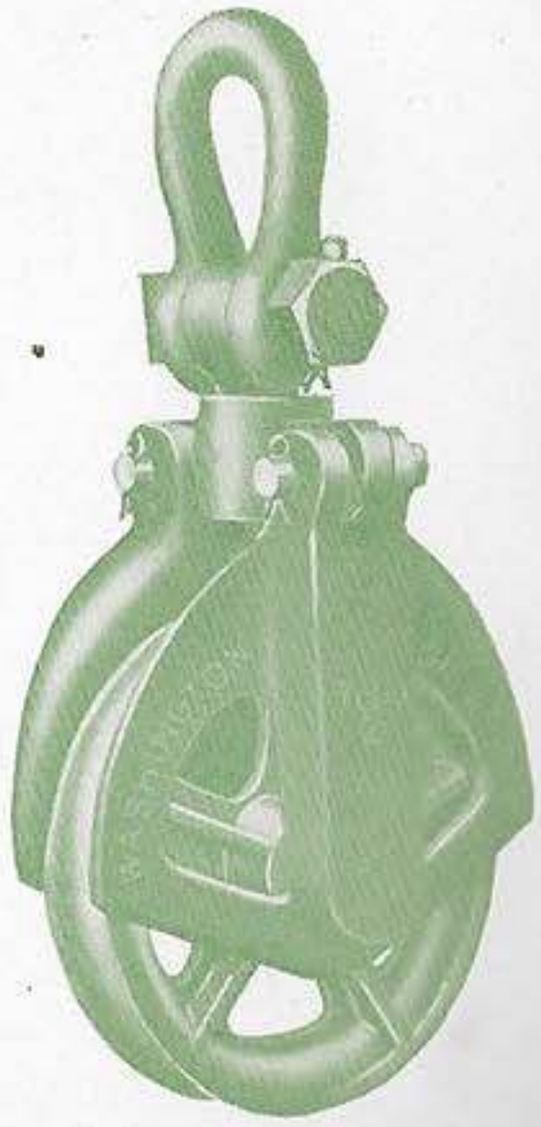
Blend	30H	30x5	Manganese Steel Sheave	1375	$400.00

Washington Rigger's Blocks

No. 78



No. 780



No. 780-2

Especially designed to meet the requirements of a block for rigging spar trees in high lead and aerial operations.

A very strong and safe block of least possible weight for its duty, made of heat-treated Electric Open Hearth steel.

All bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

GREASE CUP TYPE

Code Word	Number	Size	Weight	List
Amend	78	8"x1"	16 lbs.	$ 16.50

AUTO-LUBRICATING TYPE

Code Word	Number	Size	Weight	List
Amid	780	8"x1" with shackle	19 lbs.	$ 16.50
Rimer	780-2	8"x1¾" with swivel	30 lbs.	25.00
Riot	780-2	8"x1¾" with plain shackle	23 lbs.	17.50

Washington Loading Jacks and Loading Shoes

Fig. 189

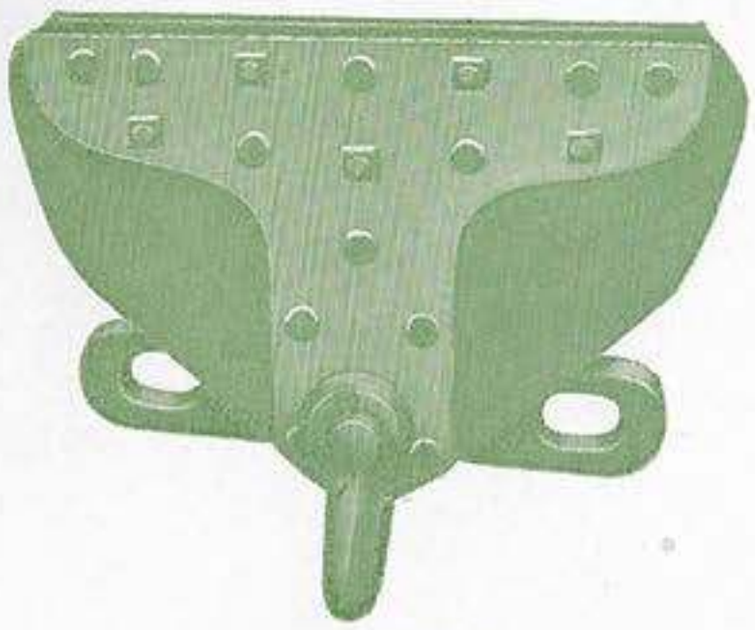


Fig. 189-B

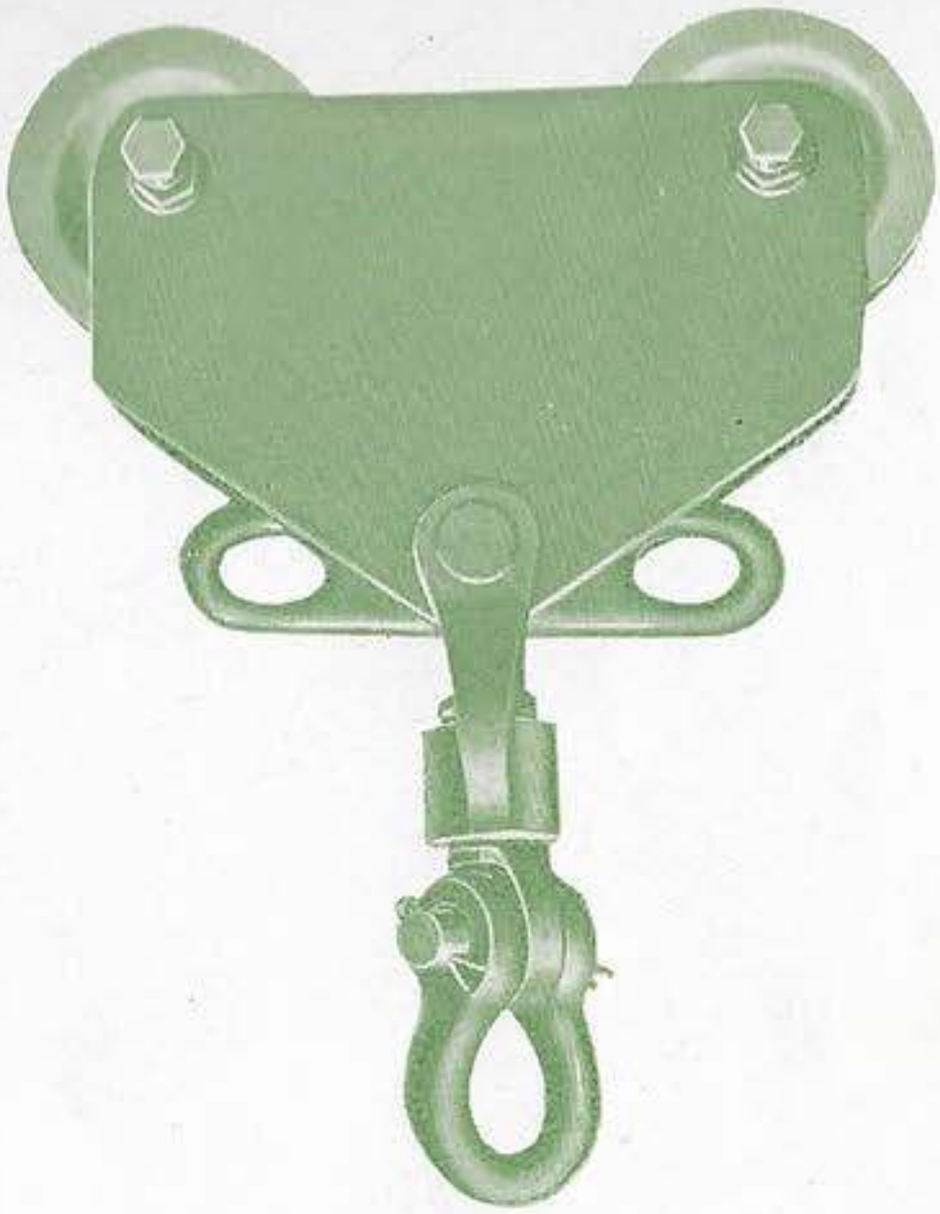


Fig. 189-A

Fig. 189 and 189-A are improved types for guy line loading. Jacks can be furnished with plain or swivel shackles and are made up with heavy steel plate sides with 10″ bronze bushed sheaves.

Loading Shoe 189-B is fitted with iron bark shoe instead of sheaves, which sometimes crystallize guy lines. Note steel eye bar.

PLAIN SHACKLE TYPE

Code Word	Number	Weight	List
Navvy	189	202 lbs.	$75.00
Phlox	189-B	165 lbs.	65.00

SWIVEL SHACKLE TYPE

Code Word	Number	Weight	List
Nawab	189-A	242 lbs.	$100.00
Phyle	189-B	205 lbs.	90.00

Washington Loading Blocks

AUTO-LUBRICATING TYPE

No. 3140

These Auto-Lubricating Blocks give a maximum of satisfaction with the minimum of attention.

Sides are of annealed open hearth steel and the sheaves are heat-treated Manganese Steel.

To obtain further mechanical perfection, sheave bore is ground on our special machine, true and central to rim and guaranteed to be accurate within .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service.

No. 3140

Specially designed spiral oil grooves.

Blocks are made with 14″ and 18″ sheaves, and are furnished with either plain shackles or swivel and crosshead.

PRICES

Code Word	Number	Size		Manganese Steel Sheave Weight Pl. Sh.	Manganese Steel Sheave Weight Swivel	Manganese Steel Sheave List Pl. Sh.	Manganese Steel Sheave List Swivel
Grasp	3140-B	14x2	Sheave	128	145	$ 67.50	$ 87.50
Gravy	3180-B	18x2	Sheave	145	182	90.00	110.00
Graze	18	18x3¼	Sheave (Extra heavy)	355	370	125.00	150.00

NOTE: Both pins and bushings in Blocks 3140-B and 3180-B are interchangeable.

Washington Loading Blocks

ROLLER BEARING TYPE

Features

Extra large Timken Bearings.

Hub of sheave does not come in contact with block side, hence there is no end wear on hub of sheave.

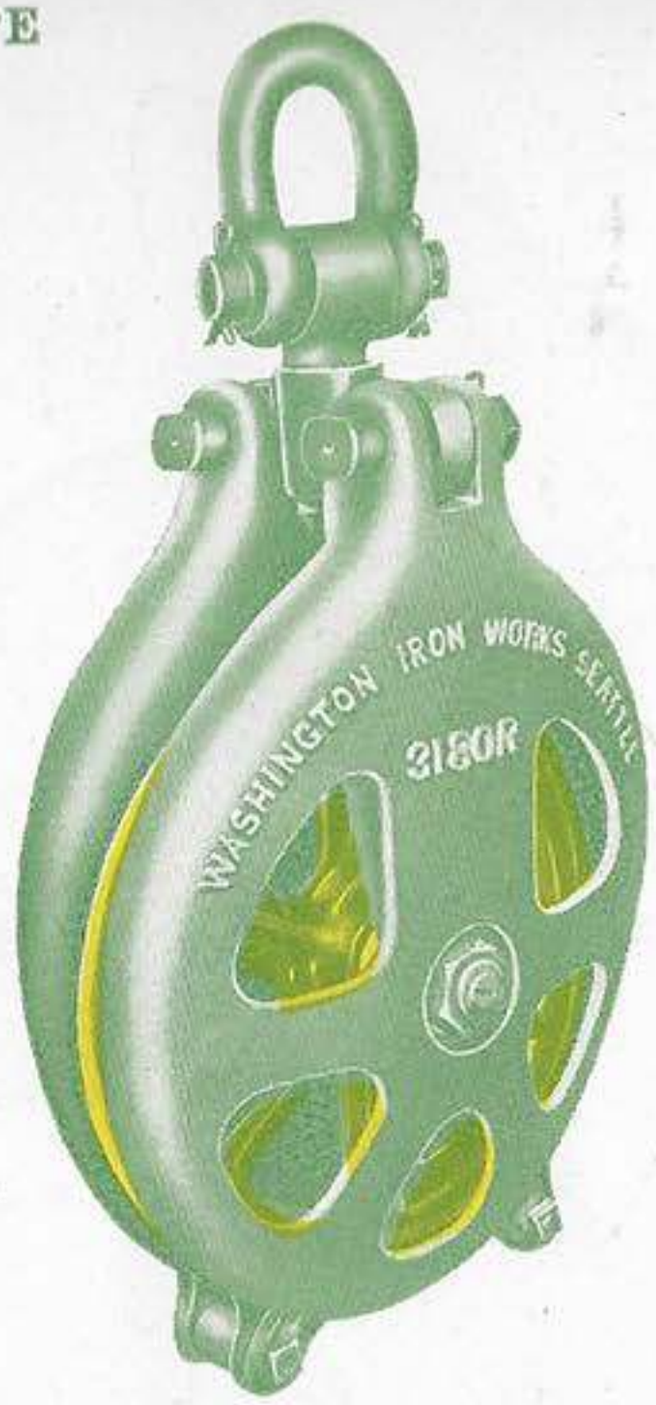
Block operates equally well in any position.

Large alloy steel pins.

No. 3140-R

Pin design prevents leakage of grease and makes bearing dust-proof.

With proper adjustment and lubrication, which is only necessary at long periods, maintenance expense of this block is almost negligible.



No. 3180-R

To obtain further mechanical perfection, sheave bore is ground on our special machine true and central to rim and guaranteed to be accurate within .001 inch.

Heat-treated Open Hearth Electric steel is used in block sides.

PLAIN SHACKLE TYPE

Code Word	Number	Size		Weight	List
Gird	3140-R	14x2½	Manganese Steel Sheave	157 lbs.	$110.00
Glare	3180-R	18x2	Manganese Steel Sheave	210 lbs.	155.00

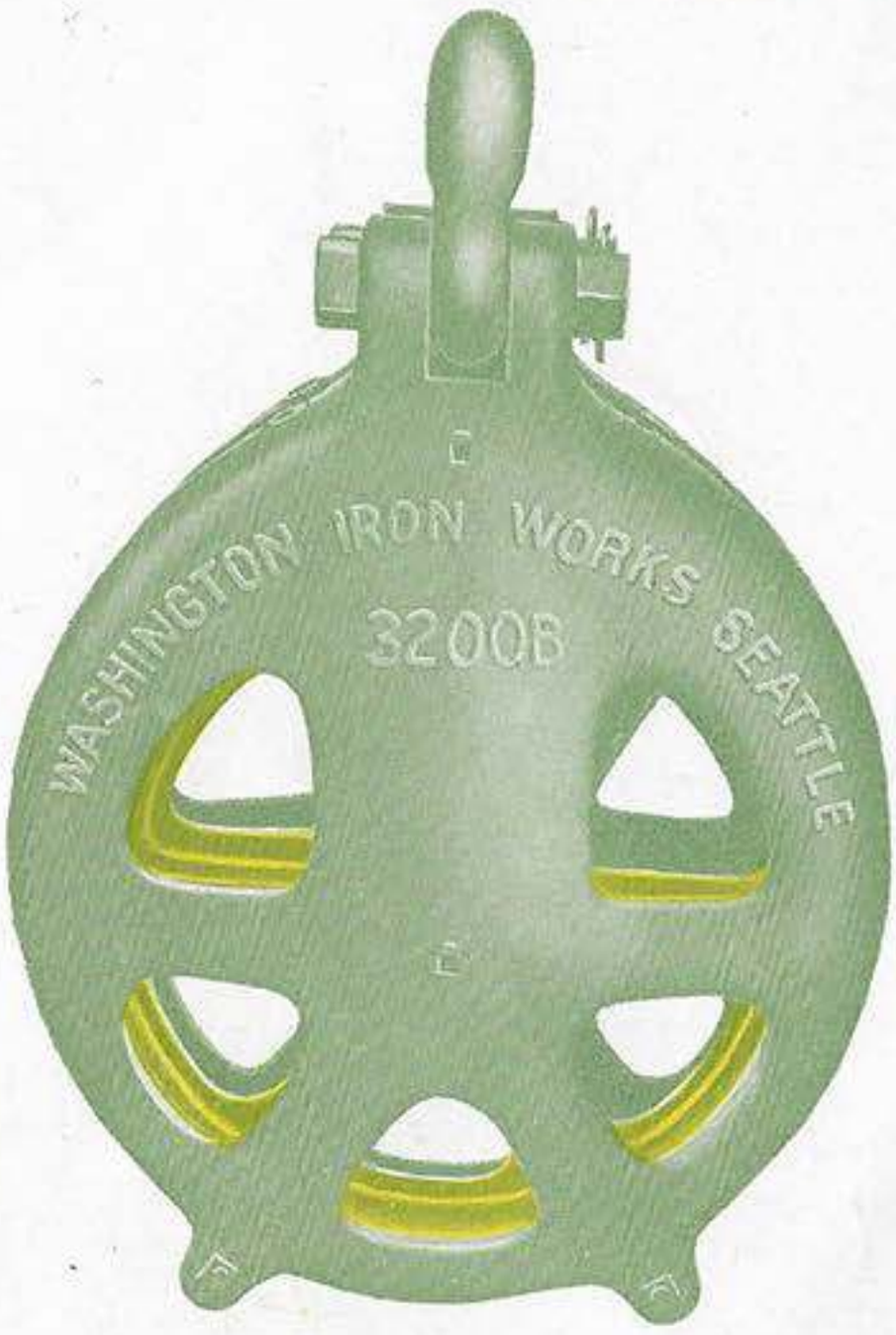
SWIVEL CROSSHEAD TYPE

Code Word	Number	Size		Weight	List
Gleam	3140-R	14x2½	Manganese Steel Sheave	174 lbs.	$130.00
Glebe	3180-R	18x2	Manganese Steel Sheave	224 lbs.	175.00

NOTE: Roller bearings in both the above sizes of blocks are interchangeable.

Washington Loading Blocks

AUTO-LUBRICATING TYPE



No. 3200 B

This block is built especially for the heaviest loading service.

Large pin and bearing and strong construction.

To obtain further mechanical perfection, sheave bore is ground on our special machine, true and central to rim and guaranteed to be accurate within .001 inch.

Block sides are of heat-treated Open Hearth Electric steel, and bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

Note strong top construction; also two bottom spreader lugs.

No. 3200-B

PRICES

PLAIN SHACKLE TYPE

Code Word	Number	Size		Weight	List
Risen	3200-B	20x2½	Manganese Steel Sheave	295 lbs.	$130.00

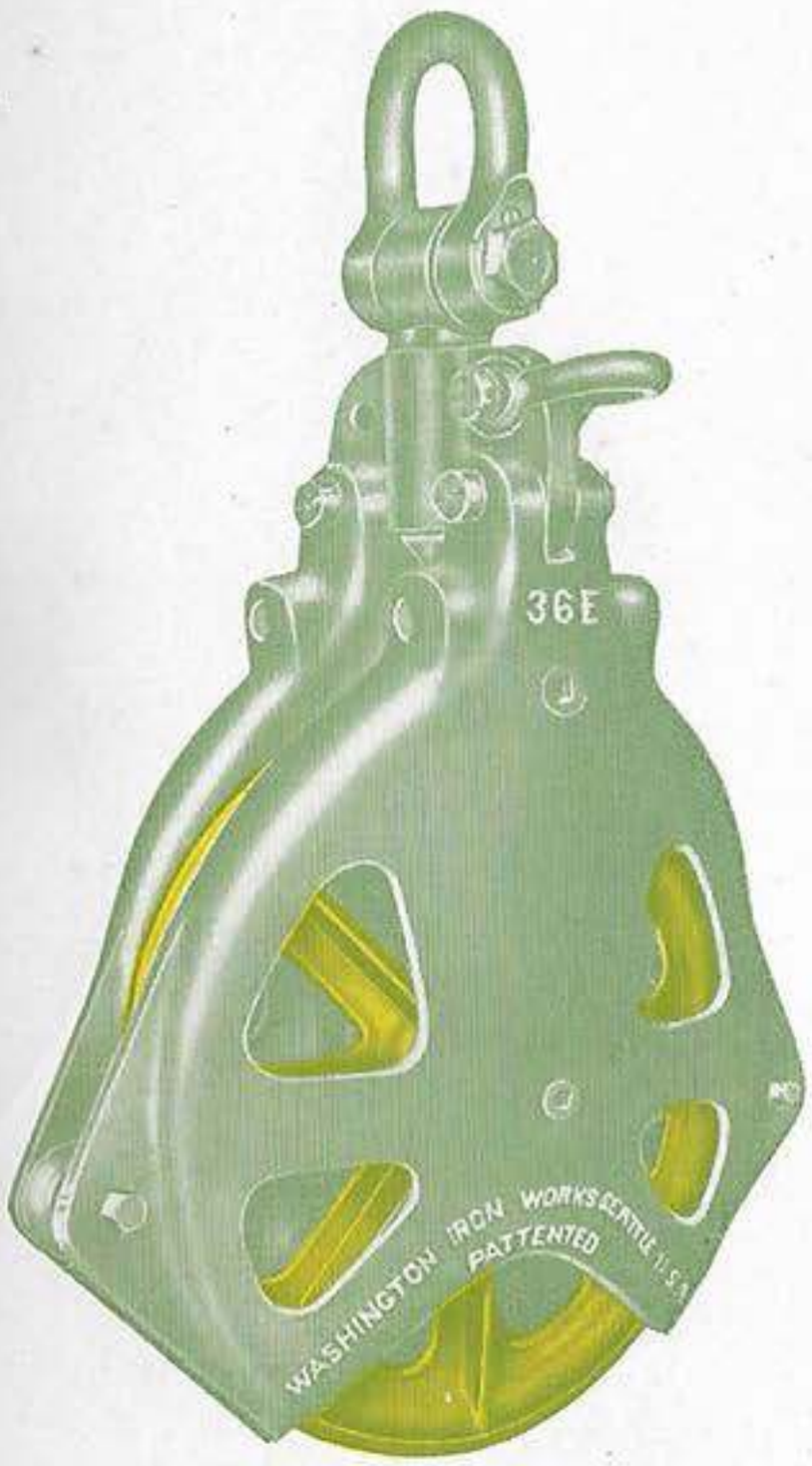
SWIVEL CROSSHEAD TYPE

Code Word	Number	Size		Weight	List
Rival	3200-B	20x2½	Manganese Steel Sheave	315 lbs.	$155.00

Washington Special Tail End Trip Line Block

(Patented)

AUTO-LUBRICATING TYPE



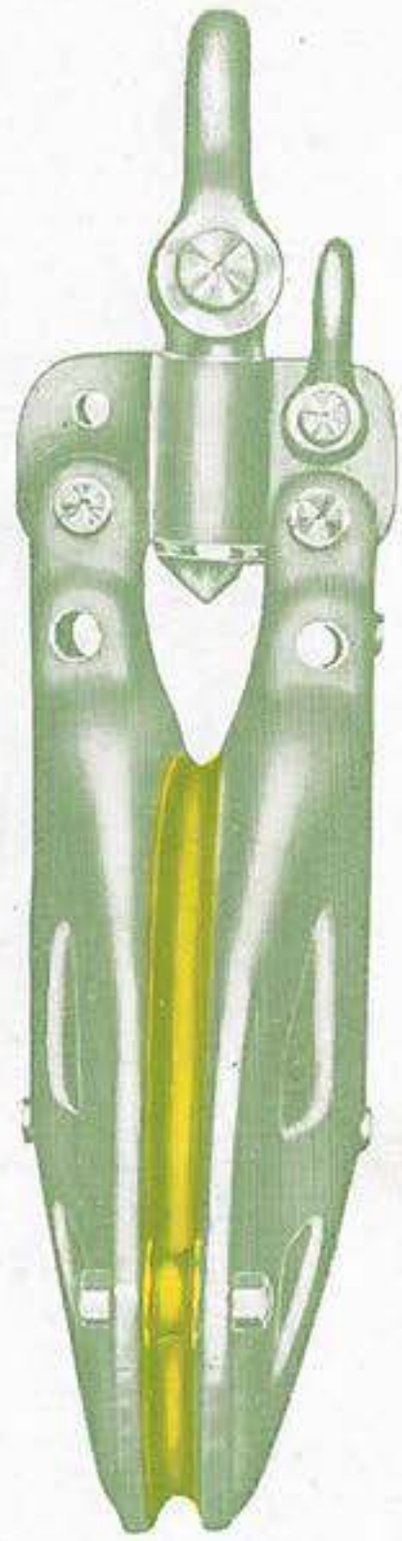
No. 36E

A Special Tail End Trip Line Block with extra side shackle and rollers for keeping line in groove. Specially adapted for double skyline operations or for very severe Trip Line service where it is desirable that there should be no chance of line getting out of groove when lots of slack is dropped.

Extra large oil chambers are enclosed in the smooth sides.

Sides are interchangeable and made of heat-treated Electric Open Hearth Steel.

Pins and bearings are extra large, turned from forged high carbon steel.



No. 36E

All bushings are of our special non-heating bronze, successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

PRICES

SWIVEL SHACKLE TYPE

Code Word	Number	Size		Weight	List
Bliss	36E	36x3	Manganese Steel Sheave	1350	$425.00
Bedge	36ER	36x3	Manganese Steel Sheave (Roller bearing type)	1575	$665.00

Note: Block 36 ER is a Roller Bearing Block, equipped with latest and heaviest type of Hyatt Multiple Roller Bearings, used in connection with improved pin design.

Washington Trip Line Head Blocks

ROLLER BEARING TYPE

No. 2180-R

These roller bearing blocks are built and guaranteed for the severe requirements of head and tail trip line blocks for high speed logging operations.

FEATURES

Extra large Timken Bearings.

Hub of sheave does not come in contact with block side, hence there is no end wear on hub of sheave.

Block operates equally well in any position.

Large alloy steel pins.

No. 2240-R

Pin design prevents leakage of grease and makes bearing dust-proof.

With proper adjustment and lubrication, which is only necessary at long periods, maintenance expense of this block is almost negligible.

To obtain further mechanical perfection, sheave bore is ground on our special machine, true and central to rim and guaranteed to be accurate within .001 inch.

Heat-treated Open Hearth Electric Steel is used in block sides.

PRICES

PLAIN SHACKLE TYPE

Code Word	Number	Size		Weight	List
Gable	2180-R	18x2	Manganese Steel Sheave	191 lbs.	$150.00
Galop	2240-R	24x2	Manganese Steel Sheave	385 lbs.	225.00
Garter	2360-R	36x2½	Manganese Steel Sheave	830 lbs.	350.00

SWIVEL CROSSHEAD TYPE

Gauze	2180-R	18x2	Manganese Steel Sheave	205 lbs.	$175.00
Ghost	2240-R	24x2	Manganese Steel Sheave	400 lbs.	250.00
Globe	2360-R	36x2½	Manganese Steel Sheave	850 lbs.	390.00

Washington Trip Line Head Blocks

No. 2240

AUTO-LUBRICATING TYPE

These auto-lubricating blocks are built for the severe requirements of head and tail end trip line blocks in high speed logging operations.

Sides are interchangeable and made of heat-treated Electric Open Hearth steel.

Pins and bearings extra large.

To obtain further mechanical perfection, sheave bore is ground on our special machine, true and central to rim and guaranteed to be accurate within .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

PRICES

PLAIN SHACKLE TYPE

Code Word	Number	Size		Weight	List
Amber	2180-B	18x2	Manganese Steel Sheave.....	195 lbs.	$110.00
Amaze	2240	24x2	Manganese Steel Sheave.....	290 lbs.	135.00
Amass	2360	36x2½	Manganese Steel Sheave.....	575 lbs.	250.00

SWIVEL CROSSHEAD TYPE

Bison	2180-B	18x2	Manganese Steel Sheave.....	220 lbs.	$130.00
Besot	2240	24x2	Manganese Steel Sheave.....	315 lbs.	160.00
Black	2360	36x2½	Manganese Steel Sheave.....	600 lbs.	290.00

NOTE: Both pins and bushings in Blocks 2180-B and 2240 are interchangeable.

Washington Trip Line Blocks

No. 2120-R

ROLLER BEARING TYPE

A perfected Roller Bearing Trip Line Block which we guarantee to meet the severe service and high speed requirements of up-to-date logging operations.

FEATURES

Extra large Timken Bearings.

Hub of sheave does not come in contact with block side, hence there is no end wear on hub of sheave.

Block operates equally well in any position.

Pin design prevents leakage of grease and makes bearing dust-proof.

With proper adjustment and lubrication, which is only necessary at long periods, maintenance expense of this block is almost negligible.

To obtain further mechanical perfection, sheave bore is ground on our special machine, true and central to rim and guaranteed to be accurate within .001 inch.

Heat-treated Open Hearth Electric steel is used in block sides.

PRICES

Code Word	Number	Size		Weight	List
Blank	2120-R	12x2½	Manganese Steel Sheave.....	96 lbs.	$ 65.00
Blare	2140-R	14x2½	Manganese Steel Sheave.....	118 lbs.	80.00

Note—Roller Bearings in both of the above size blocks are interchangeable.

The above blocks can be furnished with swivel and crosshead at extra cost.

Washington Trip Line Blocks

No. 120

AUTO-LUBRICATING TYPE

An auto-lubricating block of sturdy construction.

FEATURES

Sides are interchangeable and made of carefully annealed Electric Open Hearth steel.

Bearings extra large.

To obtain further mechanical perfection, Manganese Steel Sheave bore is ground on our special machine, true and central to rim with an accuracy of .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

PRICES

Code Word	No.	Size		Weight Lbs.	List
Minor	100	10x1½	Manganese Steel Sheave..	58	$32.50
Mirky	2100	10x2½	Manganese Steel Sheave..	65	37.50
Mirza	120	12x1½	Manganese Steel Sheave..	70	37.50
Miser	2120	12x2½	Manganese Steel Sheave..	82	43.50
Mizzy	140	14x1½	Manganese Steel Sheave..	100	50.00
Myth	2140	14x2½	Manganese Steel Sheave..	114	57.50

Trip line blocks with sheave 2½" wide can be furnished with swivel and cross head at extra cost.

No. 2100

Washington Trip Line Blocks

No. 12

GREASE CUP TYPE

These blocks are made with 10″, 12″ and 14″ diameter, Manganese steel sheaves in both the wide and narrow type, the narrow type of blocks having sheaves 1½″ thick at the rim and the wide type of blocks having sheaves 2½″ thick at the rim, which permits swivel and hook of straw line to pass through without necessity of stopping to unhook.

Sides are interchangeable and made of annealed Electric Open Hearth steel.

Pins and Bearings are extra large.

No. 212

To obtain further mechanical perfection, sheave bore is ground on our special grinding machine, true and central to rim and guaranteed to be accurate within .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

PRICES

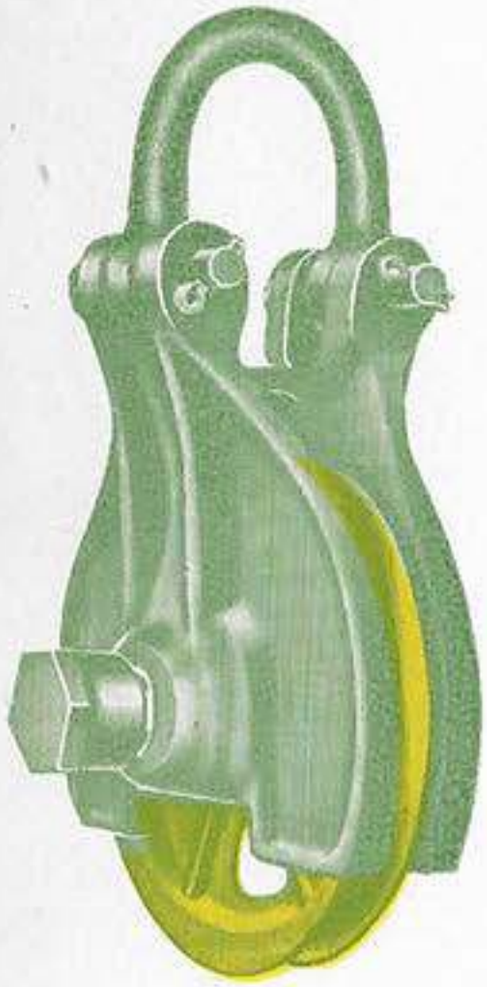
Code Word	Number	Size		Weight	List
Jaina	21	10x1½	Manganese Steel Sheave	55 lbs.	$ 25.00
Jalap	210	10x2½	Manganese Steel Sheave	65 lbs.	30.00
Janiu	12	12x1½	Manganese Steel Sheave	62 lbs.	31.50
Janus	212	12x2½	Manganese Steel Sheave	77 lbs.	37.50
Japer	14	14x1½	Manganese Steel Sheave	85 lbs.	45.00
Jolif	214	14x2½	Manganese Steel Sheave	99 lbs.	52.50

Note. Trip Line Blocks with sheaves 2½″ wide can be furnished with swivel and crosshead at extra cost.

Washington Trip Line Blocks

For 5/8 and 3/16-inch Trip Line

Medium Service



No. 8

FEATURES

Simplicity, fewer parts; line guard prevents line from fouling; sides are interchangeable; rope cannot foul in block; there are no nuts to become loose; pins absolutely cannot work loose and permit the rope to foul.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

Sheave bore ground true and central to rim and guaranteed to an accuracy of .001 inch.

PRICES

Code Word	Number	Size		Weight	List
Ephod	8	8x1	Manganese Steel Sheave	26 lbs.	$17.00
Erupt	10	10x1	Manganese Steel Sheave	35 lbs.	20.00

NOTE: Both pins and bushings in Blocks No. 8 and 10 are interchangeable.

Washington Special Trip Line Blocks

AUTO-LUBRICATING TYPE

No. 2180D

A Special Trip Line Block of auto-lubricating type with extended oil reservoir, specially designed for use where pull on block is upward. It will be noted that this block is automatically lubricated in any position.

Pins and bearings extra large.

To obtain further mechanical perfection, sheave bore is ground on our special machine, true and central to rim and guaranteed to be accurate within .001 inch.

Bushings are of our special non-heating bronze, successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

PRICES

PLAIN SHACKLE TYPE

	Number	Size		Weight	List
Beeve	2180D	18x2	Manganese Steel Sheave	265	$135.00

SWIVEL CROSSHEAD TYPE

Befit	2180D	18x2	Manganese Steel Sheave	290	$155.00

Washington Yarding or Moving Block

No. 816

Extra Heavy Service

A block of new design with improved pin construction.

Built and guaranteed for the severest service.

Sides are interchangeable and made of heat-treated Electric Open Hearth steel.

Pin and bearings extra large.

To obtain further mechanical perfection, sheave bore is ground on our special machine, true and central to rim and guaranteed to be accurate within .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

PRICES

Code Word	Number	Size		Weight	List
Bleat	816	16x3½	Manganese Steel Sheave	310 lbs.	$150.00

Washington Yarding or Moving Block

No. 816

Extra Heavy Service

A block of new design with improved pin construction.

Built and guaranteed for the severest service.

Sides are interchangeable and made of heat-treated Electric Open Hearth steel.

Pin and bearings extra large.

To obtain further mechanical perfection, sheave bore is ground on our special machine, true and central to rim and guaranteed to be accurate within .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

PRICES

Code Word	Number	Size		Weight	List
Bloat	816	16x3½	Manganese Steel Sheave	310 lbs.	$150.00

Washington Moving or Yarding Block

AUTO-LUBRICATING AND GREASE CUP TYPES

No. 4120-B

Heavy Service

Built and guaranteed for the severest service!

Sides are made of heat-treated Open Hearth steel and are interchangeable.

Pins and bearings extra large.

To obtain further mechanical perfection, sheave bore is ground on our special machine, true and central to rim and guaranteed to be accurate within .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

PRICES

AUTO-LUBRICATING TYPE

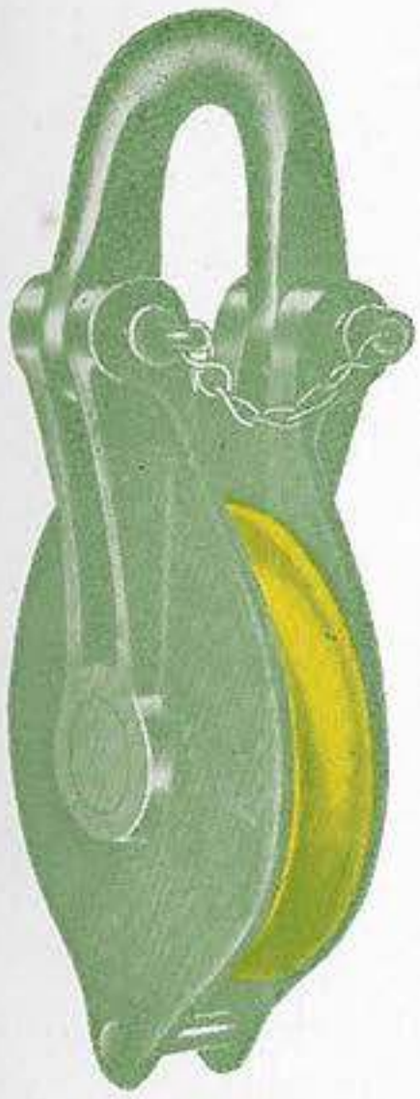
Code Word	Number	Size		Weight	List
Exalt	4120-B	12x2½	Manganese Steel Sheave	185 lbs.	$85.00
Excel	4140	14x3	Manganese Steel Sheave	225 lbs.	95.00

GREASE CUP TYPE

Exert	412	12x2½	Manganese Steel Sheave	180 lbs.	$75.00
Exile	414	14x3	Manganese Steel Sheave	217 lbs.	85.00

Washington Moving or Yarding Block

MEDIUM SERVICE

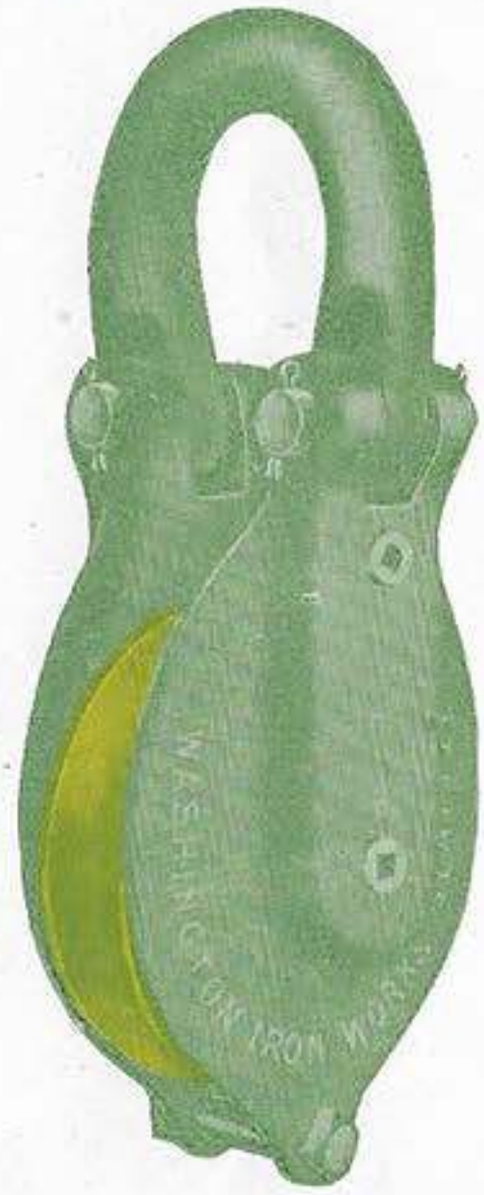


No. 880

Medium service Moving or Yarding Blocks made in both auto-lubricating and plain types.

Sides are made of heat-treated Open Hearth steel and are interchangeable.

Pins and bearings extra large.



No. 8110

To obtain further mechanical perfection, sheave bore is ground on our special machine, true and central to rim and guaranteed to be accurate within .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

PRICES

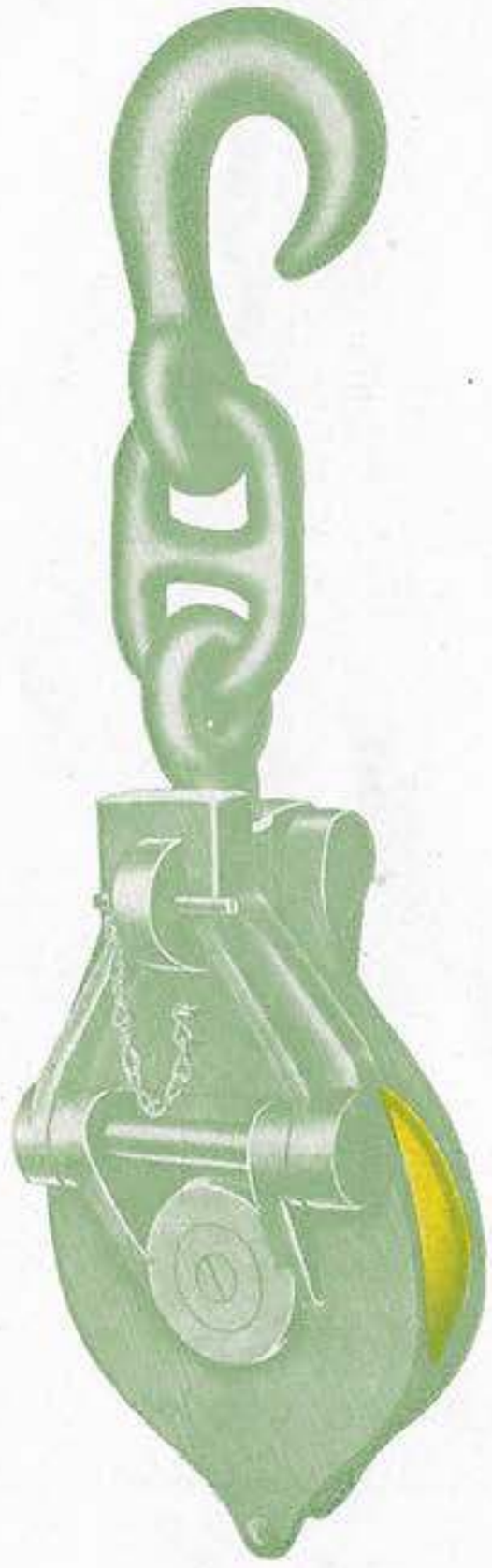
AUTO-LUBRICATING TYPE

Code Word	Number	Size		Weight	List
Newel	8110	10x2¼	Manganese Steel Sheave	90 lbs.	$55.00
Nexus	8120	12x2½	Manganese Steel Sheave	155 lbs.	80.00

PLAIN TYPE

Code Word	Number	Size		Weight	List
Cater	880	8x2	Manganese Steel Sheave	55 lbs.	$35.00
Cavil	810	10x2¼	Manganese Steel Sheave	80 lbs.	45.00
Clerk	812	12x2½	Manganese Steel Sheave	120 lbs.	60.00

Washington Latch Side Yarding Blocks



No. 88

Medium Service

FEATURES

Simplicity, fewer parts. Block trips with very little slack. Rope cannot foul in block. There are no nuts on pin to become loose and make block awkward to carry in woods. Pins absolutely cannot become loose and permit rope to foul. 8-inch blocks have pins 2½ inches diameter. 10-inch blocks have pins 3 inches diameter. Sheaves have extra long bronze bushed bearings.

To obtain further mechanical perfection, sheave bore is ground on our special machine, true and central to rim and guaranteed to be accurate within .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service.

Specially designed spiral oil grooves.

PRICES

Code Word	Number	Size		Weight	List
Giddy	88	8x2	Manganese Steel Sheave	67 lbs.	$45.00
Gild	81	10x2¼	Manganese Steel Sheave	105 lbs.	55.00
Gimp	82	12x2½	Manganese Steel Sheave	155 lbs.	70.00

Washington Team Yarding Blocks

No. 77

No. 77

These blocks are especially designed for team work or light logging and stump pulling. Sides are made of Electric Open-Hearth steel and Sheaves are made of Manganese steel, Bronze Bushed. Made in two sizes.

To obtain further mechanical perfection, sheave bore is ground on our special grinding machine, true and central to rim, and guaranteed to be accurate within .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil groove.

PRICES

Code Word	Number	Size		Weight	List
Eaves	76	6x1¾	Manganese Steel Sheave.....	34 lbs.	$26.00
Eblis	77	7x1¾	Manganese Steel Sheave.....	40 lbs.	27.00

Little Washington Butt Chain Blocks

No. 9410

AUTO-LUBRICATING TYPE

This block is recommended for light work where frequent changes are necessary.

Sides are made of heat-treated Open Hearth Electric Steel and are interchangeable.

To obtain further mechanical perfection, sheave bore is ground on our special grinding machine, true and central to rim and guaranteed accurate within .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed oil grooves.

PRICES

Code Word	Number	Size		Weight	List
Davit	9410	10x4	Manganese Steel Sheave	130 lbs.	$80.00
Roric	931	10x3	Manganese Steel Sheave	115 lbs.	70.00

Washington Special Main Lead Blocks

Heavy Service

No. 2480

AUTO-LUBRICATING TYPE

Built and guaranteed for the severest service.

Both sides have an oil reservoir, are interchangeable and made of Electric Open-Hearth Steel.

Forged high carbon steel pins. Bearings extra large.

To obtain further mechanical perfection, Manganese Steel Sheave bore is ground on our special machine, true and central to rim with an accuracy of .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

PRICES

AUTO-LUBRICATING TYPE

Code Word	Number	Size		Weight	List
Nerve	1690	16x 9	Manganese Steel Sheave	490 lbs.	$180.00
Nenia	2090	20x 9	Manganese Steel Sheave	690 lbs.	270.00
Nazar	2480	24x 8	Manganese Steel Sheave	915 lbs.	310.00
Neigh	241	24x10	Manganese Steel Sheave	1020 lbs.	360.00

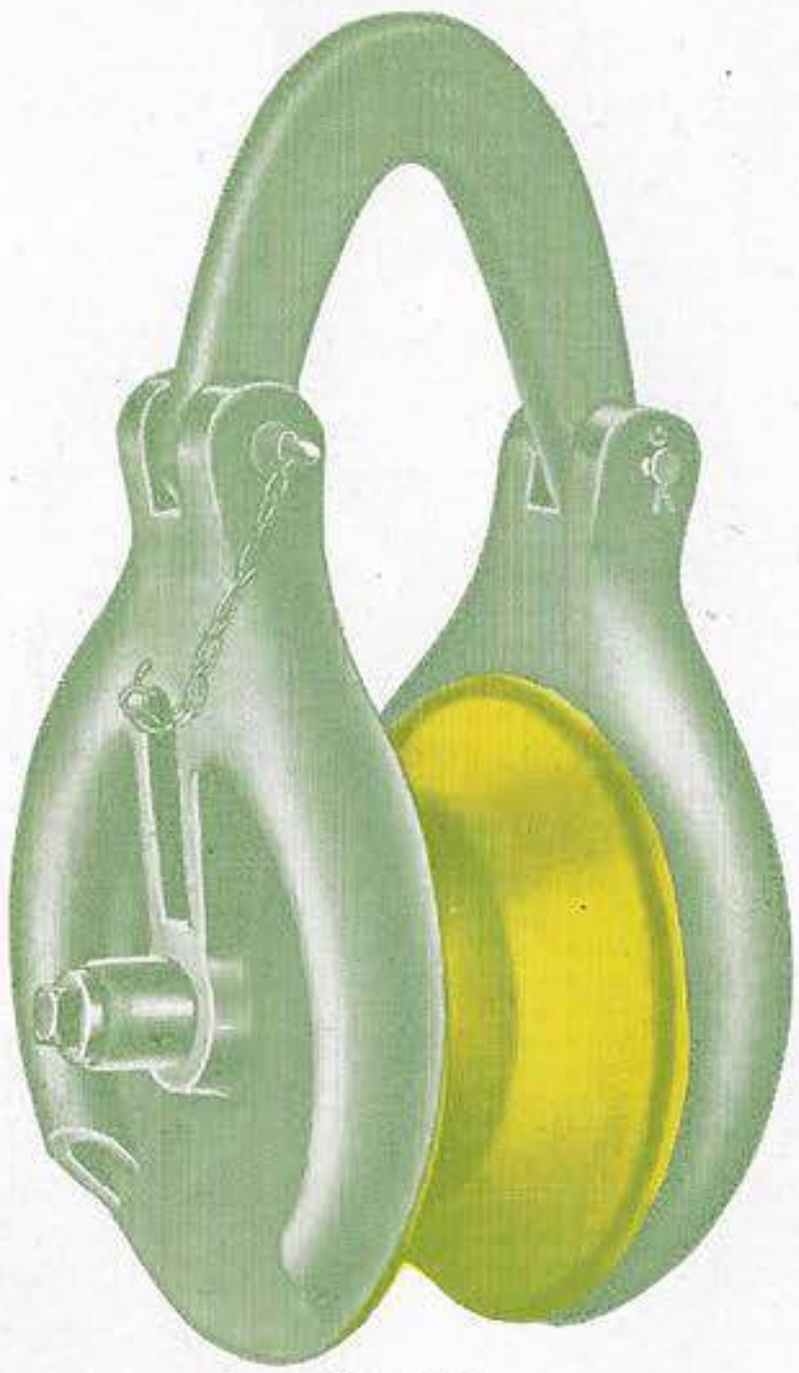
GREASE CUP TYPE

Code Word	Number	Size		Weight	List
Lotus	248	24x 8	Manganese Steel Sheave	860 lbs.	$275.00
Lowly	2410	24x10	Manganese Steel Sheave	935 lbs.	315.00

Washington Main Lead Blocks

(Patented)

GREASE CUP TYPE



No. 148

Medium Service

The special feature of this block is the patented side with full rolled edge, preventing the hooks from catching on the sides, which, in the ordinary type of block, destroys the rigging and causes serious delays in yarding. Also, owing to this rolled edge, the shell of block cannot be bent by catching on log or stump which supports it.

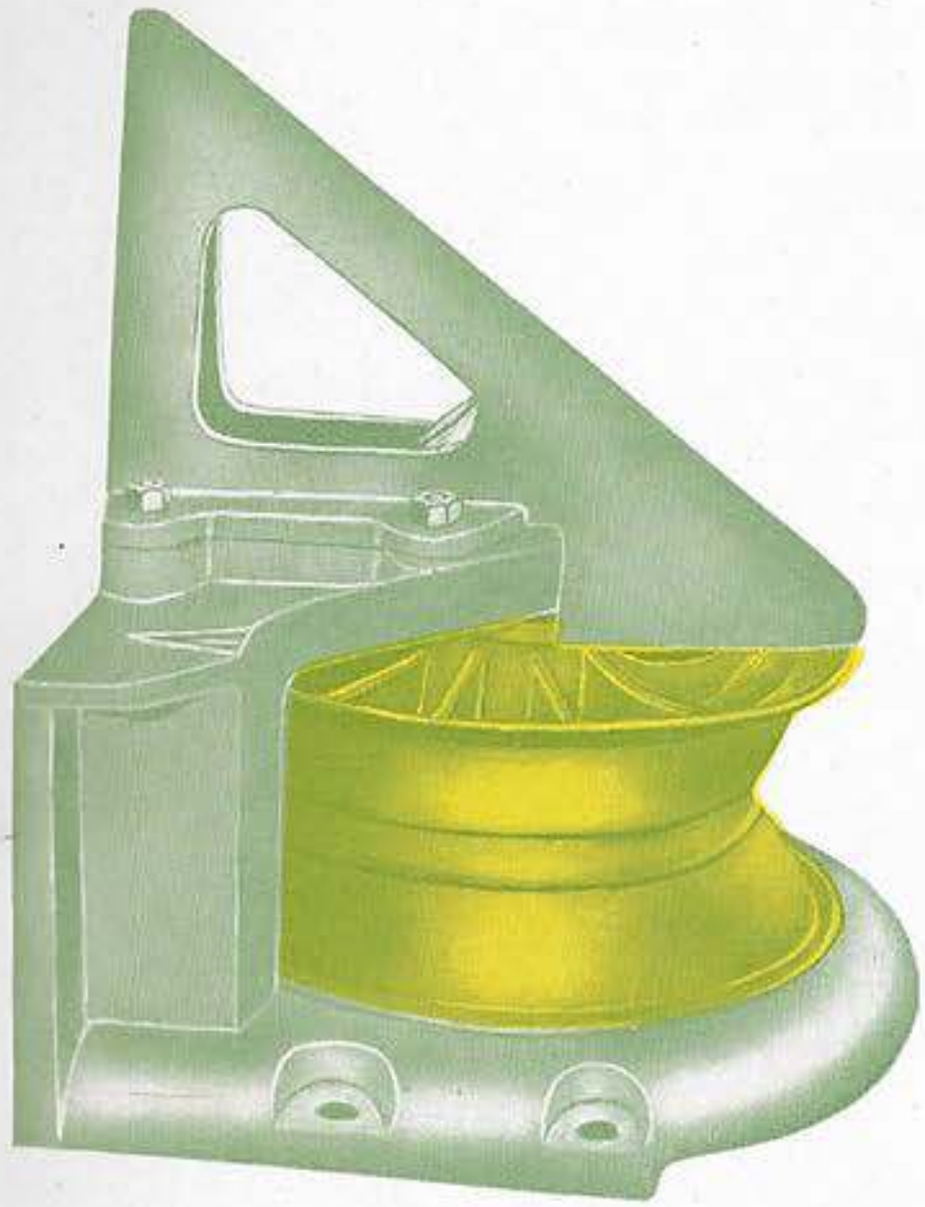
To obtain further mechanical perfection, sheave bore is ground on our special grinding machine, true and central to rim and guaranteed to an accuracy of .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

PRICES

Code Word	Number	Size		Weight	List
Cache	148	14x8	Manganese Steel Sheave	310 lbs.	$115.00
Broma	169	16x9	Manganese Steel Sheave	375 lbs.	150.00
Bruin	188	18x8	Manganese Steel Sheave	425 lbs.	150.00

Washington Road and Yarding Spool



No. 362

This improved spool not only takes the place of the old type line or road roller, but is being used with great success in place of main lead block in ground yarding operations, thereby saving a great deal of time lost in yarding by stopping to unhook lines at the lead block.

To obtain further mechanical perfection, sheave bore is ground on our special machine, true and central to rim and guaranteed to be accurate within .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

Base is made of Electric Open Hearth steel.

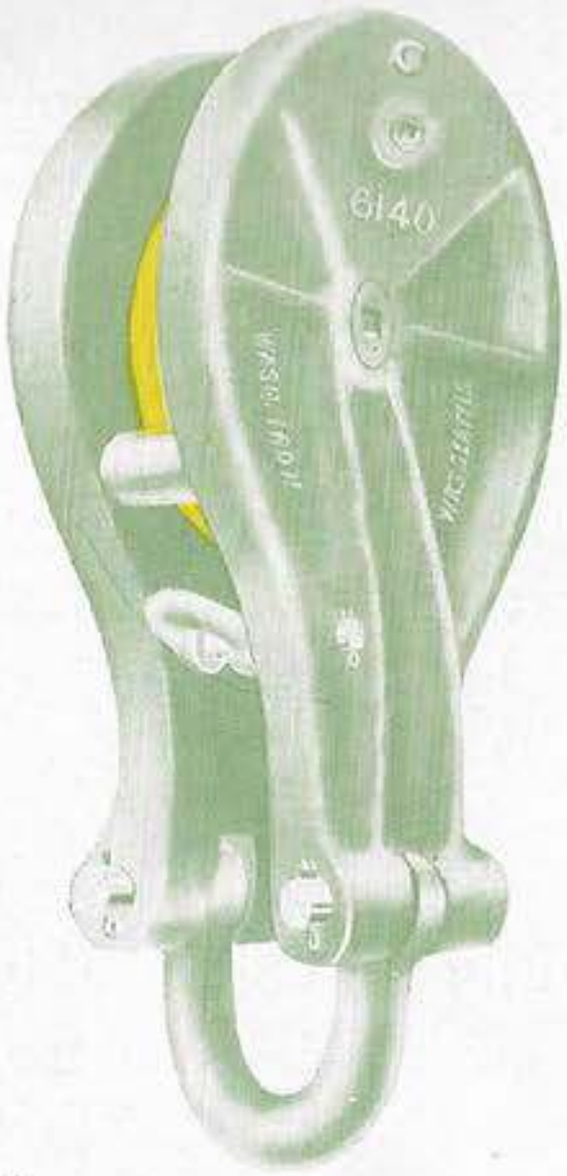
Oil chambers provided in shaft.

PRICE

Code Word	Number	Size		Weight	List
Dizzy	362	8x18	Manganese Steel Sheave	327 lbs.	$135.00

Washington Carriage Fall Blocks

AUTO-LUBRICATING TYPE



No. 6140-B

Heavy Pattern

Built for the most severe service.

This Block is adapted for use with Carriages shown on pages 39 and 41.

Sides are made of annealed Electric Open Hearth Steel and are interchangeable.

To obtain further mechanical perfection, Manganese Steel Sheave bore is ground on our special grinding machine, true and central to rim and guaranteed to be accurate within .001 inch.

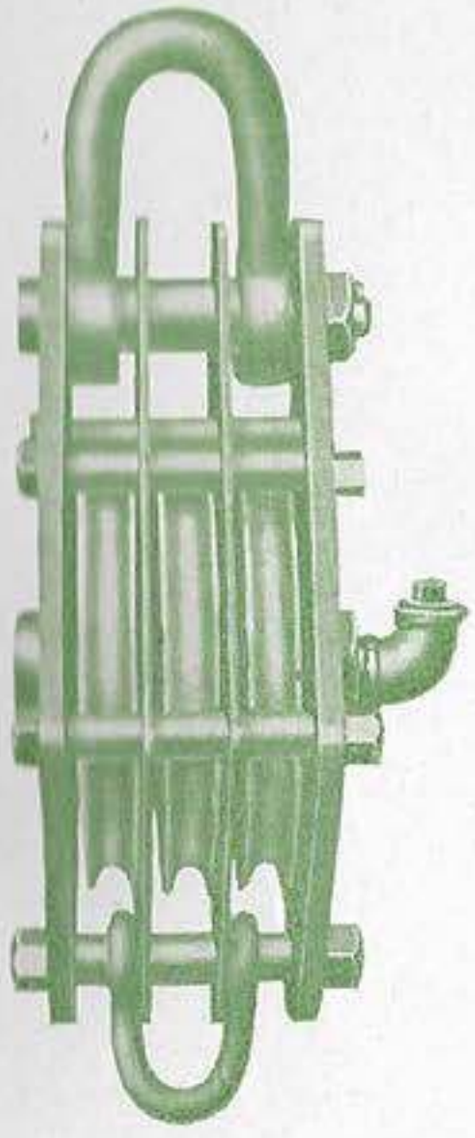
Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging service. Specially designed spiral oil grooves.

PRICES

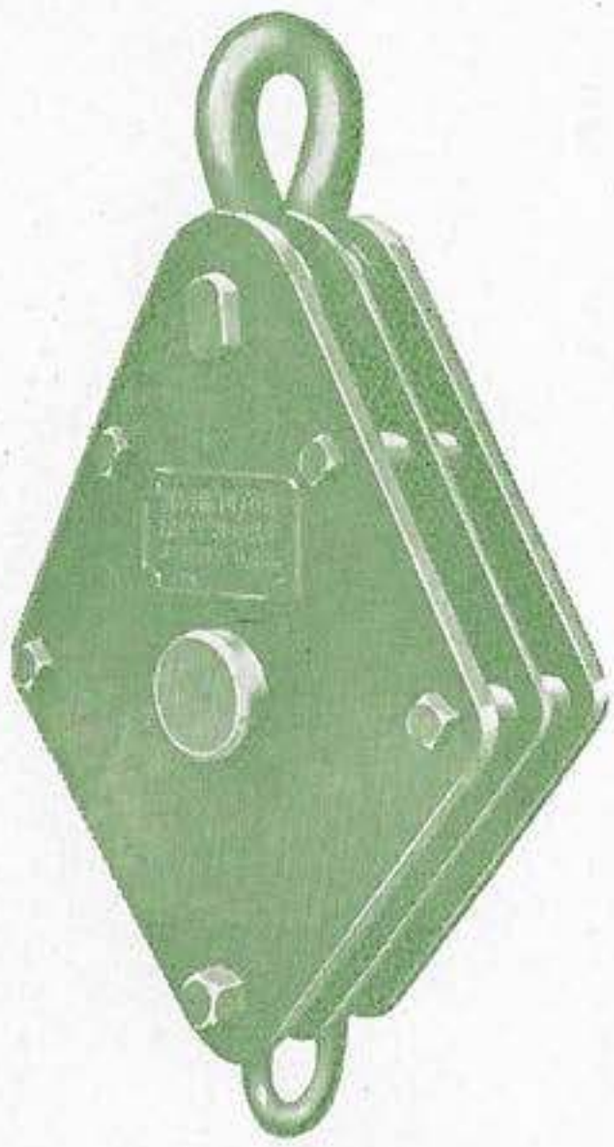
Code Word	Number	Size		Weight	List
Ducat	6140-B	14x3	Manganese Steel Sheave	455 lbs.	$165.00
Druid	6180	18x3	Manganese Steel Sheave	655 lbs.	210.00

Washington Skyline Tightening Blocks

Especially Designed for Overhead Logging Systems



No. 143A



No. 142A

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

FOR LIGHT SERVICE—5/8" DIA. LINE

Code Word	Number	Size		Weight	List
Odeon	141	14"	Single Sheave	149 lbs.	$ 90.00
Odize	142	14"	Two-sheave	205 lbs.	110.00
Adyml	143	14"	Three-sheave	280 lbs.	130.00
Eagle	144	14"	Four-sheave	335 lbs.	150.00
Early	145	14"	Five-sheave	390 lbs.	170.00

FOR MEDIUM SERVICE—3/4" DIA. LINE

Code Word	Number	Size		Weight	List
Earth	142-A	14"	Two-sheave	295 lbs.	$115.00
Egert	143-A	14"	Three-sheave	375 lbs.	140.00
Erase	144-A	14"	Four-sheave	455 lbs.	165.00
Error	145-A	14"	Five-sheave	535 lbs.	190.00

FOR HEAVY SERVICE—1" DIA. LINE

Code Word	Number	Size		Weight	List
Erapt	142-B	14"	Two-sheave	310 lbs.	$125.00
Estop	143-B	14"	Three-sheave	395 lbs.	153.00
Event	144-B	14"	Four-sheave	480 lbs.	180.00
Ewact	145-B	14"	Five-sheave	565 lbs.	208.00

Washington Tree Shoe

Fig. 224

For supporting overhead lines at head and tail trees

Made of heavy steel plate reinforced, with hard iron bark wood shoe.

PRICES

Code Word	Size	Weight	List
Rally	60″	1075 lbs.	$285.00
Dunce	48″	450 lbs.	140.00
Ramie	36″	305 lbs.	110.00
Rashl	24″	180 lbs.	85.00

Note—In ordering give size of overhead line.

Washington Tree Jack

Fig. 341

Fig. 342

Where it is necessary to frequently lower tight line tree jacks are sometimes desired for supporting skyline at the head spar tree.

Our tree jacks are made of heavy steel plate, reinforced and equipped with genuine Manganese bronze bushed sheaves.

PRICES

Code Word	Length	Size	Sheaves	Weight	List
Twine	55″	8″x3½″	(5) Manganese Steel Sheaves.....	790 lbs.	$325.00
Tweed	31″	8″x5″	(3) Manganese Steel Sheaves.....	225 lbs.	120.00

Roller Bearing Single Sheave Carriage

No. 20-28

This Carriage is of sturdy design, built to stand rough use continuously. The load is carried through a single 28" dia. Manganese Steel, Hyatt Multiple Roller Bearing Sheave. Sheave bore ground to accuracy of .001 inch on our special machine.

The lower sheave is Manganese Steel 14" dia., bushed with our special non-heating bronze and ground true. Specially designed spiral oil grooves.

Sides of Open Hearth Electric Steel, annealed.

Strongly lugged for stiffness.

Extra large pin of alloy steel.

Oil reservoirs for lubricating track cable, cast into carriage sides.

Main pin ends in grease chambers under cover plates shown in cuts.

Guide roller prevents carriage from jumping.

Note entire protection of working parts.

Uses: Carriage adapted to both slack line and tight line skyline systems, as per sketches on pages 43 and 39.

PRICES

Code Word	Number	Size	Weight	List
Alum	20-28	28" Manganese Steel Sheave	2230 lbs.	$800.00

NOTE: In ordering give size of track cable.

Yarding and Loading Trolley

AUTO LUBRICATING TYPE

No. 22-20

This Carriage is built for close-in skyline work and loading.

Plate sides, reinforced.

Extra large oil chamber.

Manganese Steel Sheave with bore ground accurately on our special machine.

Bushing of our special non-heating bronze. Spiral oil grooves.

An excellent piece of equipment for your lighter work.

PRICES

Code Word	Number , Size		Weight	List
Gourd	22-20	20″ Manganese Steel Sheave	510 lbs.	$150.00

Washington Overhead Carriages

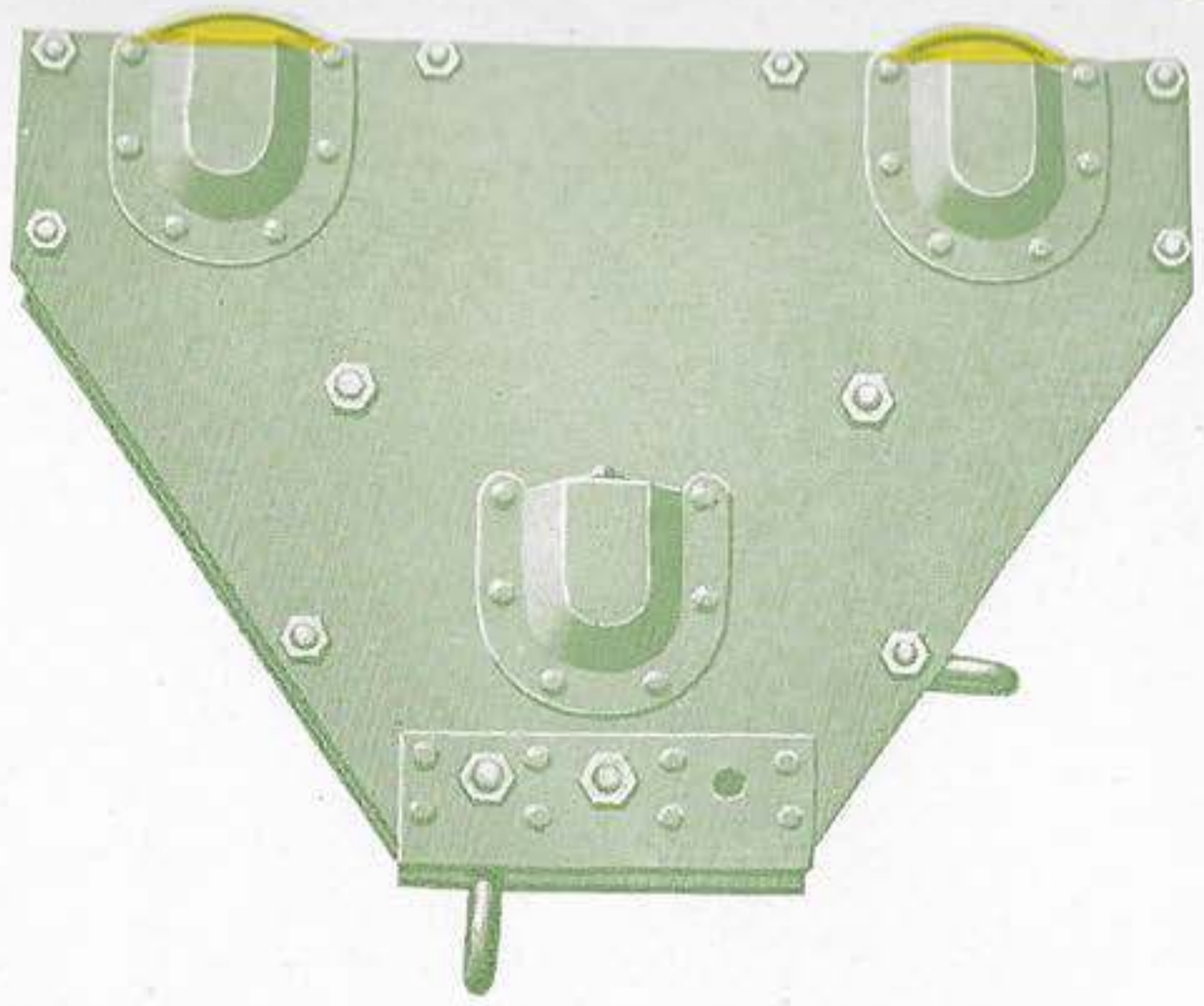


Fig. No. 2-16

V-TYPE THREE-SHEAVE PATTERN

Made with heavy steel plate sides. Carriage is equipped with cable oiling device and Manganese Steel Sheaves are fitted with special oil reservoirs.

Better results can generally be obtained with this improved Carriage than with the older "L" type Carriage, for the reason that the lower sheave is in the center of the Carriage, and puts an equal strain on both Sheaves in the logging operations. There are also two sheaves beneath the track sheaves to keep the carriage from jumping the track.

To obtain further mechanical perfection, Manganese Steel Sheave bores are ground on our special grinding machine, true and central to rim and guaranteed to be accurate within .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

Illustration shown on page 39 shows one method of using this Carriage.

PRICES

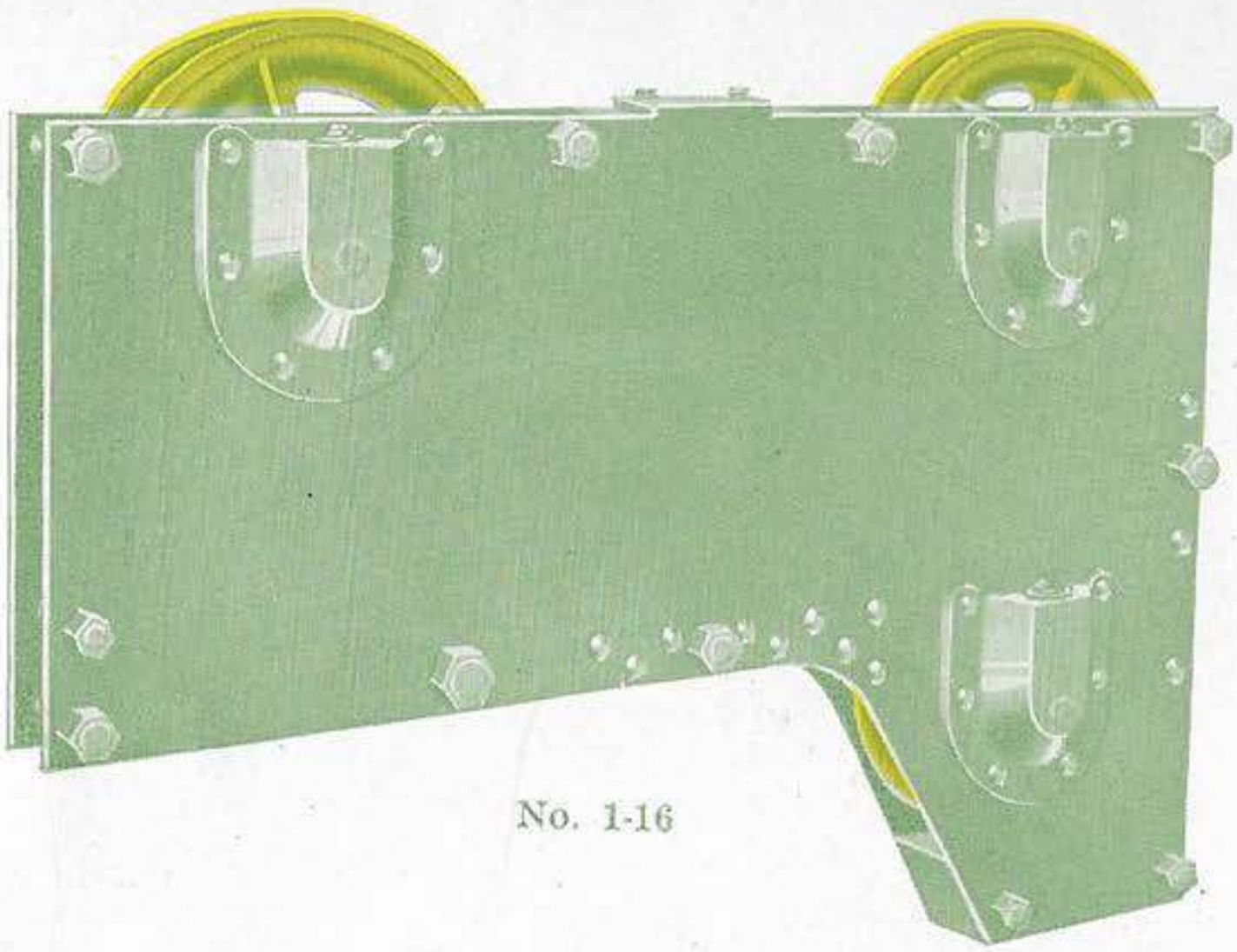
Code Word	Number		Weight	List
Irate	2-14	Carriage with 14x3 Manganese Steel Sheaves	850 lbs.	$375.00
Irian	2-16	Carriage with 16x3 Manganese Steel Sheaves	985 lbs.	400.00
Ixtli	2-20	Carriage with 20x3 Manganese Steel Sheaves	1280 lbs.	440.00

NOTE—In ordering give diameter track cable.

Fig. 293

View showing Skyline Logging with V-Type Carriage and a Three-Drum Logging Engine.

Washington Overhead Carriages



No. 1-16

L TYPE THREE-SHEAVE PATTERN

Made with heavy steel plate sides equipped with cable oiling device. Manganese Steel Sheaves fitted with special oil reservoirs.

To obtain further mechanical perfection, sheave bores are ground on our special grinding machine, true and central to rims and guaranteed to be accurate within .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed spiral oil grooves.

Illustration shown on page 41 shows one method of using this carriage.

PRICES

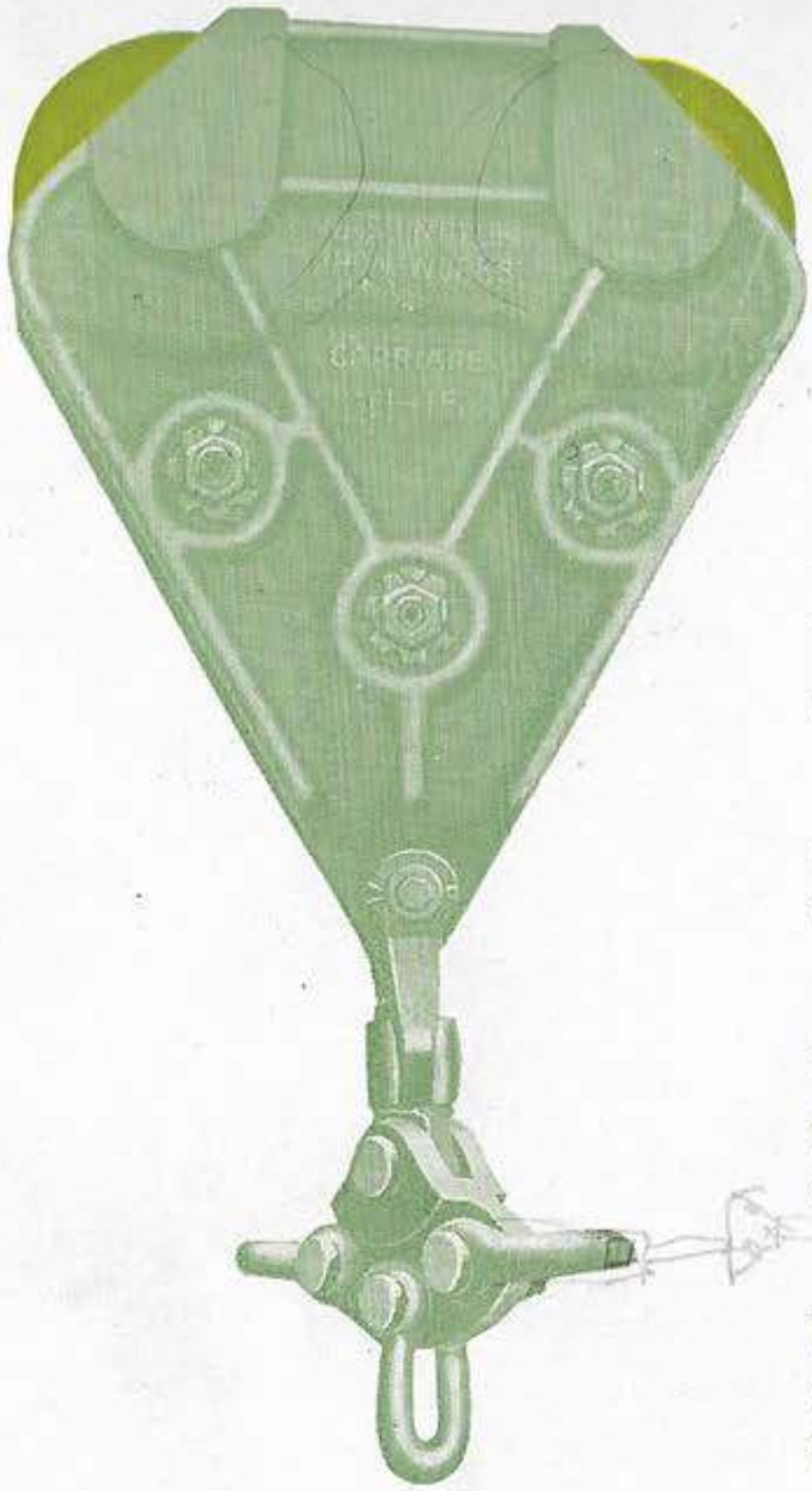
Code Word	Number	Size		Weight	List
Ghoul	1-12	12x2½	Manganese Steel Sheave	530 lbs.	$275.00
Climb	1-14	14x3	Manganese Steel Sheave	850 lbs.	375.00
Cloud	1-16	16x3	Manganese Steel Sheave	1015 lbs.	400.00
Clown	1-20	20x3	Manganese Steel Sheave	1250 lbs.	440.00

In ordering give size of track cable.

Fig. 292

View showing Skyline Logging with L-Type Carriage and a Three-Drum Logging Engine.

Washington Overhead Carriage



No. 11-15

SLACK LINE TYPE CARRIAGE

A new design for slack line logging in hilly or mountainous country.

Carriage No. 11-15 is of rugged construction, made with annealed Electric Open Hearth Steel sides without projections to catch on rocks or other obstruction, which would be a handicap in logging by slack line method.

Carriage is equipped with cable oiling device and Manganese Steel Sheaves are fitted with special oil reservoirs.

To obtain further mechanical perfection, sheave bore is ground on our special grinding machine, true and central to rim and guaranteed accurate within .001 inch.

Bushings are of our special non-heating bronze successfully developed by us to meet the hard requirements of logging block service. Specially designed oil grooves.

The hauling line and haulback line are attached to swivel head at the bottom of the carriage, and are far enough away from the skyline to keep the hauling line from wrapping around the overhead line when carriage is at a low point, or overhead line is slack. It will be noted further that cast steel sides have rollers under the track sheaves to keep the carriage from jumping off the overhead or skyline.

Sketch on page 43 shows method of operating this Carriage.

PRICES

Code Word	Number	Size		Weight	List
Ratio	11-15	15″	Manganese Steel Sheaves	790 lbs.	$350.00

In ordering give size of track cable.

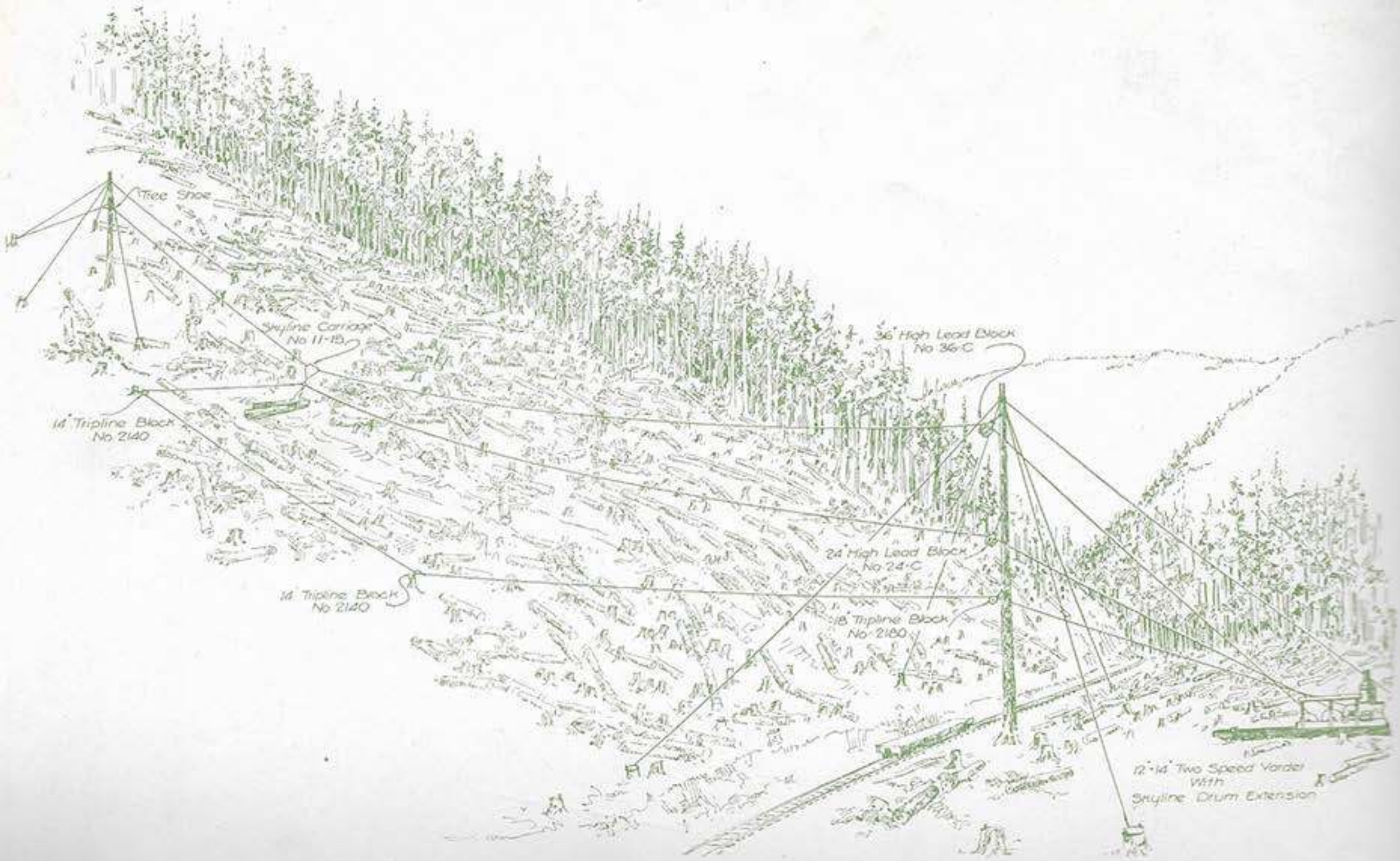
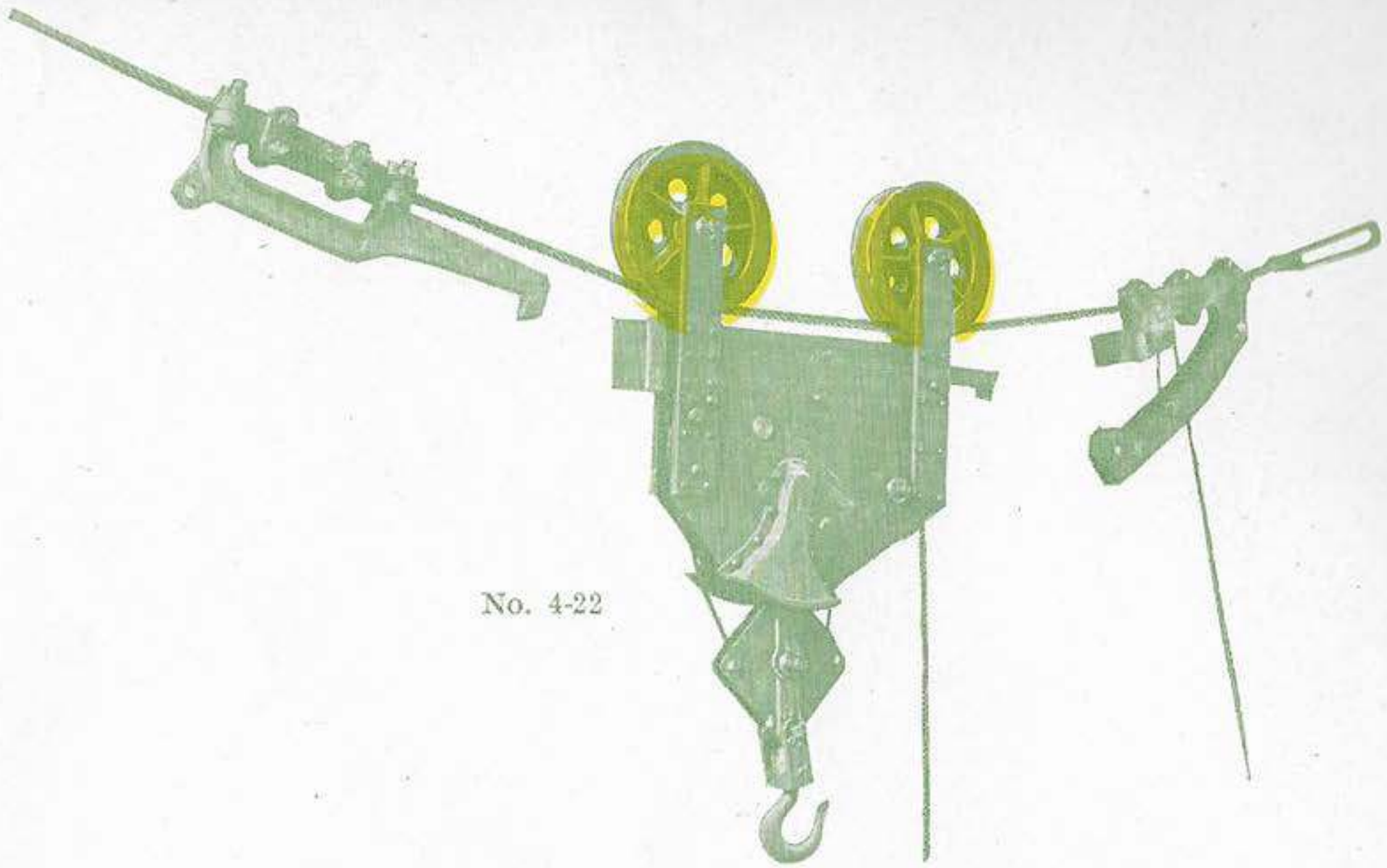


Fig. 288

View showing Slack Line Logging Operation with 11-15 Carriage and Logging Engine equipped with Skyline Drum Extension.—See page 51.

Washington Aerial Snubbing Carriage



No. 4-22

With our No. 4-22 Aerial Snubbing Carriage logs can be lowered down steep grades at high speed.

METHOD OF OPERATION

This carriage requires but one operating line, and can be operated by a single drum on engine with the heavy brake, the brake depending on the grade between the two points. There is a stop at each end of the line. When the carriage is hauled to the top stop, locks are engaged. The Block is then lowered and logs attached. The Block is then hauled up to carriage, where block locks in carriage suspending load. The carriage is then released, and load of logs lowered to the lower stop. When the carriage strikes the stop at the bottom, the block unlocks automatically from the carriage, and the logs are lowered. At the same time the carriage is held to the stop, and cannot move up the line until the block is hauled up into the carriage again and locked. It will be noted that the clamp on the line at the bottom is independent of the stop. This is to take care of the turning of the line so that catch will always strike fair in the trigger or carriage.

Illustration shown on page 45 shows method of lowering logs using 4-22 Carriage.

PRICES

Code Word	Number	Size		Weight	List
Ebony	4-22	22"	Manganese Steel Sheaves	2815 lbs.	$800.00

In ordering give size of track cable.

Fig. 231

Tree showing logs being lowered down mountain side with 4-32 snubbing carriage.

Washington Open Side Carriage, Hanger, and Cable Support

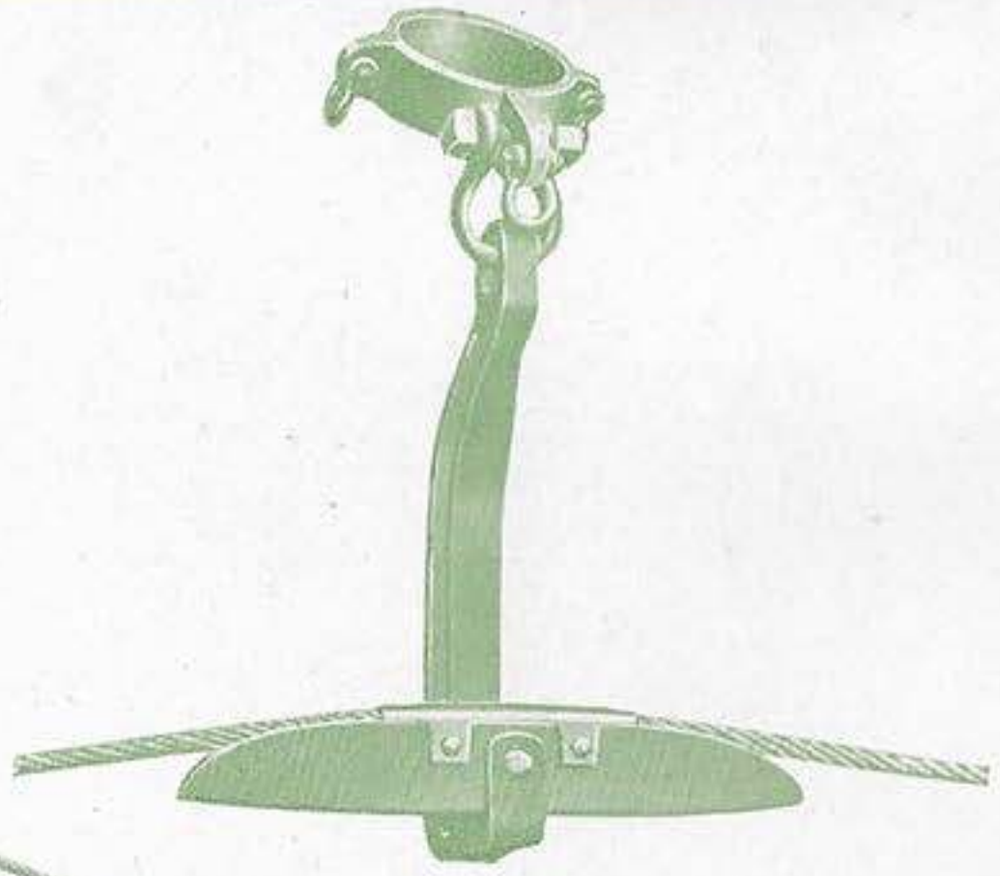


Fig. 309.

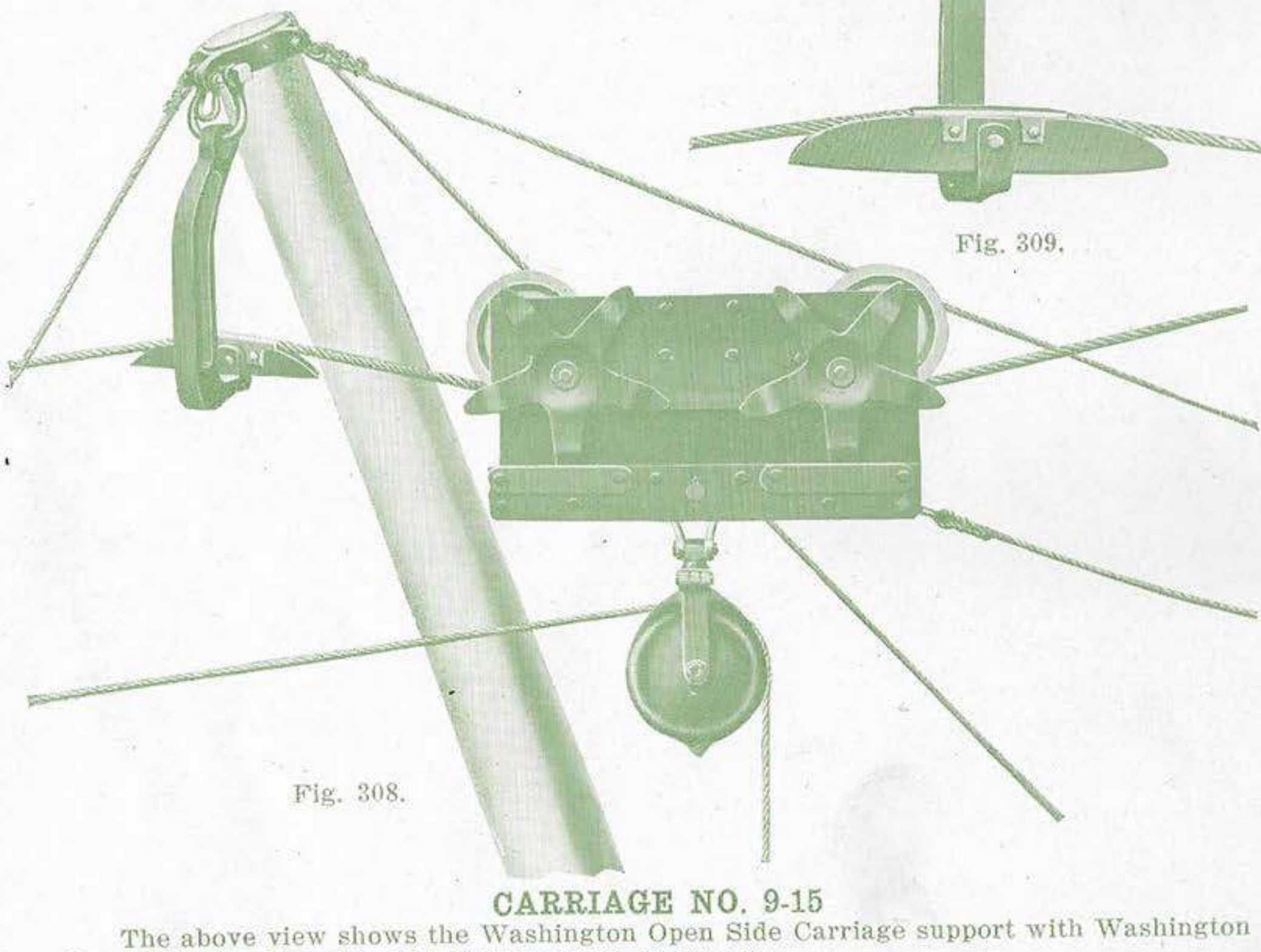


Fig. 308.

CARRIAGE NO. 9-15

The above view shows the Washington Open Side Carriage support with Washington Open Side Carriage No. 9-15 about to pass over same.

Illustration Figure No. 308 shows the Washington Hanger and Support and Washington Open Side Carriage No. 9-15 used for skyline logging operations, where topography of country is such that a single span cannot be used.

A feature of the Washington Open Side Carriage is the spider shaped guards which prevent carriage from jumping the line, and at the same time permit Carriage to pass over hangers.

It will be noted that hangers have extra long line supports in which line fits accurately, and which are covered with Manganese steel shoes to prevent excessive wear or stranding of cable at the point of extreme tension on center of hanger support when sheaves of carriage strike this point of line in passing over hangers.

Sketch page 47 shows one of the conditions under which Washington Open Side Carriage and Hangers can be used.

Full particulars covering Washington Slack Pulling Attachment (Patent applied for) and Washington Interlocking Skidder shown on Sketch No. 302, page 47, will be sent on application.

Fig. 30

View showing Open Side Carriage operating over hangers and Slack Pulling Attachment (Patent applied for) used in connection with Washington Interlocking Skidder.

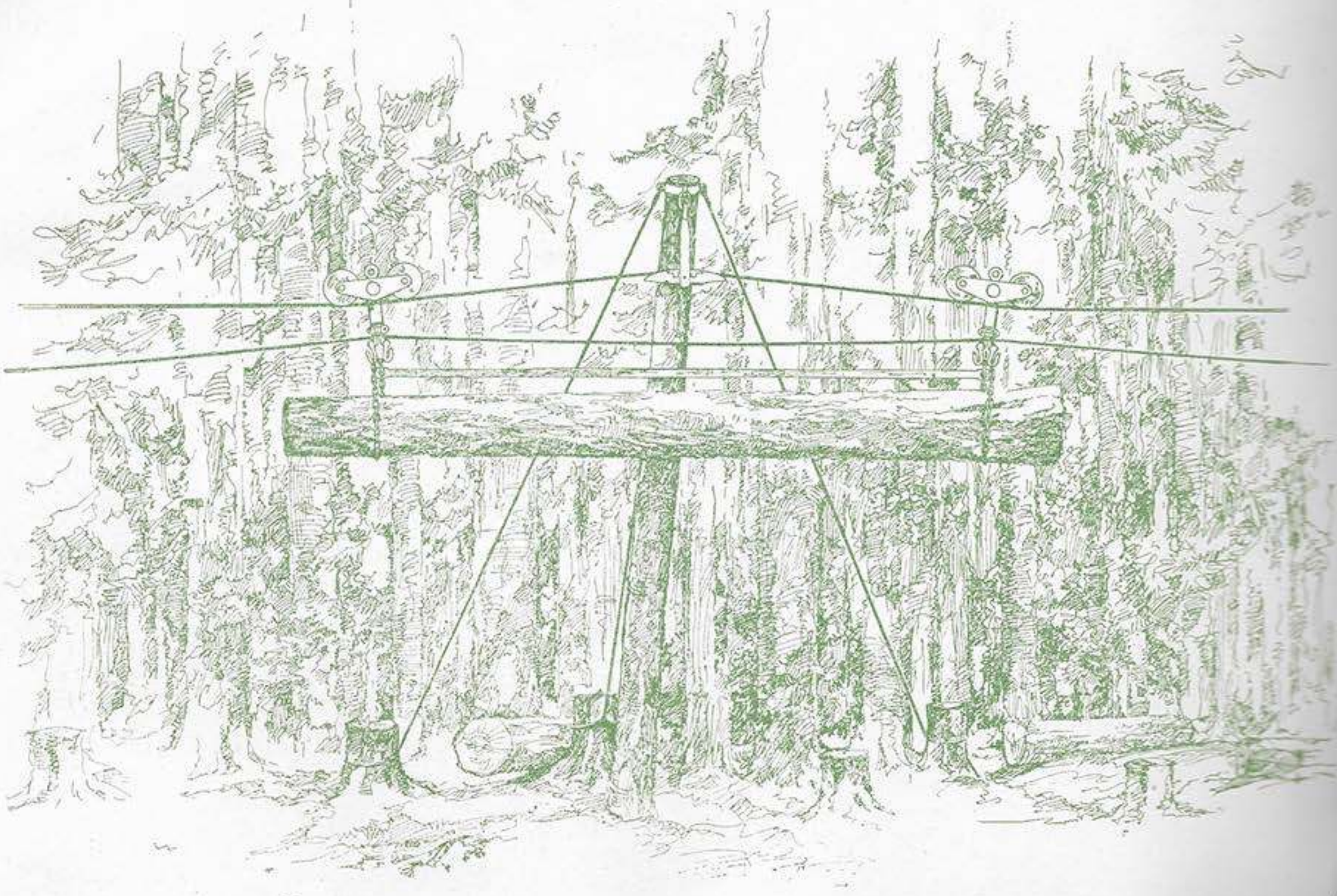


Fig. 313
View Showing Log Tramway Carriage, Hangers, Etc.

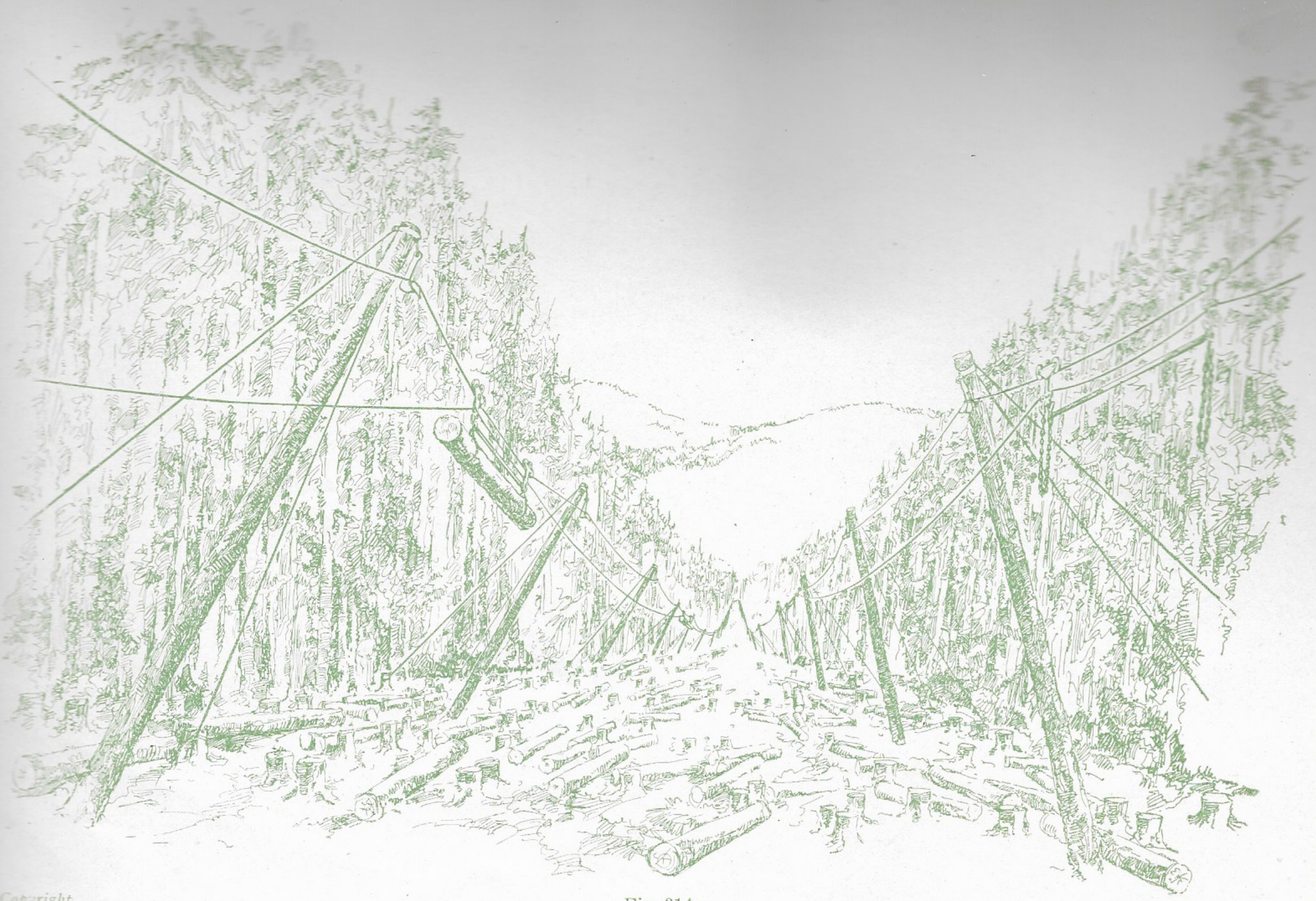


Fig. 314
View Showing Double Line Log Tramway System.

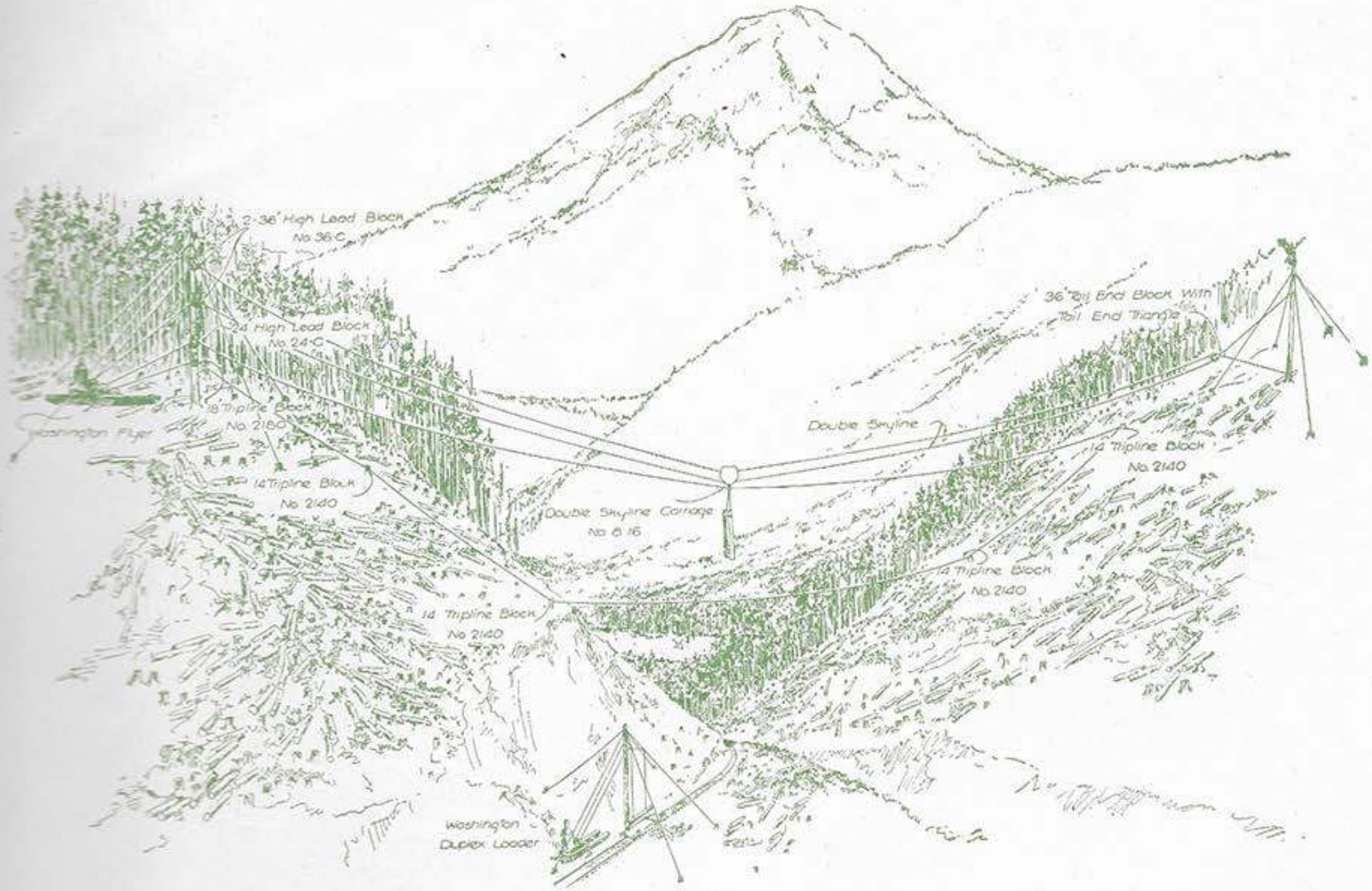


Fig. 296

View showing Skyline Operation with Two-Speed Washington Duplex Aerial Yarder or Flyer, Two Speeds on Skyline and Main Hauling Drum. (Send for Special Bulletin.)

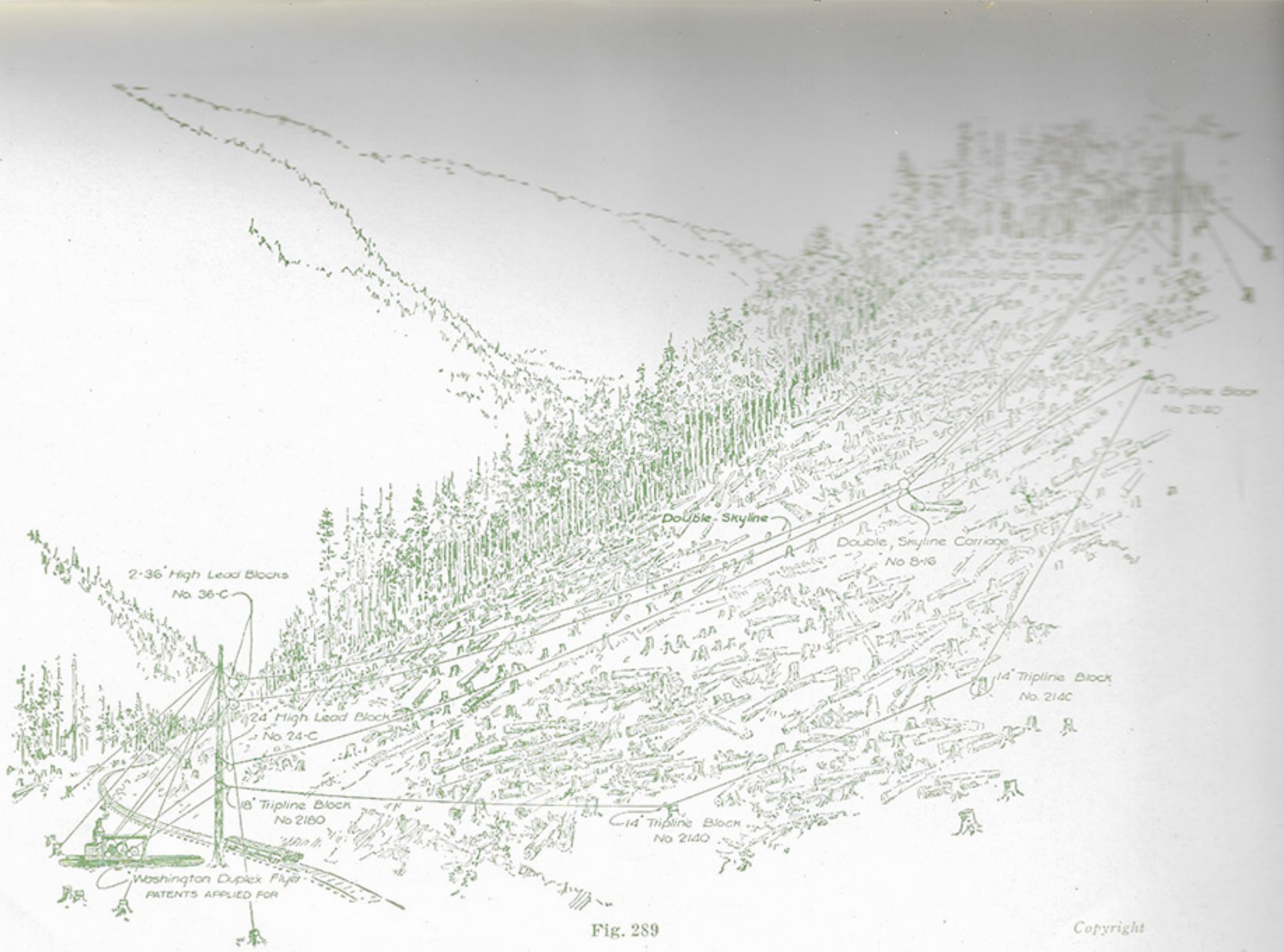


Fig. 289

View showing Skyline Operation with Two-Speed Washington Duplex Aerial Yarder or Flyer, Two Speeds on Skyline and Main Hauling Drum. (Send for Special Bulletin.)

Pierson Patent Automatic Locking Device Logging Carriage

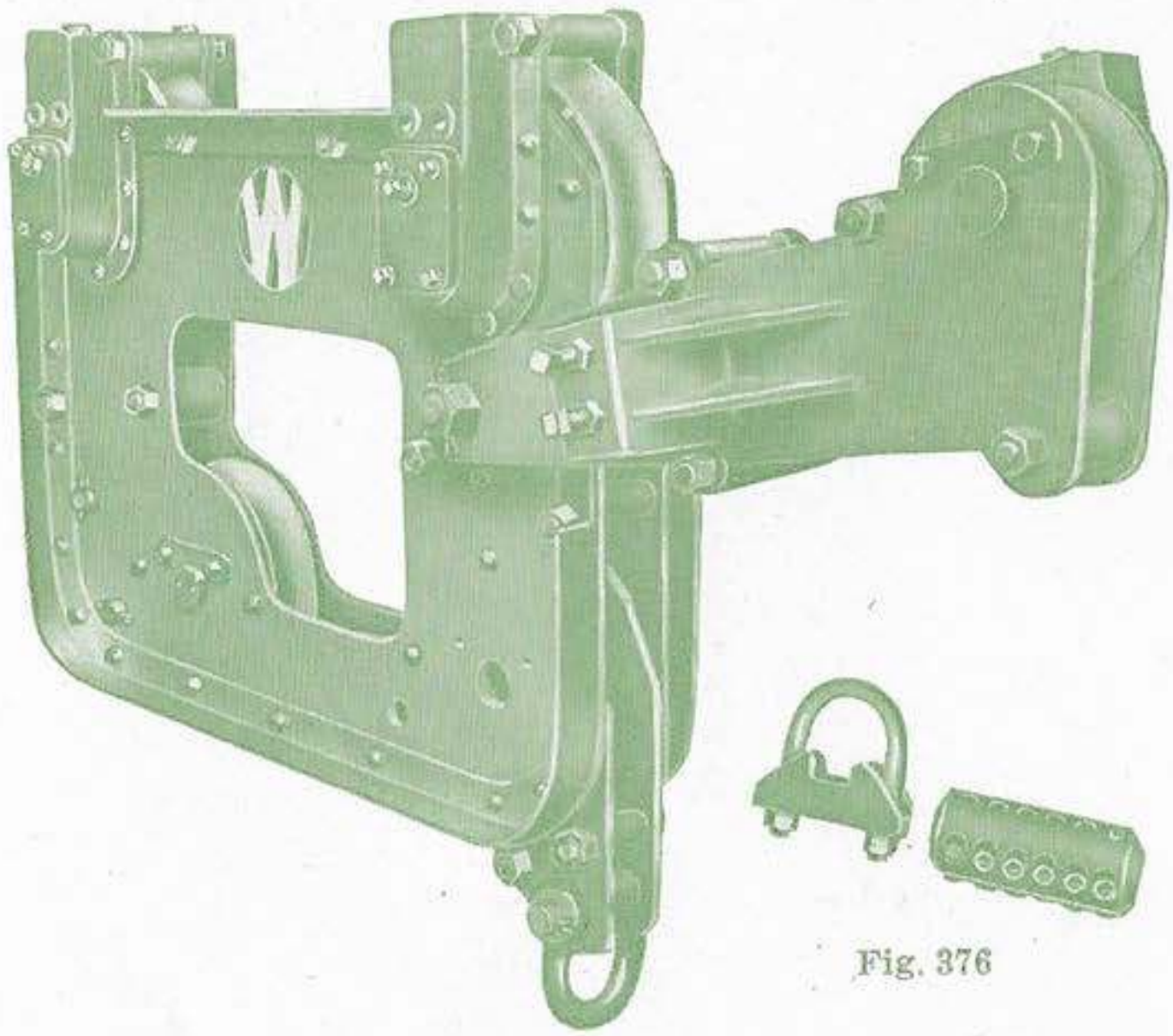


Fig. 376

No. 16-20

The only carriage equipped with a practical automatic locking device which will hold carriage at the spar tree while unhooking chokers.

Carriage is perfectly balanced and of rugged construction throughout. Manganese traveler sheaves have solid shafts which run in specially designed outside bronze journals. Journals are packed with grease and renewal of lubrication is necessary only at long periods.

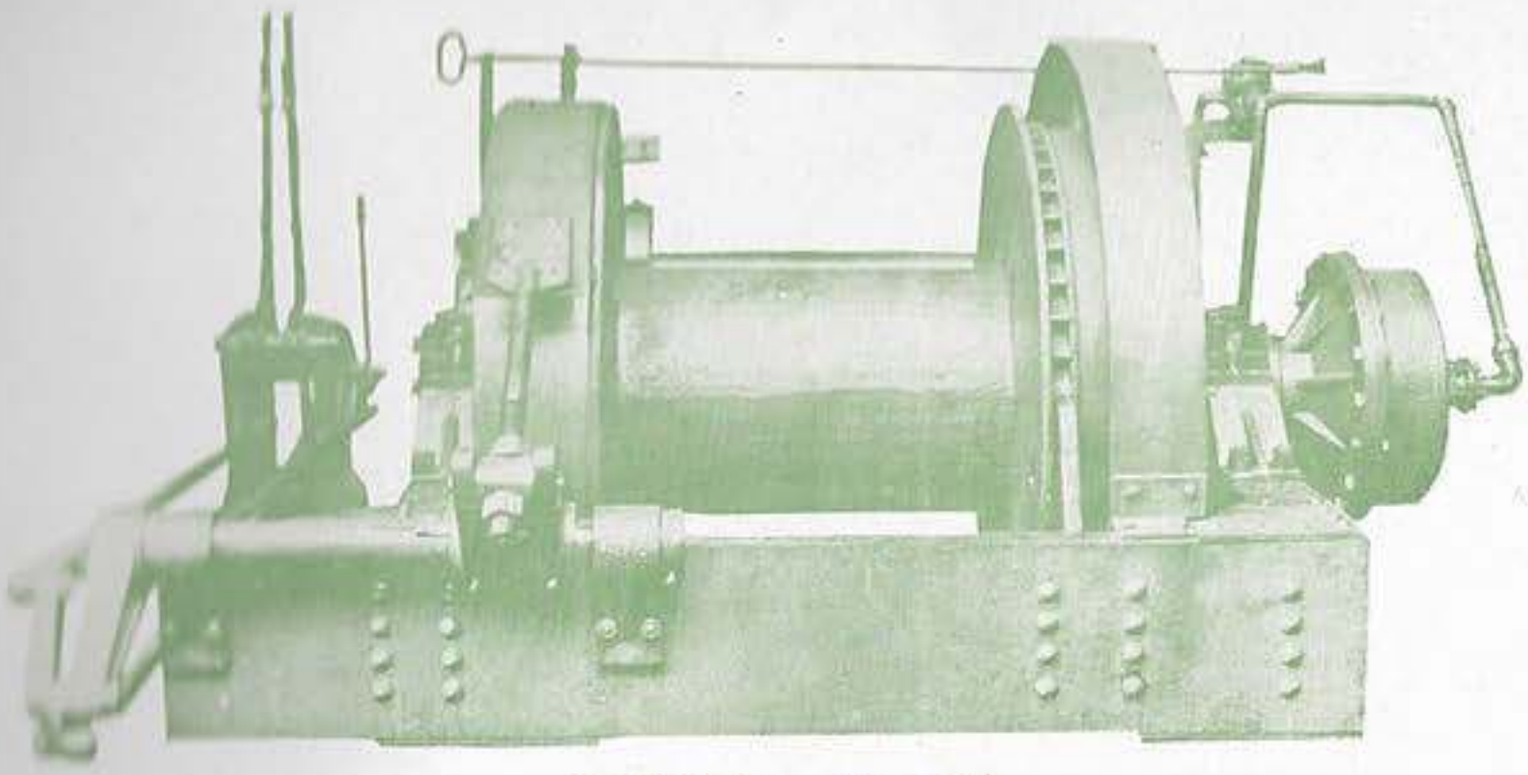
METHOD OF OPERATION

The line grip, Figure 376, is riveted to line near spar tree at the point it is desired to lock carriage. Locking device is contained in front housing of carriage which has guide sheaves as shown which travel on overhead line and guide the jaws which catch on the grip, Figure No. 376, when loaded carriage is brought up to spar tree. To unlock carriage and run back after unhooking chokers it is only necessary to run carriage forward a few feet and allow to drift back and it will unlock itself automatically.

PRICES

Code Word	Number	Size		Weight	List
Raven	16-20	20"	Manganese Steel Sheaves	2560 lbs.	$1,100.00

Skyline Drum Attachment



End View—Fig. 295

Figures No. 294 and No. 295 illustrate our improved Skyline Drum Attachment for Two Speed and Standard Simplex Yarders, and all late types of Road Engines and Tandem Drum Yarding Engines.

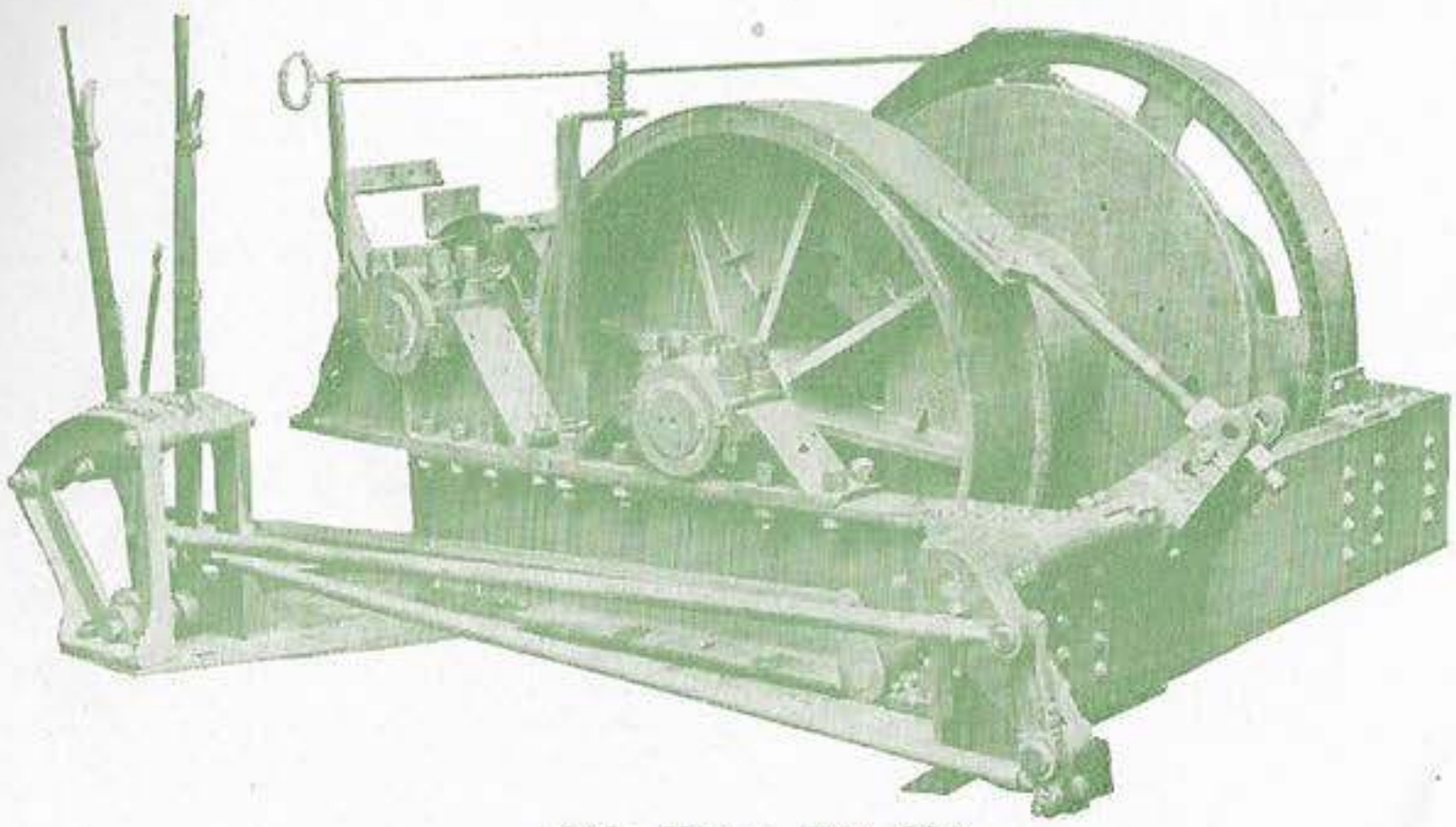
By means of this drum attachment any of the above Logging Engines can be successfully operated in connection with slack or tight line skyline logging operations, as shown in Sketches on pages 39, 41 and 43 of this Catalog.

The special features of this drum are as follows:

Drum is compound geared and has ample power. Through special gear design, the drum shaft and skyline drum remain stationary when held by brake or ratchet and pawl, even though engine is running, eliminating the cutting out of drum bearings.

Drum has extra heavy compound lever brake and is equipped with heavy ratchet and pawl.

Prices on application.



Side View—Fig. 294

Brake Linings

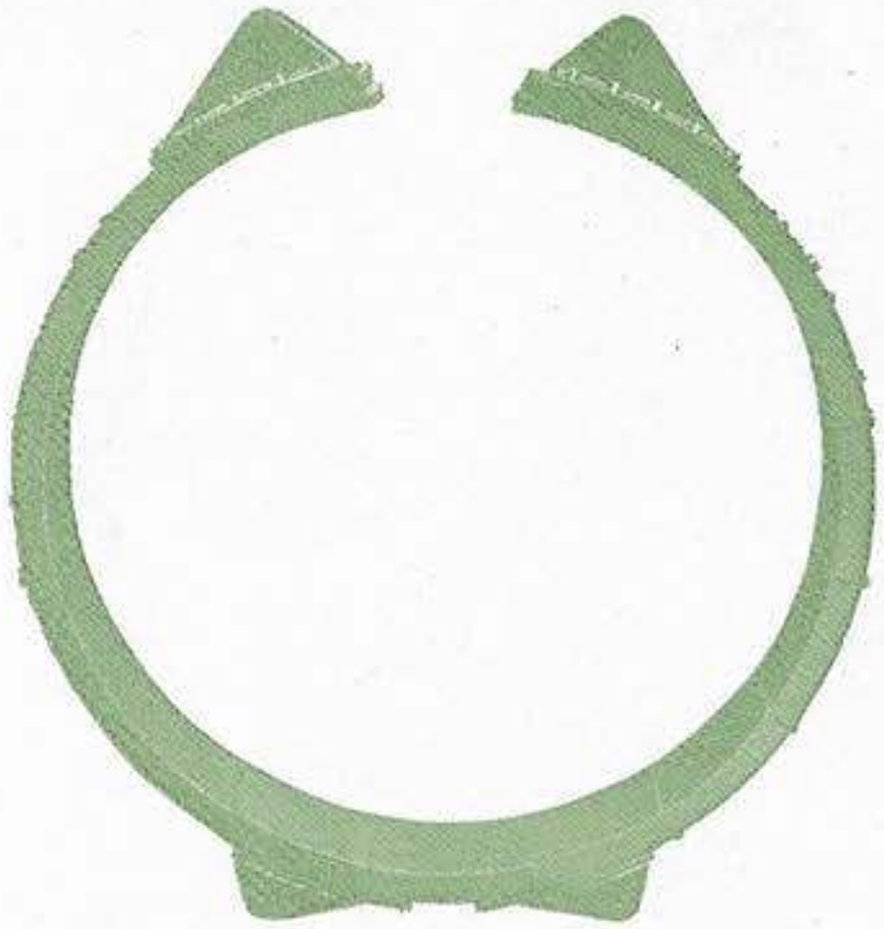


Fig. 357

Fig. 377

We are prepared to furnish molded Metallic Asbestos Blocks for various types of brakes. Also interwoven asbestos wire-inserted brake linings, (automobile truck type) for logging engine brakes in widths and lengths to replace old type fibre or wood brake linings.

Brake Attachments

Figure No. 225 illustrates one of several types of Brake Attachments we build to fit wide face logging engine drums.

Our engineering department will be pleased to submit drawings and prices of brakes to meet varying conditions.

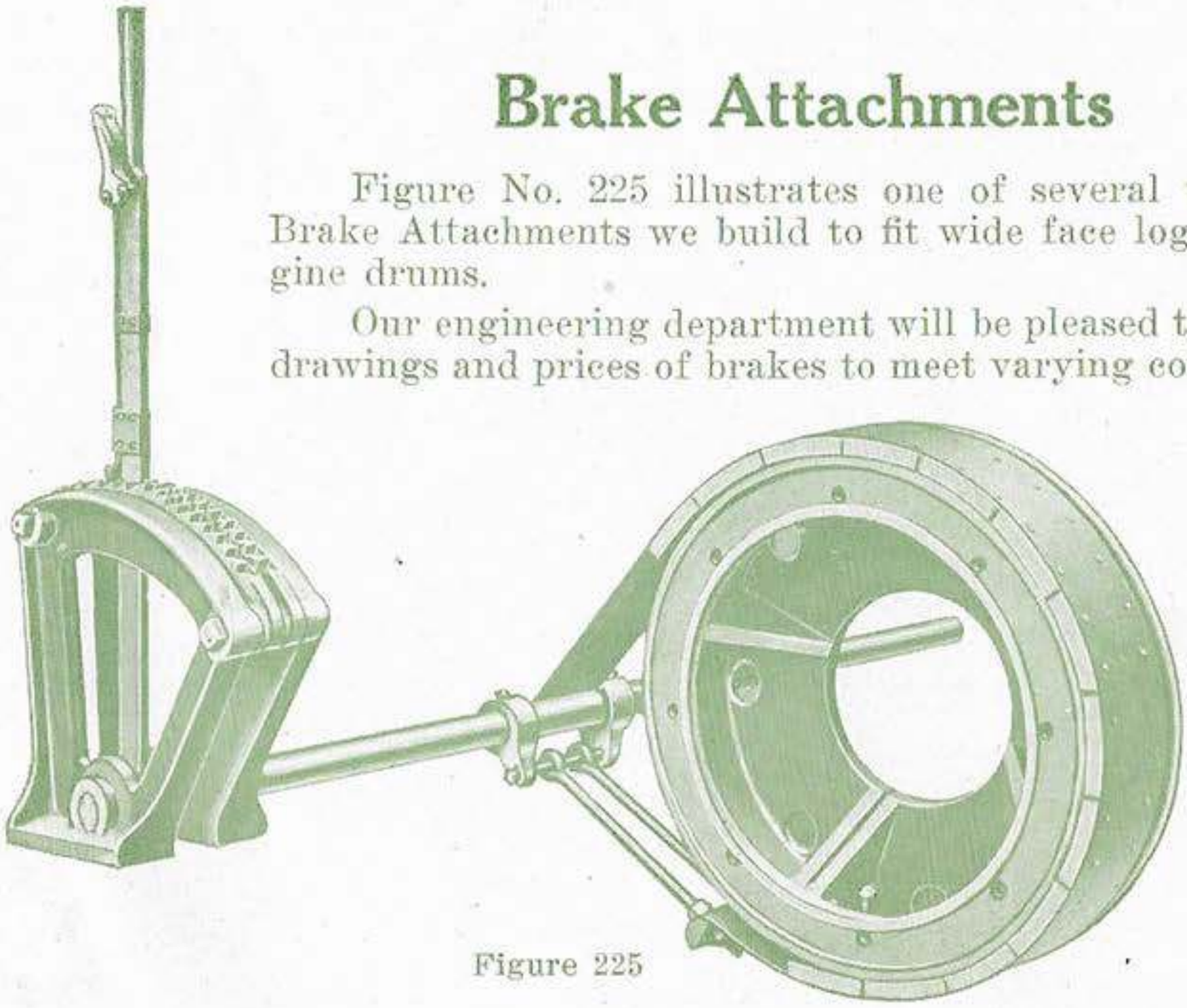


Figure 225

Washington Metallic Asbestos Friction Blocks and Mounting

(Patented)

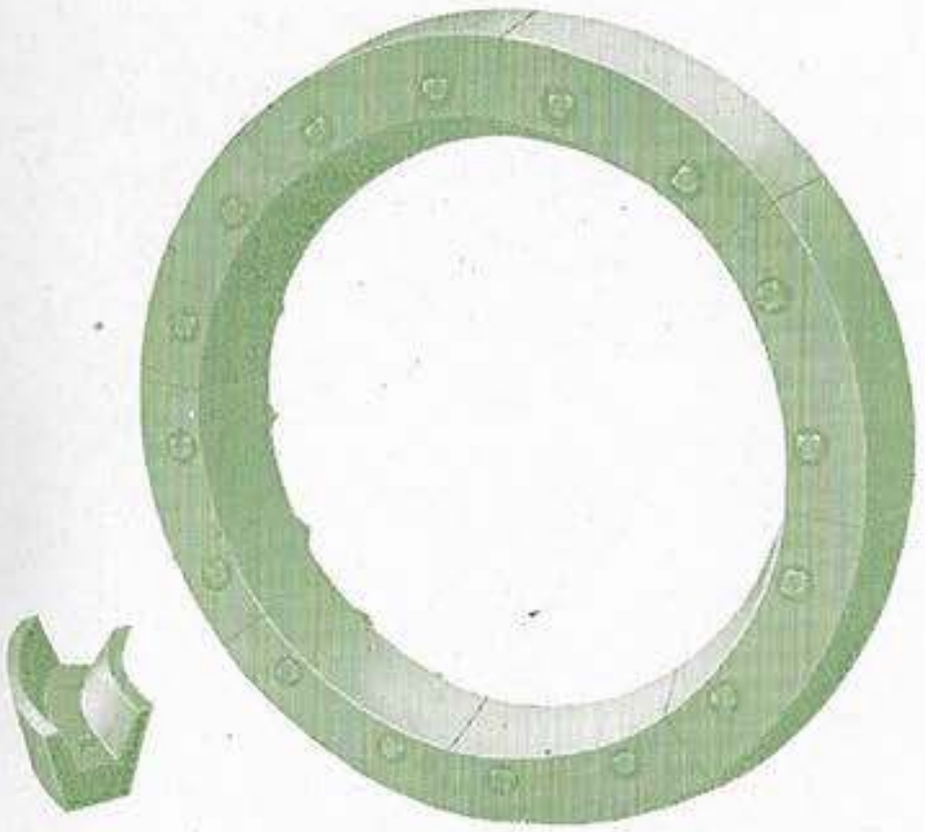


Fig. 356

The only successful metallic asbestos friction block to date has been the solid metallic asbestos friction block, which has not been generally used on account of its high original cost and replacement cost.

A new type of Metallic Asbestos Friction Block (patented) has been originated and placed on the market by our company. It has all of the advantages of a solid metallic asbestos friction block and, in addition, its first cost is less and replacement cost is greatly lessened. By using a machined ring on which our hollow Asbestos Blocks are mounted, this friction block and mounting is made interchangeable with present installations on logging engines.

Our Metallic Asbestos Friction Blocks (patented) are made of selected asbestos fibre, brass or copper wire, and a special binding compound all intimately mixed and then densely compacted together by vulcanizing under enormous pressure in special steel molds to conform to the exact form required by our design.

Asbestos Blocks give better control of machine so highly desirable in handling modern logging engines.

Economy effected is not only due to the fact that this metallic asbestos friction block wears many times longer than wood, but also by minimizing shutdowns and reducing the time and labor necessary for replacements of other forms of friction blocks.

There are no rivets used in attaching our metallic asbestos friction blocks and, when they are finally worn out, new blocks are easily bolted in place.

Prices on application.

Washington Fairleaders

Washington Iron Works is the originator of fairleaders for use in connection with logging engines. The Washington line of fairleaders includes designs adapted for every class of service and to meet the demands which the present standard of severe usage and high speed logging has put upon them.

No. 24-27

Heavy Bulls Eye fairleader device for main line service. Frame annealed Electric Open Hearth Steel. Sheaves 13" diameter Manganese Steel bronze bushed.

No. 21-38

A Bulls Eye trip line fairleader device made for continuous service. Frame annealed Open Hearth Steel. Sheave Manganese steel 8" in diameter, bronze bushed. No. 29 Buils Eye Lead, which has a 14" diameter sheave can be used in any frame where the No. 21 lead is used.

No. 21-39

A Bulls Eye fairleader device which can be used as a roof fairleader device for loading lines when loading engine is mounted on car at spar tree. Also can be used as a boom fairleader. Frame annealed Electric Open Hearth steel. Sheaves 8" diameter Manganese steel bronze bushed.

No. 16

A patent swivel universal trip line device. Frame annealed Electric Open Hearth steel. Sheaves 8" diameter Manganese steel bronze bushed.

No. 28

A Haul Back fairleader device, adapted for medium trip line service. Frame annealed Electric Open Hearth steel. Rollers 5" diameter Manganese steel bronze bushed.

No. 20

A straw line fairleader device. Frame annealed Electric Open Hearth steel. Rollers 3" diameter Manganese steel bronze bushed.

No. 34

A main line fairleader device for light to medium service. Frame annealed Electric Open Hearth steel. Manganese steel rollers 7" diameter bronze bushed.

No. 21-34-35

A combination main line and trip line fairleader device adapted for light to medium service. Frame annealed Electric Open Hearth steel. Manganese steel rollers and sheaves bronze bushed.

No. 10

A main line narrow drum fairleader device built for the severest service. Frame annealed Electric Open Hearth steel. Manganese steel rollers 8" diameter bronze bushed.

No. 10-16

A patent double deck fairleader service combining No. 10 and No. 16 adapted for the severest service. Frame annealed Electric Open Hearth steel. Sheaves and rollers Manganese steel bronze bushed.

No. 10-29-30

A double deck fairleader device combining No. 10 and No. 29 and adapted for the severest service. Frames annealed Electric Open Hearth steel. Sheaves and rollers Manganese steel bronze bushed.

No. 10-29-31

A double deck fairleader device combining No. 10 and No. 29. For use where the upper drum is offst by the lower drum. Frames annealed Electric Open Hearth steel. Sheaves and rollers Manganese steel bronze bushed.

No. 1

Old type main line fairleader device adaptable for use with tandem drum type engines.

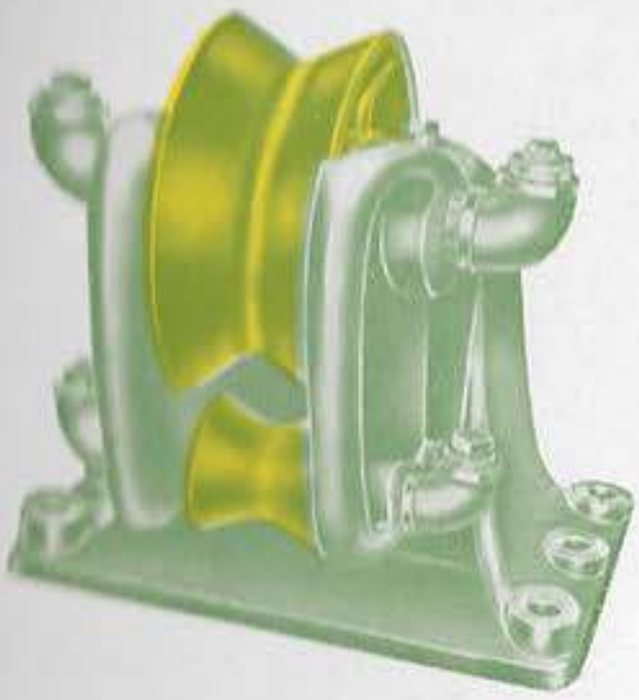
No. 37

An universal main line fairleader device which swivels automatically to lead fair to both spar tree and drum. A fairleader of rugged design. Frame annealed Electric Open Hearth steel. Sheaves Manganese steel bronze bushed.

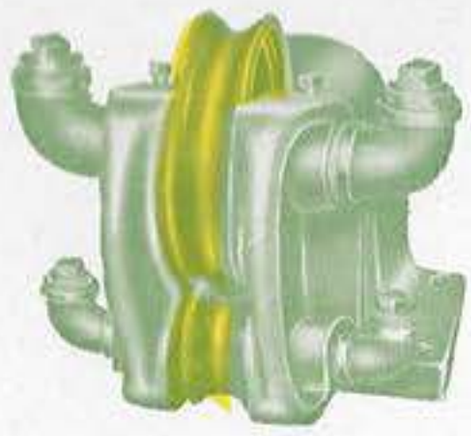
No. 24-29-26 and No. 24-21-26

Are our combination swivel main line and trip line fairleader devices. It will be noted that construction of these fairleaders permits several changes in off-setting position of the Bulls Eye trip line fairleader device. Frame annealed Electric Open Hearth steel. Sheaves Manganese steel bronze bushed.

Washington Fairleaders

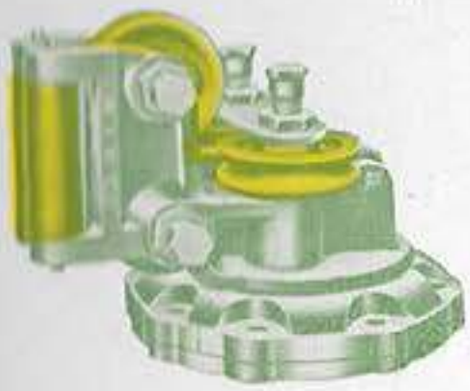


No. 24-27



No. 21-38

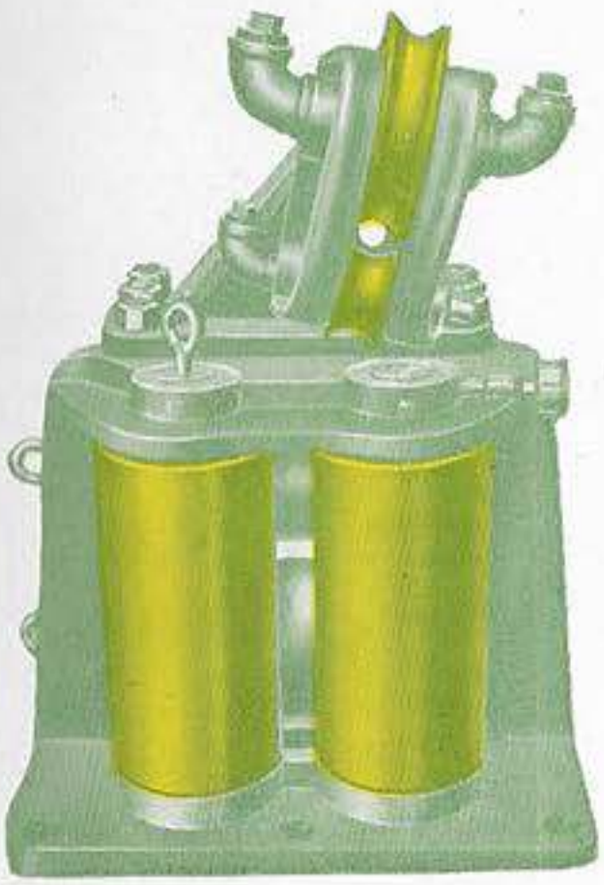
No. 21-39



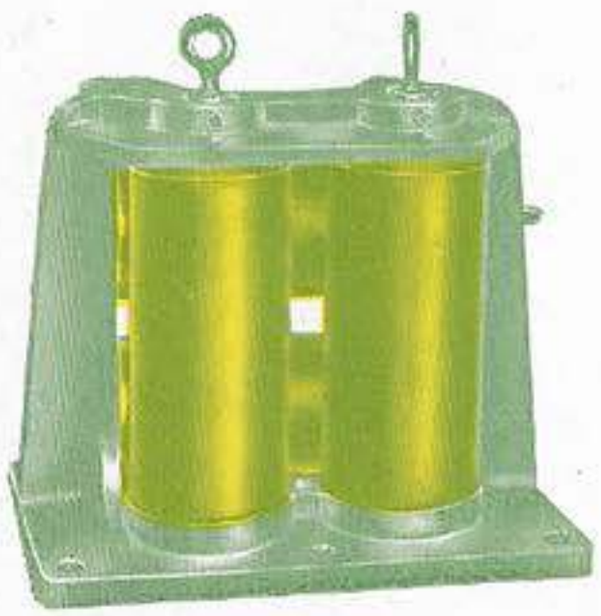
No. 16

No. 28

No. 20

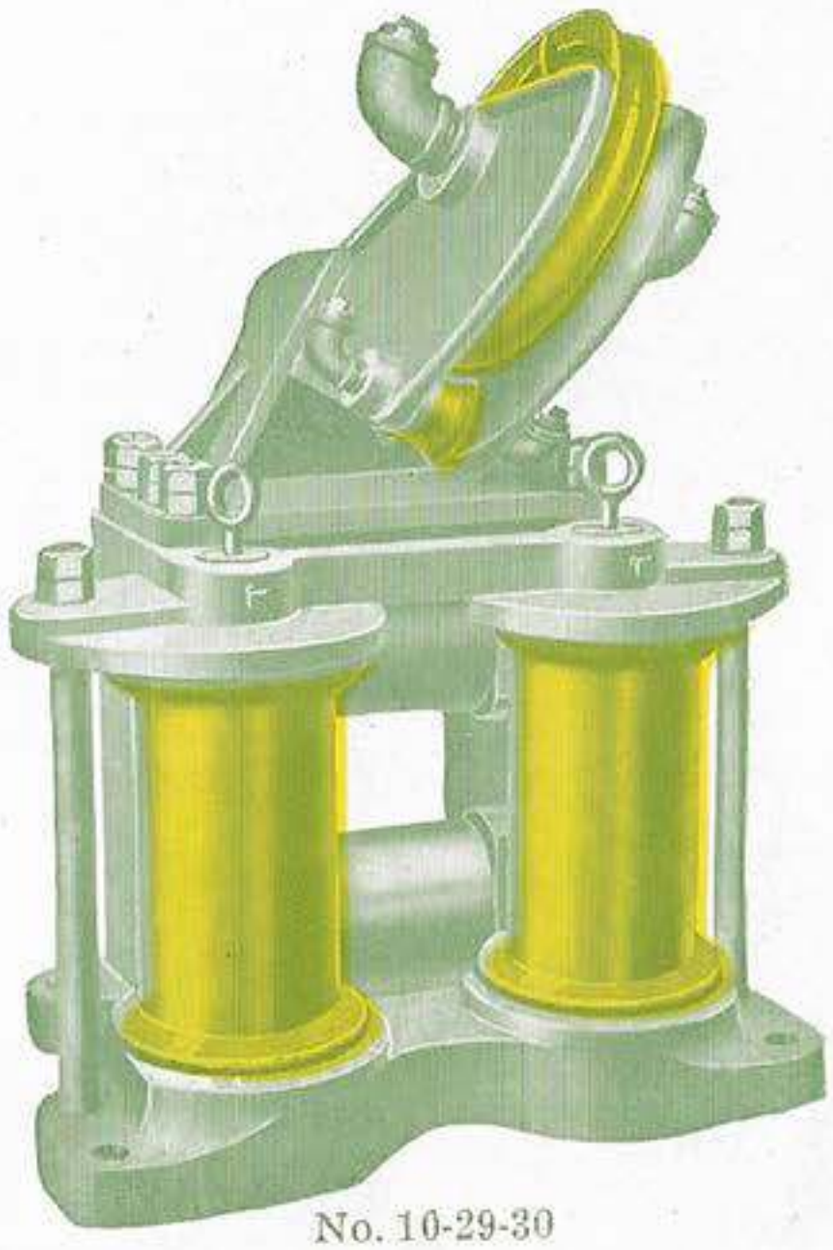


No. 21-34-35

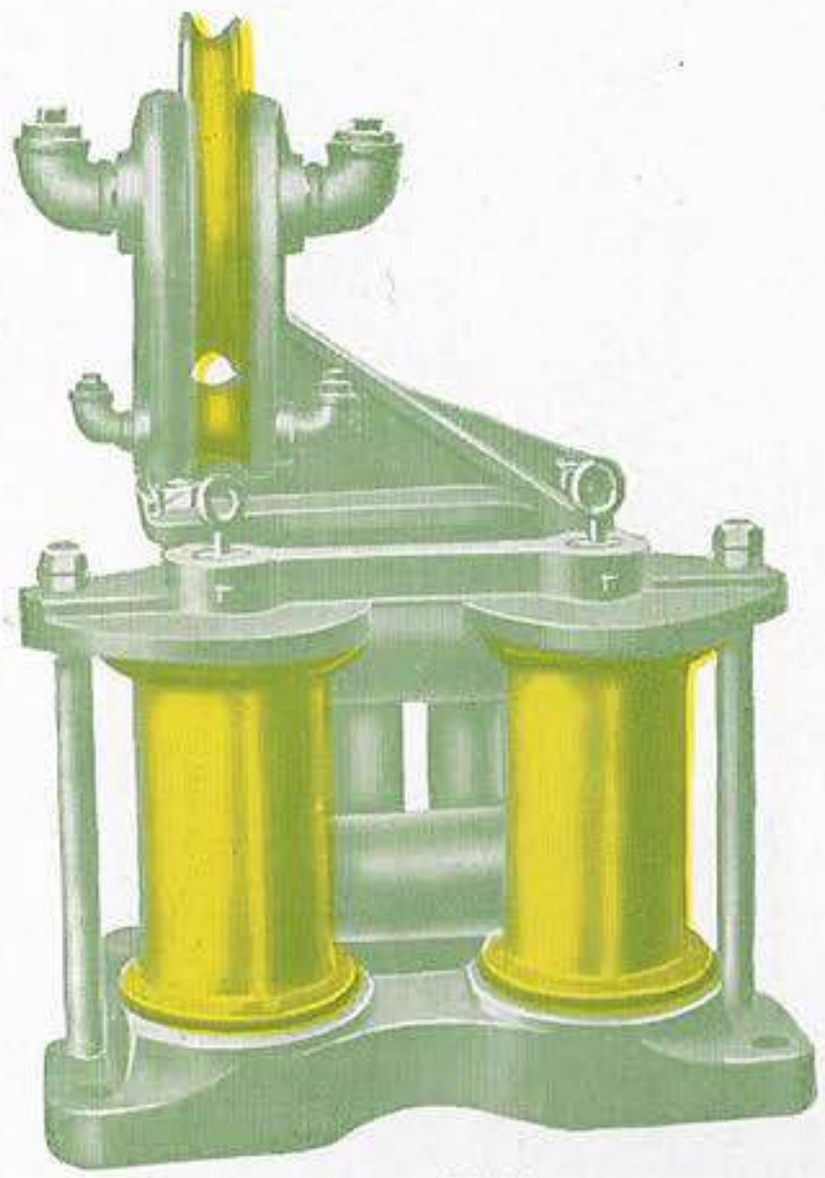


No. 34

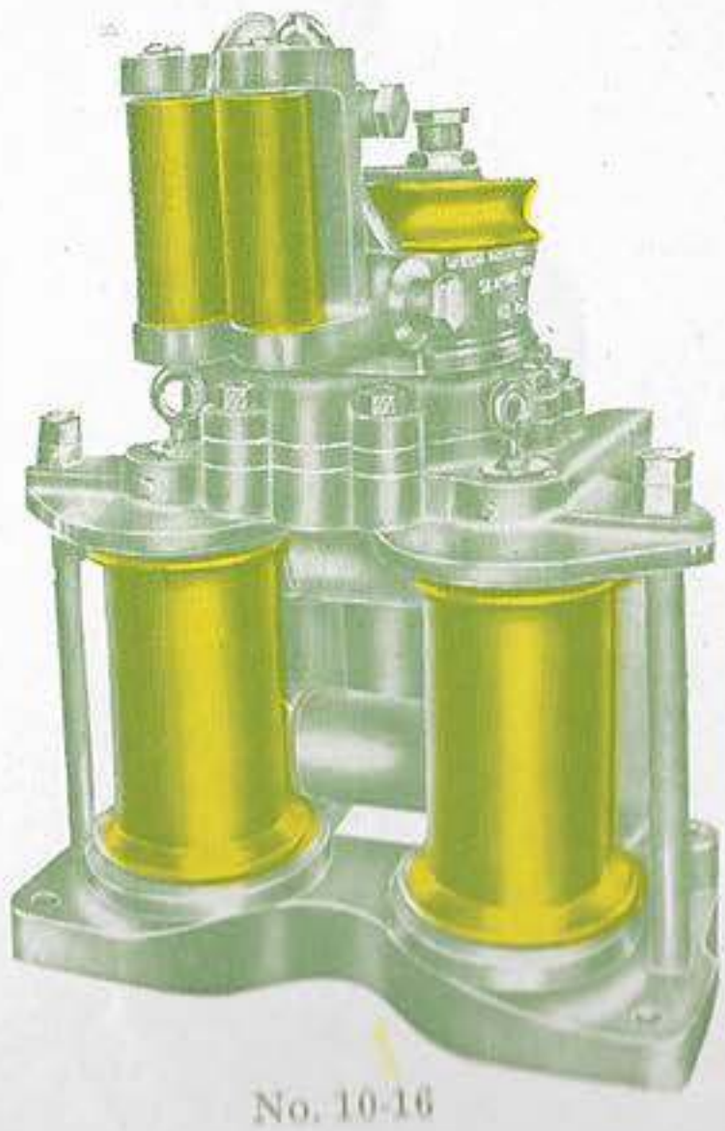
Washington Fairleaders



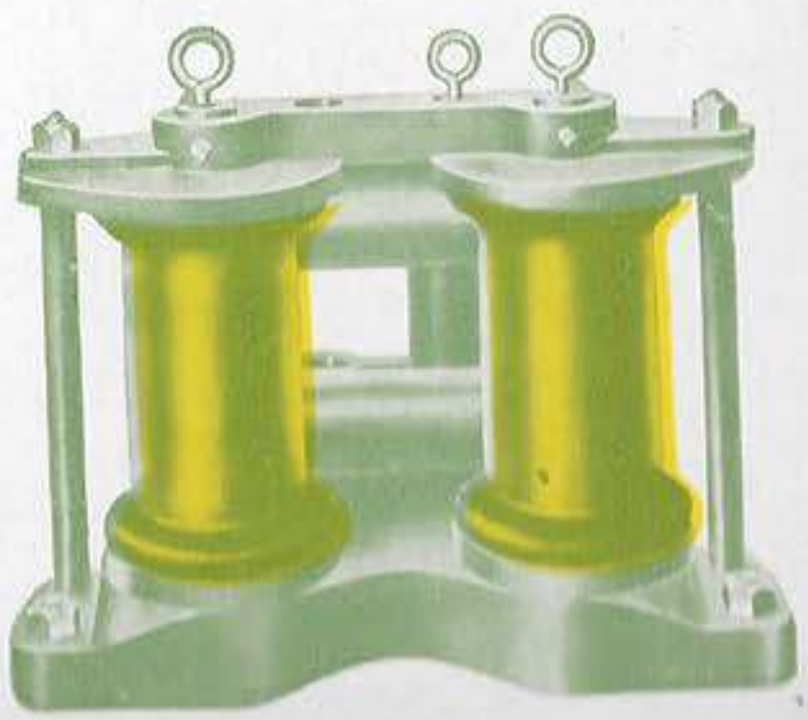
No. 10-29-30



No. 10-29-31

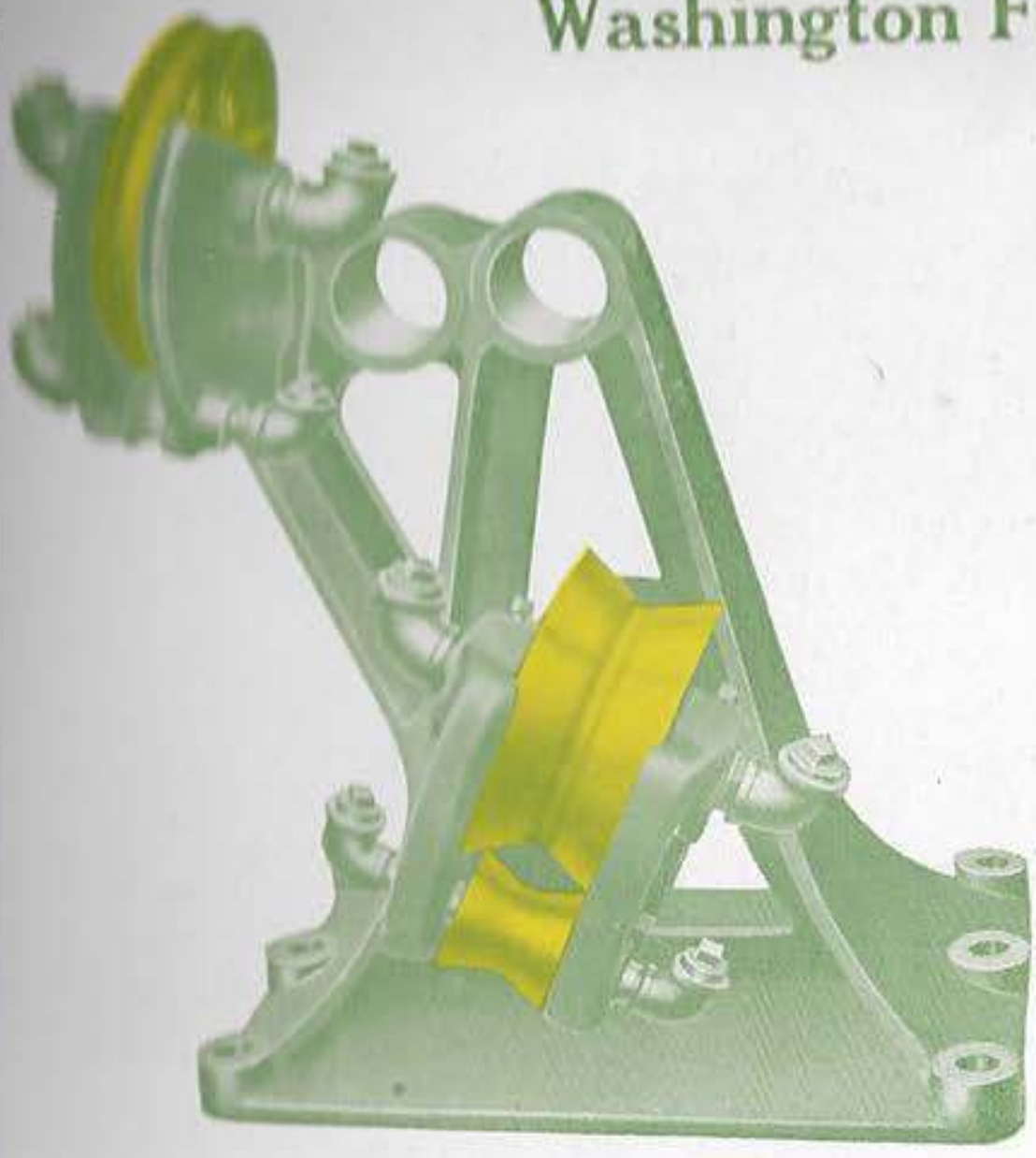


No. 10-16



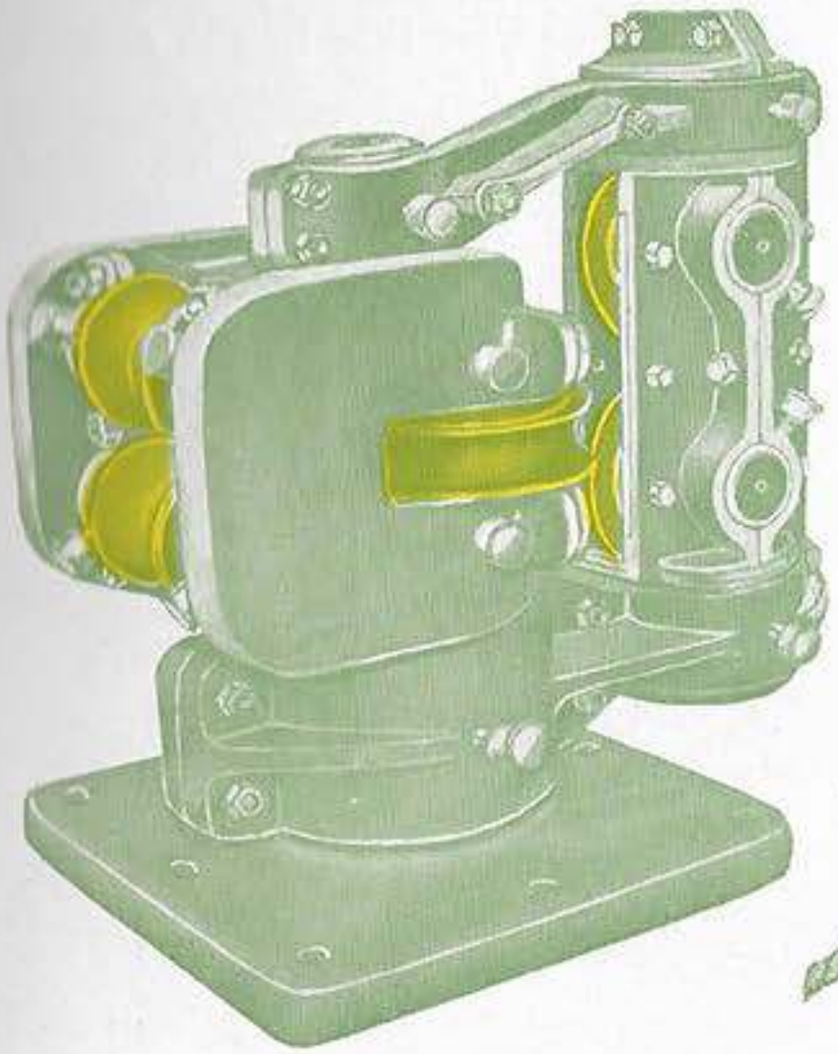
No. 10

Washington Fairleaders

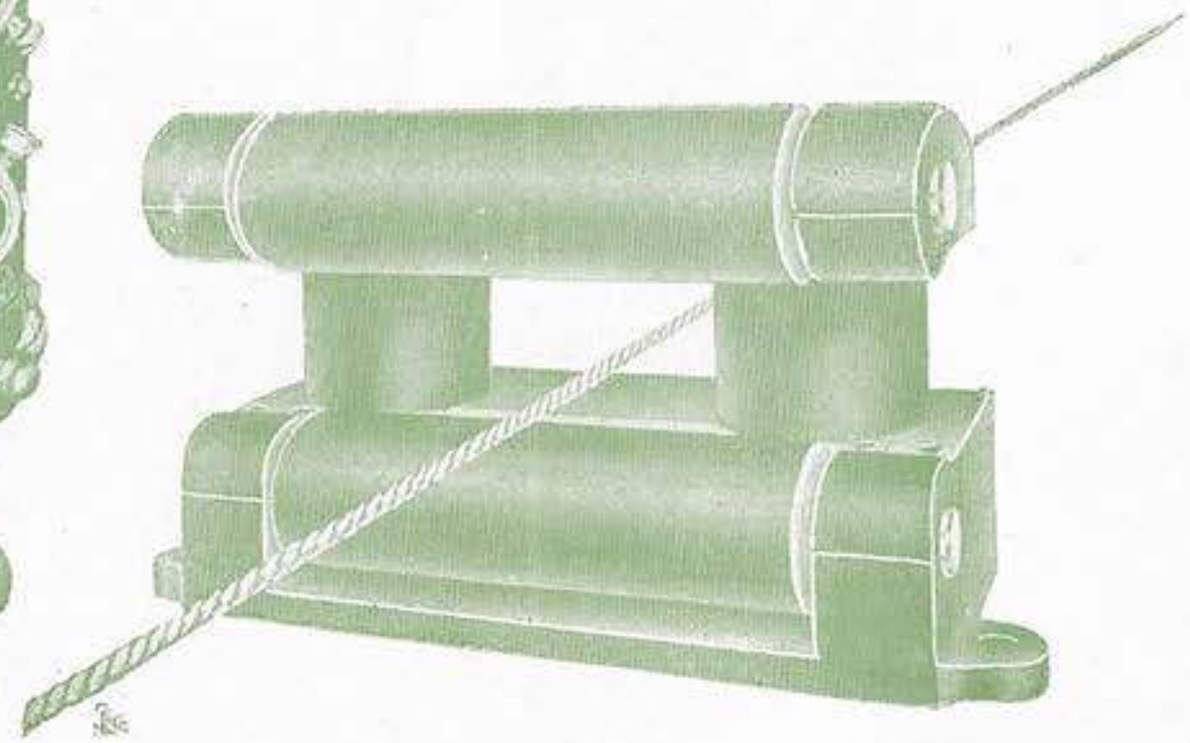


No. 24-29-26

No. 24-21-26



No. 37
Holmes Patent



No. 1

Rollers for Inclines

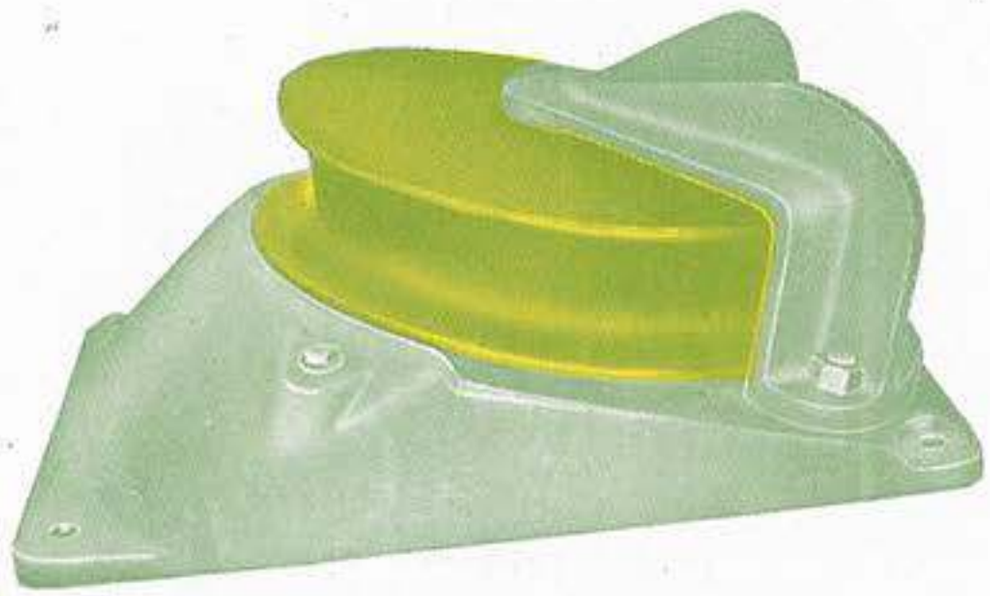


Fig. 375

Fig. 387

These illustrations show a few of the many types of incline rollers we build for logging and mine inclines.

In order to properly protect an incline cable under heavy tension and prevent air tempering of line, rollers should be installed that move easily, and cable should be supported in groove to maintain shape.

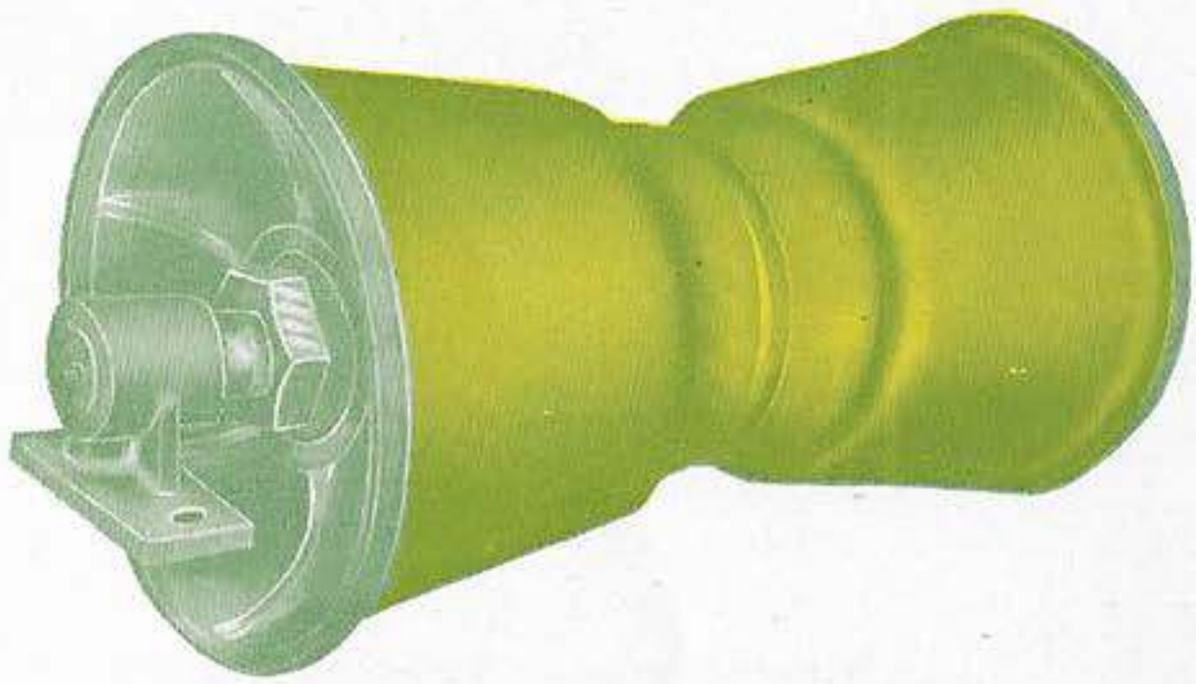


Fig. 374

Figure 374 shows the Brady roller, which is a special roller bearing three-part roller which moves with the slightest friction of the line and carries line to the center groove.

Figure 375, track curve sheave.

Figure 387, track knuckle sheave.

Figure 386, standard incline roller.

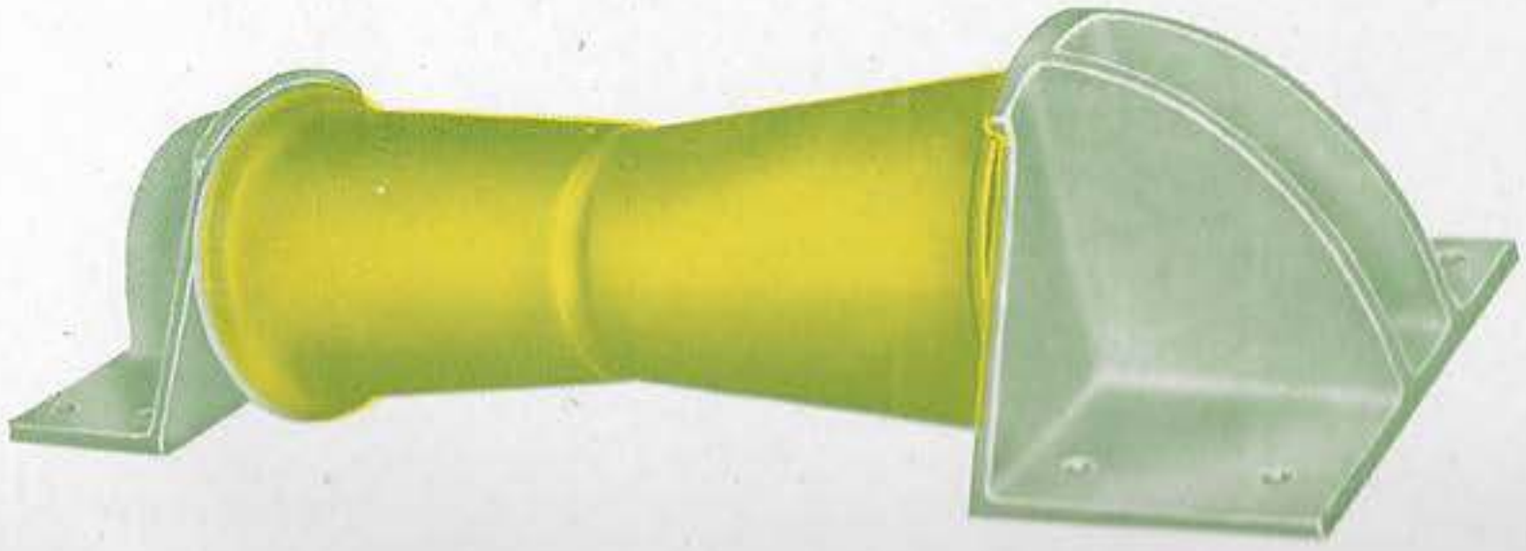


Fig. 386

Road Rollers

Fig. 220

Fig. 221

Genuine Manganese Steel Road Rollers, corrugated or plain bronze bushed, complete with shafts, with oil reservoirs and flat boxes.

Code Word	Size		List
Gount	8x12	Plain Manganese	$50.00
Gayer	8x16	Plain Manganese	75.00
Gavel	8x12	Corrugated Manganese	50.00

Chilled Iron Road Rollers, corrugated or plain, complete with flat boxes and shafts.

Code Word	Size		List
Gawky	8x12	Plain	$25.00
Gaze	8x12	Corrugated	25.00

Write for Discounts

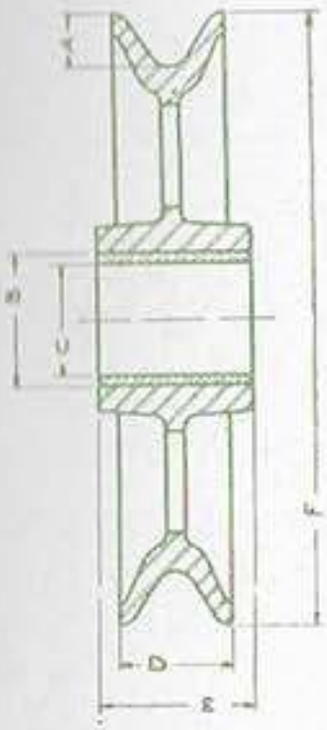


Fig. 223

Manganese Steel Sheaves

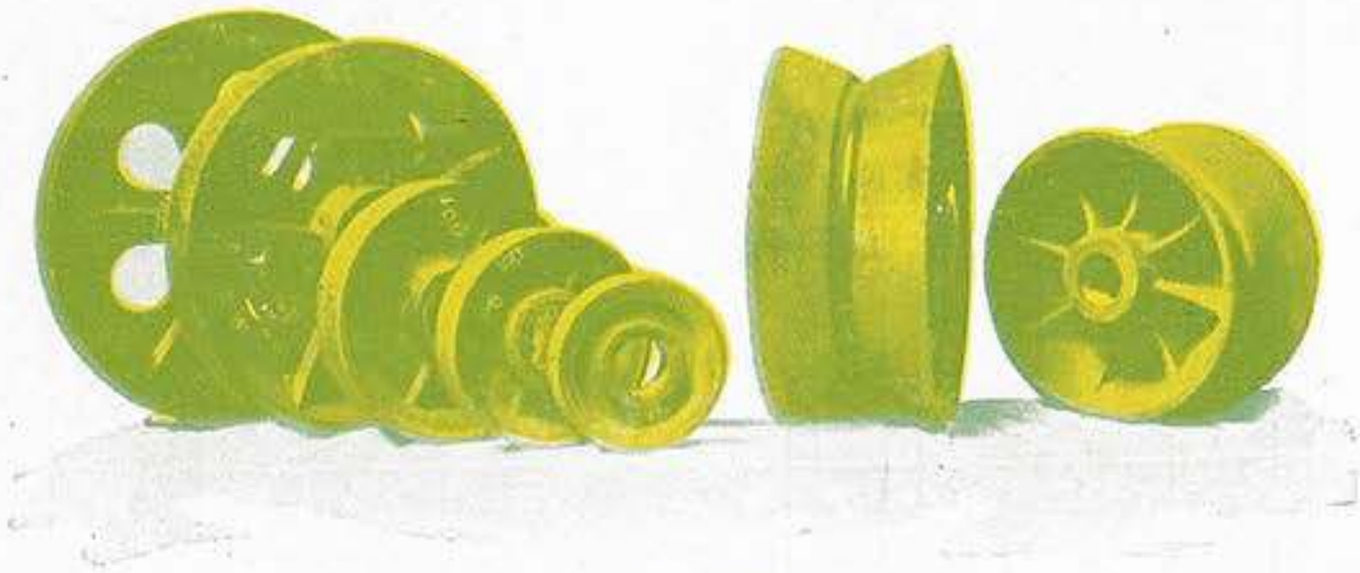


Fig. 168

We manufacture a complete line of genuine Manganese Steel Sheaves. Hardness, strength and toughness guaranteed. All standard sizes in stock. In ordering special sizes give dimensions indicated on sketch, Fig. 223.

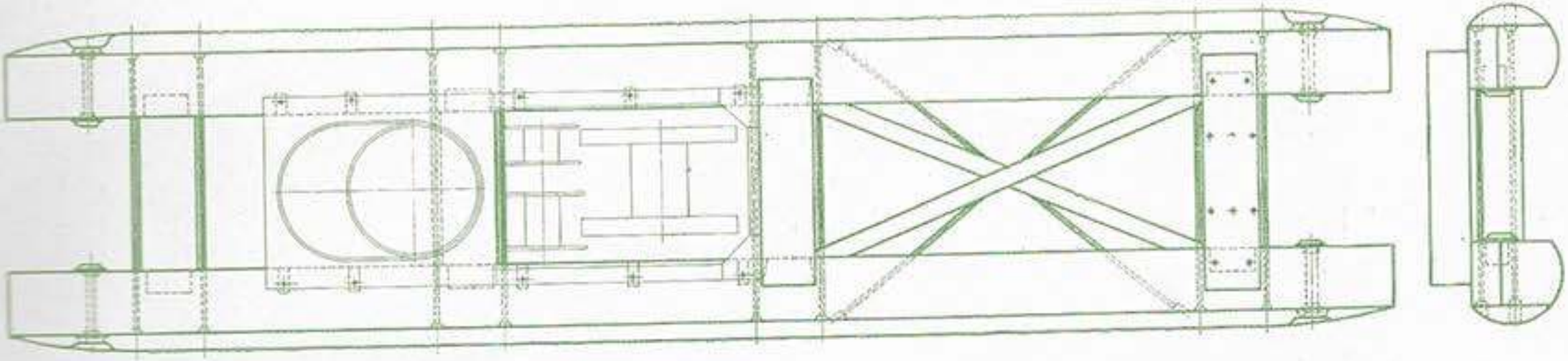


Fig. 268

LOGGING ENGINE SLED

Dimensioned Sled Prints for Washington Logging Engines will be furnished on request

Logging Engine Sled Irons

Fig. 310
Code Word *Ahead*

A steel sled place of improved design with extra deep 7" throat for either chain or wire rope.

Guaranteed against breakage. List Price $10.00

Fig. 310

Fig. 76
Code Word *Flank*

This improved washer for holding down bolts prevents holding down bolt becoming loose and cutting into sled.

Price of Washer, each.....$0.60

Fig. 77
Code Word *Filly*

A cast iron sled plate furnished as shown or with round hole when desired. Price $4.00

Fig. 379
Code Word *Fable*

Extra Wide Washer, Fig. 379, each.....$1.00

SLED WASHERS

Heavy pattern extra large diameter sled washer especially designed for cross rods and bolts used in construction of logging engine sleds.

Size	List
1¼"	60c each

Fig. 378
Code Word *Squid*

In addition to above listed sled irons, we are prepared to furnish for prompt shipment cross rods, brace rods and holding down bolts for engine sleds. Prices on application.

The Clausen Butt Hook

(Patented)

Figure 381

Simplicity itself and a safety hook that will not lose the chokers. No springs, bolts or catches to get out of order and require attention.

Price ..... $22.00 each
Ferrules (all sizes) ..... $12.00 per doz.

Figure 385

A correctly designed plain drop forged Butt Hook made of alloy steel heat treated after forging.

PRICES

Sizes	List
2¼ inch	$ 9.00
2½ inch	10.50

Patent Locking Butt and Choker Hooks

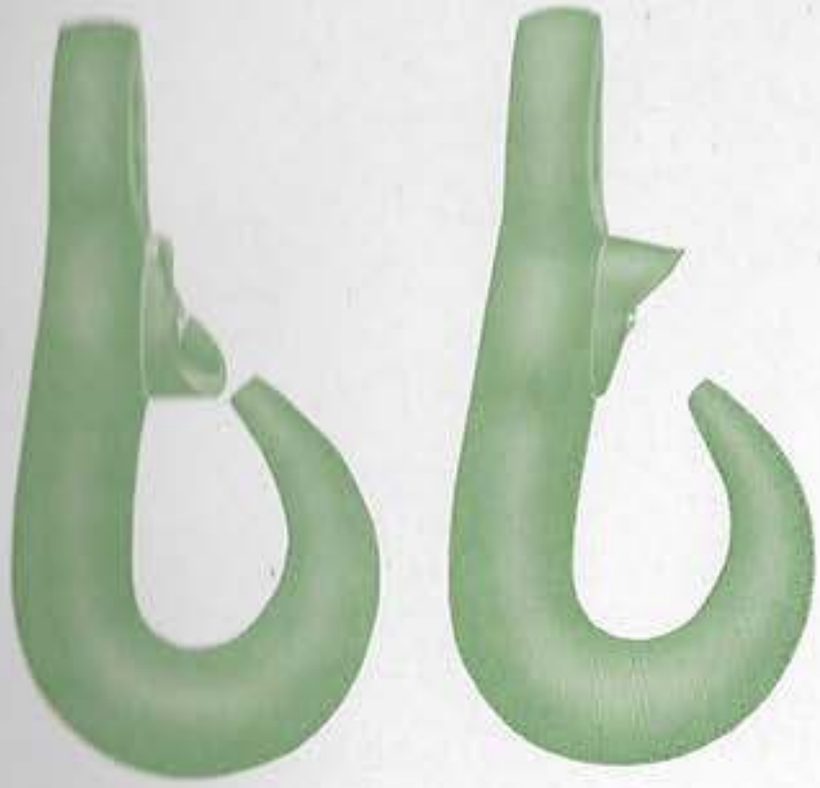


Fig. 382

Fig. 196

Patent locking Butt Hooks and Choker Hooks shown in Figures 382 and 196 are very practical and dependable locking hooks.

PRICES

PATENT LOCKING BUTT HOOKS—Figure 382

Size	List
½ inch	$18.00
¾ inch	21.00
2¼ inch	25.00
2½ inch	

PATENT LOCKING CHOKER HOOKS—Figure 196

Size	List
⅞"x2½"	$16.00
1" x3"	16.00
1⅛"x3½"	17.00
1¼"x4"	18.00
1⅜"x5"	18.00

Butt Chain Outfit

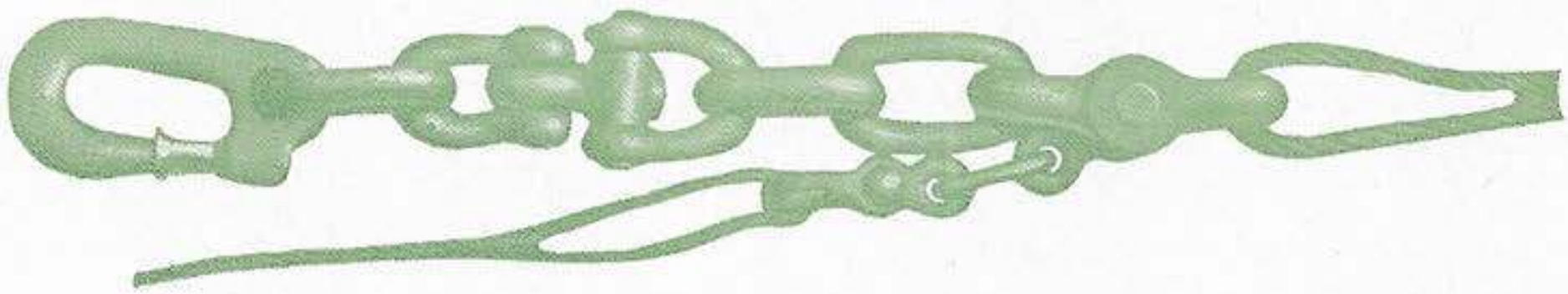


Fig. 402

Made up of patented Butt Hook and Tag Line Clevis, with standard pattern main-line swivel and trip line swivel and sister hooks, forged from tool steel throughout, except Norway iron links.

List price, with 1¾" lag line clevis and 2½" butt hook, $72.00.

Drop Forged Choker Sockets

Fig. 384

A correctly designed wire rope socket, drop forged and bored to size after forging.

PRICES

Size		List
⅞" and 1"	Each	$3.00
1⅛" and 1¼"	Each	3.50
1⅜" and 1½"	Each	5.00

Loading Tongs

Fig. 347

Pacific Coast type loading tongs made of high grade chrome nickel tool steel, oil tempered.

PRICES

Sizes	Spread	List
1¾	30 inches	$45.00
2	36 inches	50.00
2¼	42 inches	55.00
2½	48 inches	80.00

Marlin Spikes

Marlin Spike made of high grade tool steel carefully tempered and ground.

Fig. 352

Fig. 383

Rafting Dogs

Drop forged rafting dogs with large smooth eye to permit passage of swifter lines.

Oil and Water Tanks

Fig. 351

Single and Double Compartment Oil and Water Tanks built in all sizes for logging needs. Strong, well constructed Tanks.

Washington Boilers

Fig. 393

The unexcelled reputation of Washington Boilers is due to distinctive features of their design combined with the highest quality of material and superior construction throughout. All edges of plates are planed and all flanged and rolled plates are so laid out and drilled that they come into perfect fit and alignment without being strained in riveting. This careful construction with uniform pressure used in riveting makes a perfect and absolutely tight joint and a boiler of long life. Tube heads are carefully drilled. Tubes are accurately fitted and expanded. Hand holes of boilers are so arranged that they come opposite opening between tubes and level with the top of crown sheet, which allows the tube sheet to be readily cleaned of scale and sediment.

Fig. 160

Washington boilers are thoroughly tested under hydrostatic pressure and guaranteed for working pressure specified. Washington boilers are designed and material used in same to conform to the American Society of Mechanical Engineers' Specifications.

TABLE OF SIZES VERTICAL BOILERS (HIGH PRESSURE TYPE)

Nominal H. P.	Inside Diameter of Boiler, Inches	Height of Boiler, Inches	Number of Tubes, 2-Inch	Length of Tubes, Inches	Thickness of Steel in Shell	Thickness of Tube Heads, Inches	Estim'ted Wt. of Boiler Without Fixtures, Lbs.	Estim'ted Wt. of Boiler & Fixtures Complete, Lbs.
4	24	48	24	24	¼	5/16	900	1,300
5	24	60	24	35	¼	5/16	1,000	1,400
6	24	72	24	41	¼	5/16	1,100	1,500
8	30	60	44	35	¼	5/16	1,400	1,880
10	30	72	44	41	¼	5/16	1,600	2,080
12	36	72	69	41	5/16	5/16	2,200	2,750
15	36	78	69	49	5/16	5/16	2,300	2,850
20	40	84	88	54	5/16	3/8	2,860	3,830
25	42	90	96	54	3/8	7/16 and 3/8	3,200	4,200
30	42	96	96	60	3/8	7/16 and 3/8	3,360	4,200
35	44	96	112	60	3/8	7/16 and 3/8	4,550	6,600
40	48	96	140	60	7/16	7/16	5,280	6,580
45	48	106	140	66	7/16	7/16	5,670	6,970
50	54	96	188	60	7/16	½ and 7/16	6,900	8,750
55	54	106	188	66	7/16	½ and 7/16	7,400	9,250
60	54	120	188	76	7/16	½ and 7/16	8,000	9,850
75	60	106	248	66	7/16	½	9,400	11,500
85	60	120	248	76	7/16	½	10,900	13,000
105	66	120	302	76	7/16	9/16 and ½	13,350	15,850
125	66	132	302	88	7/16	9/16 and ½	14,690	17,190
135	72	120	376	76	7/16	5/8 and 9/16	15,720	18,840
150	72	132	376	88	7/16	5/8 and 9/16	16,300	19,420

NOTE—Specifications Extended Fire Box Boiler mailed on request.

Improved Type Loading Drum

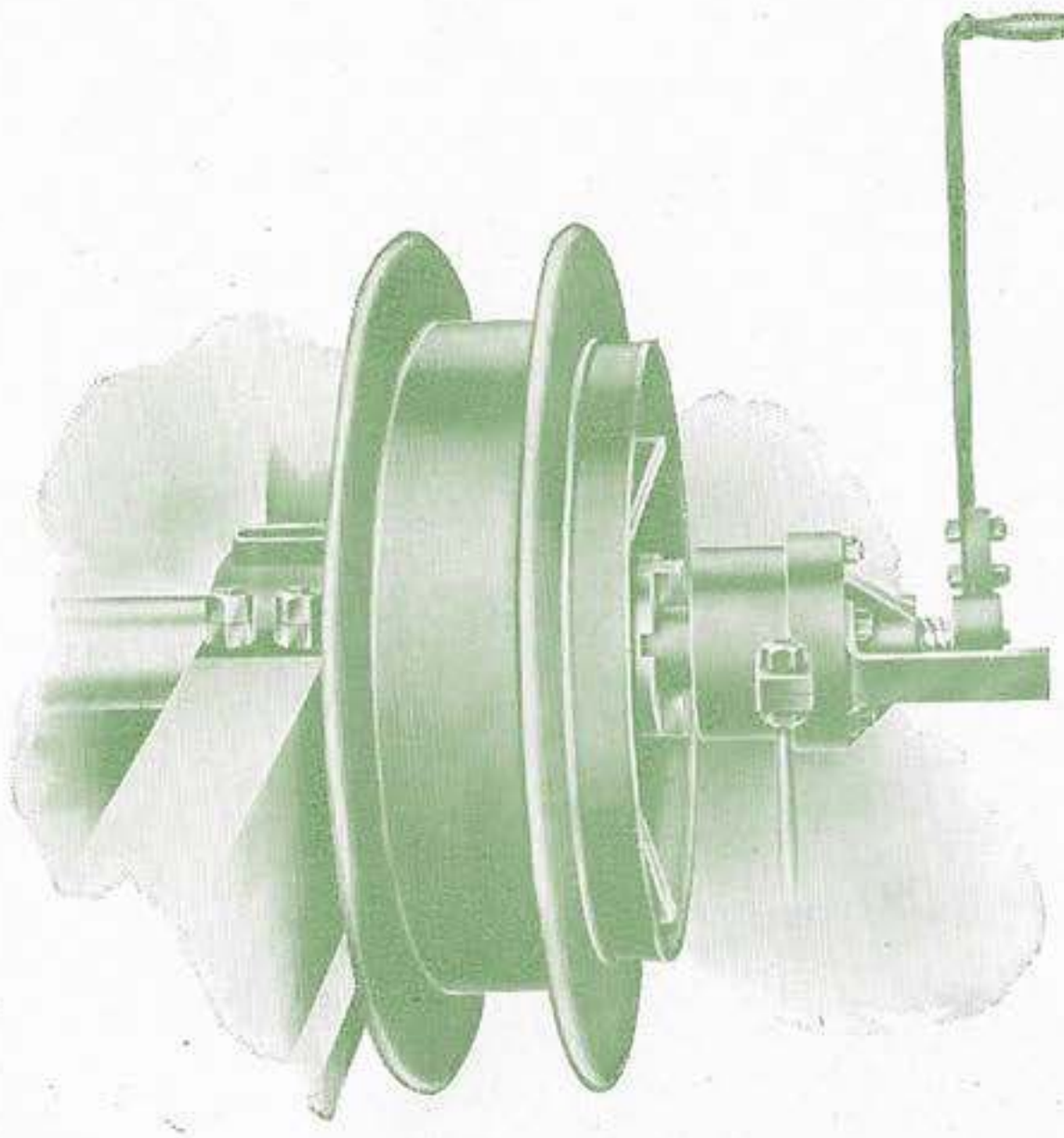


Fig. 100
Code Word *"Lemur"*

SPECIAL FEATURES

1. Can be installed in place of gypsy on any engine without new shaft.

2. The only loading drum made with ample sized friction.

3. Compactness; drum does not extend beyond sled runner.

Use of this drum instead of gypsy saves time and line. Drum can be used as loading drum or straw line drum to run out trip line.

Washington Sand Stove

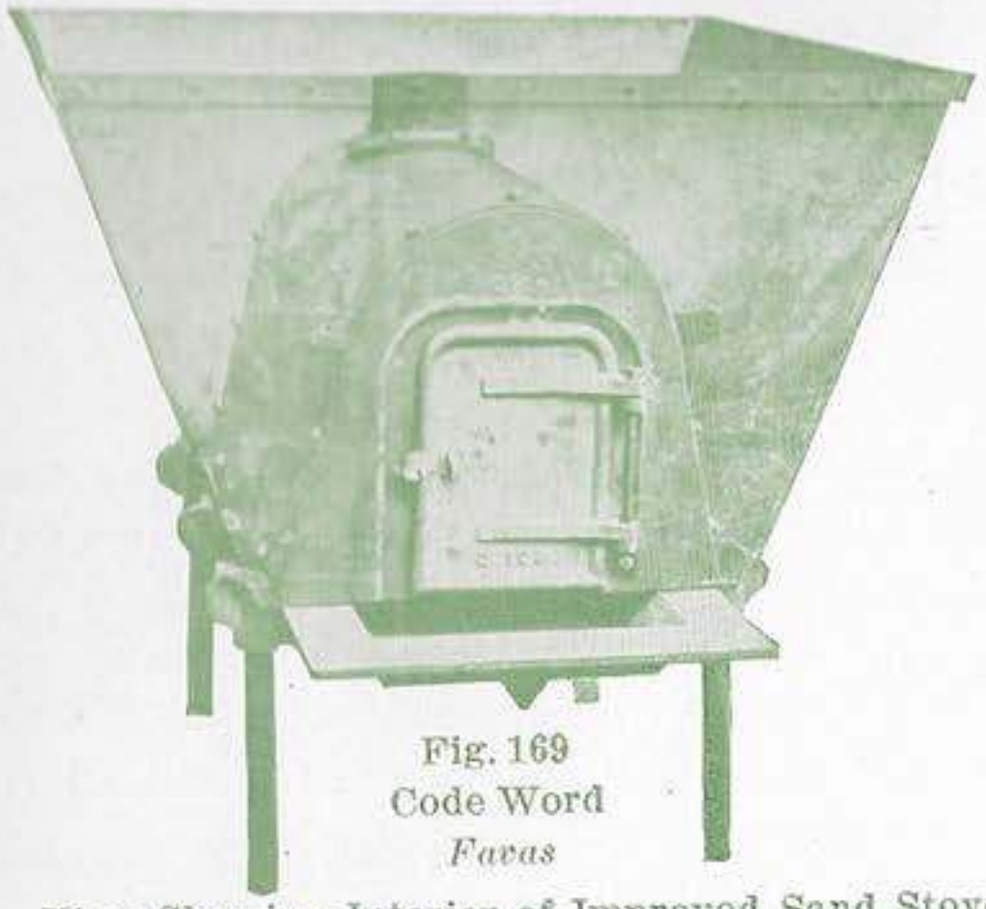


Fig. 169
Code Word
Favas

View Showing Interior of Improved Sand Stove

This improved sand stove dries a large quantity of sand quickly and is of simple and durable construction.

Burch Wire Rope Cutter

Cuts wire rope quickly, cleanly and cheaply. An excellent tool for the splicer. Cuts any grade and size of rope up to 1″ in diameter. Used in the field or in the shop. Price, $20.00.

Fig. 380
Code Word *Phyma*

Washington Nickel Babbitt

Fig. 370

Washington Nickel Babbitt possesses a peculiar toughness and hardness which makes it particularly suitable for high speed and heavy pressure machinery and especially in places where there is pounding or unequal pressure exerted on the journals.

We recommend this Babbitt for Crank Shaft and all High Speed Drum Shafts.

Washington Anti-Friction Babbitt

Fig. 371

Washington Anti-Friction Metal is a high grade hard Anti-Friction Babbitt of high melting point, and is manufactured for heavy, slow-running bearings.

We recommend this Babbitt for slow-running Drum Shafts.

Babbitrite

A MATERIAL FOR RETAINING MOLTEN BABBITT METAL

Fig. 394

Babbitrite prevents blow-outs, due to the fact that it will not absorb moisture and will adhere to the work under all conditions. Do you figure the time wasted in your factory caused by blow-outs while pouring babbitt metal into journal boxes, it being necessary in many cases to chip out all the babbitt that was put in and rebabbitt the box. This important advantage of BABBITRITE over putty or clay should have your careful consideration.

Babbitrite is always ready for use and requires no preparation or mixing and can be used a hundred times on the same work pouring babbitt metal into journal boxes, babbitting choker sockets on wire rope, etc.

PRICES

No. 15 Size Pail	$ 4.25
No. 30 Size Pail	7.50
No. 50 Size Pail	12.50

NOTE:—This material is used exclusively in our own factory and we invite inspection of its use.

Melting Ladle

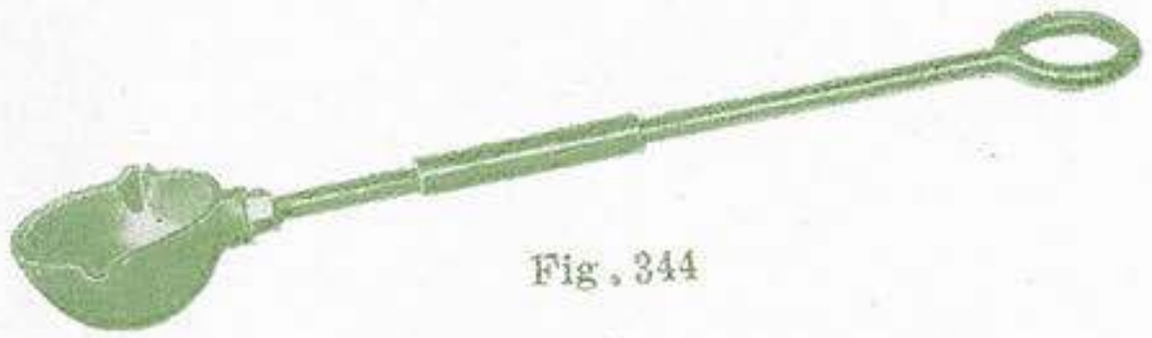


Fig. 344

A heavy, serviceable camp melting ladle furnished with or without handle.

Lubricating Compounds

WASHINGTON ROLLER BEARING BLOCK GREASES

Washington block greases are specially prepared for us to properly lubricate roller bearing logging blocks.

Grade "A" is a yellow medium body semi-fluid grease, fibrous in constituency with high melting point and is recommended for roller bearing logging blocks with Hyatt bearings.

Grade "B" is a light body grease and turns to almost liquid form and is especially recommended for logging blocks with Timken bearings.

PRICES

Grade "A," 25-lb. cans ..... Per lb. $0.20
Grade "B," 25-lb. cans ..... Per lb. $0.20

"Marvel" Grease Gun

Equipped with flexible hose and nozzle and special frame for fitting over 25-lb. can of "Washington" Grease.

With this grease gun, roller bearing blocks, bearings, cups, etc., can be quickly filled with grease—free from dust and dirt. Pump delivers about one pound of grease per stroke.

Price, each, with special frame $22.50

Price, each, without special frame 20.00

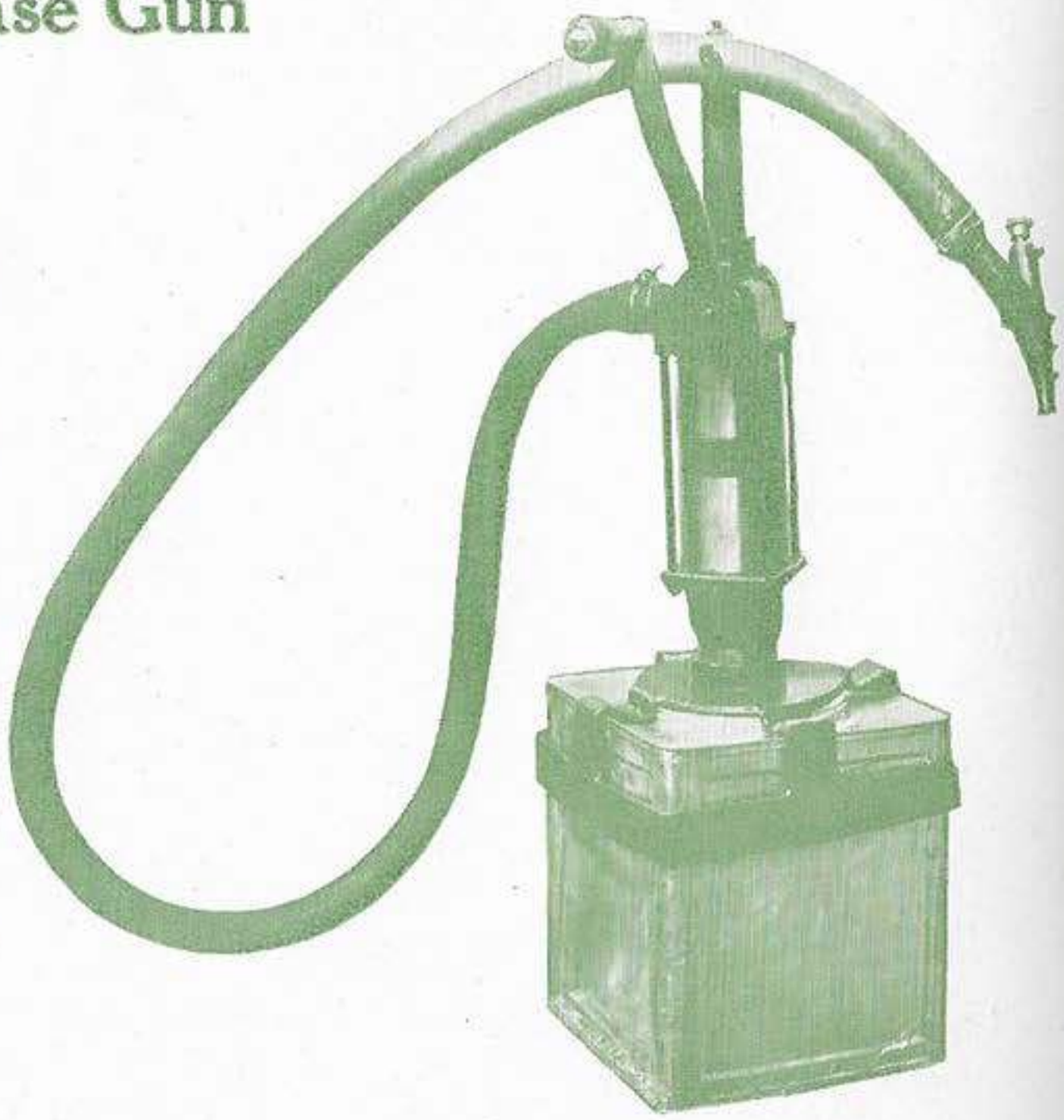


Fig. 389

Improved Non-Heating Auto-Lubricating Friction Device No. 20

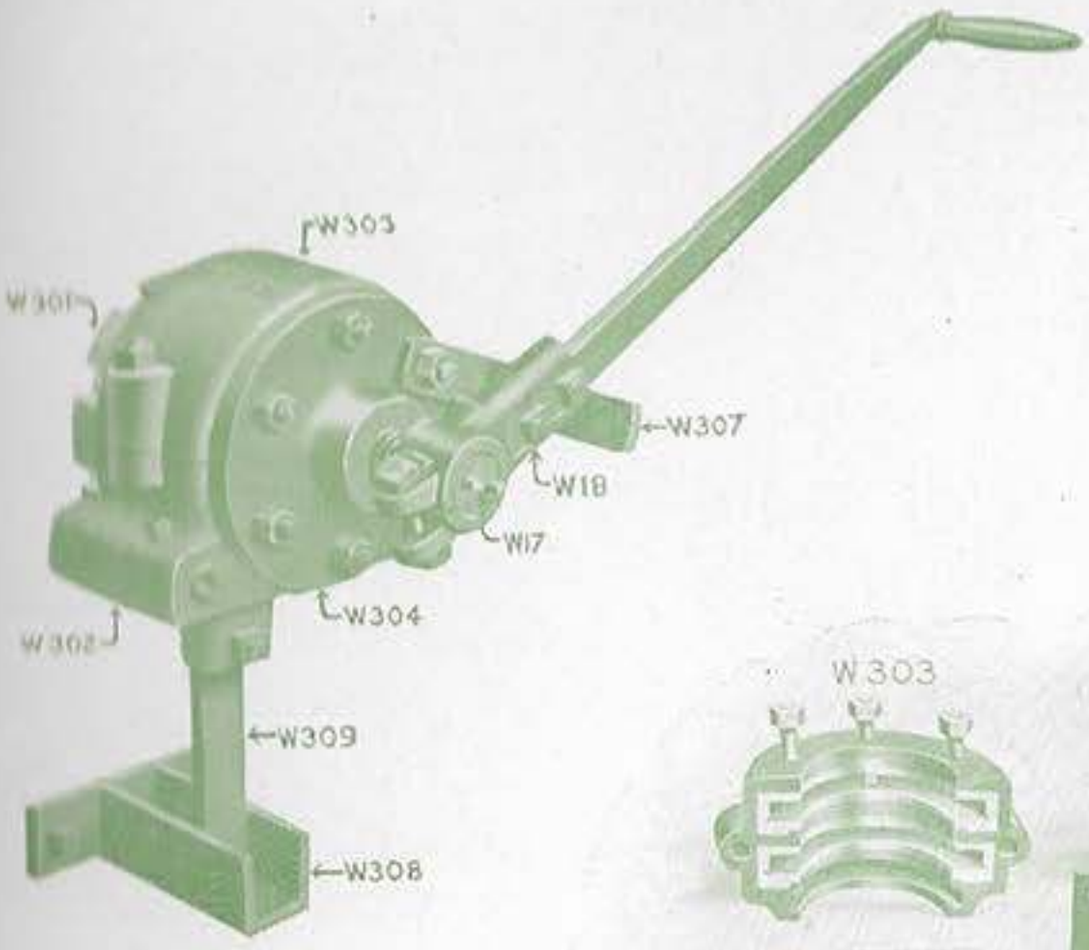


Fig. 258

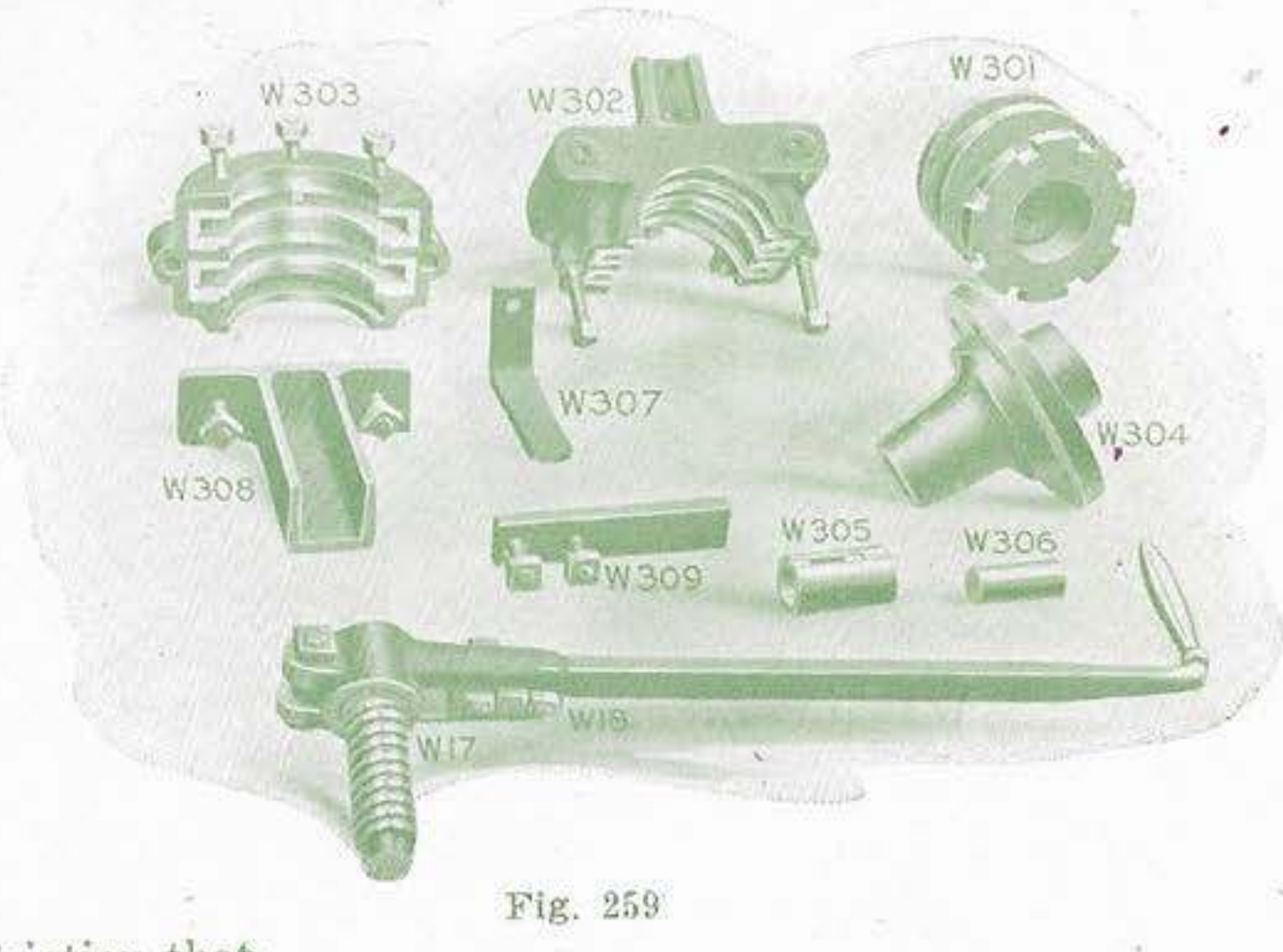


Fig. 259

We claim for this Friction that:

It has all the advantages of sensitiveness of an ordinary lever friction device with none of its defects, and is especially adapted to yarding.

This device eliminates friction pin trouble as well as end pressure on shaft and drum shaft bearing.

Requires no adjustment other than that given any ordinary Lever Friction device.

Has fewer parts than other frictions.

Can be attached to any engine without taking apart, device being so designed that it can be easily screwed or unscrewed from drum shaft.

Will wear longer with less upkeep than any other friction.

Price ..... $.....

Boiler Tubes

Fig. 388

We carry a large stock of seamless tubes with annealed ends in gauges and lengths for logging engine and locomotive boilers.

Seamless Copper Ferrules

Fig. 392

Washington seamless copper ferrules for boiler tubes.

Staybolts

Fig. 290

We are prepared to furnish boiler staybolts made of hollow or solid genuine staybolt iron in all sizes and lengths.

Steel Log Branding Hammers

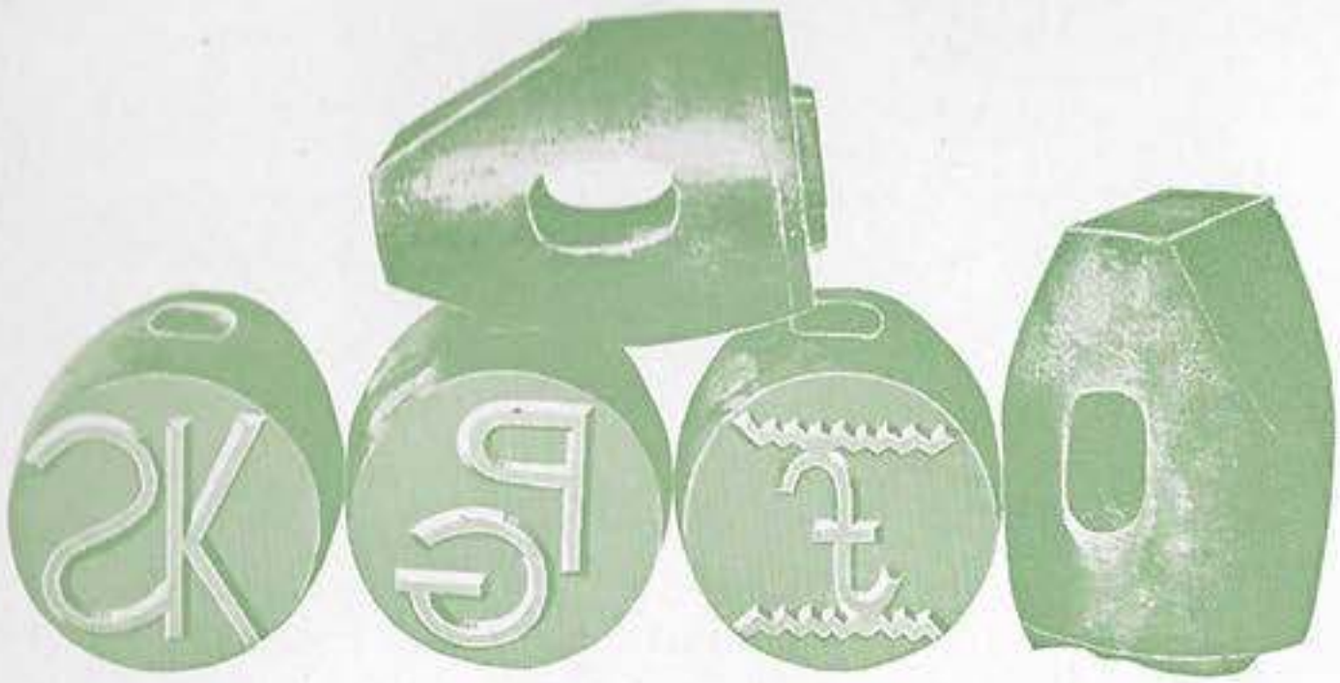


Fig. 360

Washington Steel Log Branding Hammers have sharp, clean cut edges and insure good log markings.

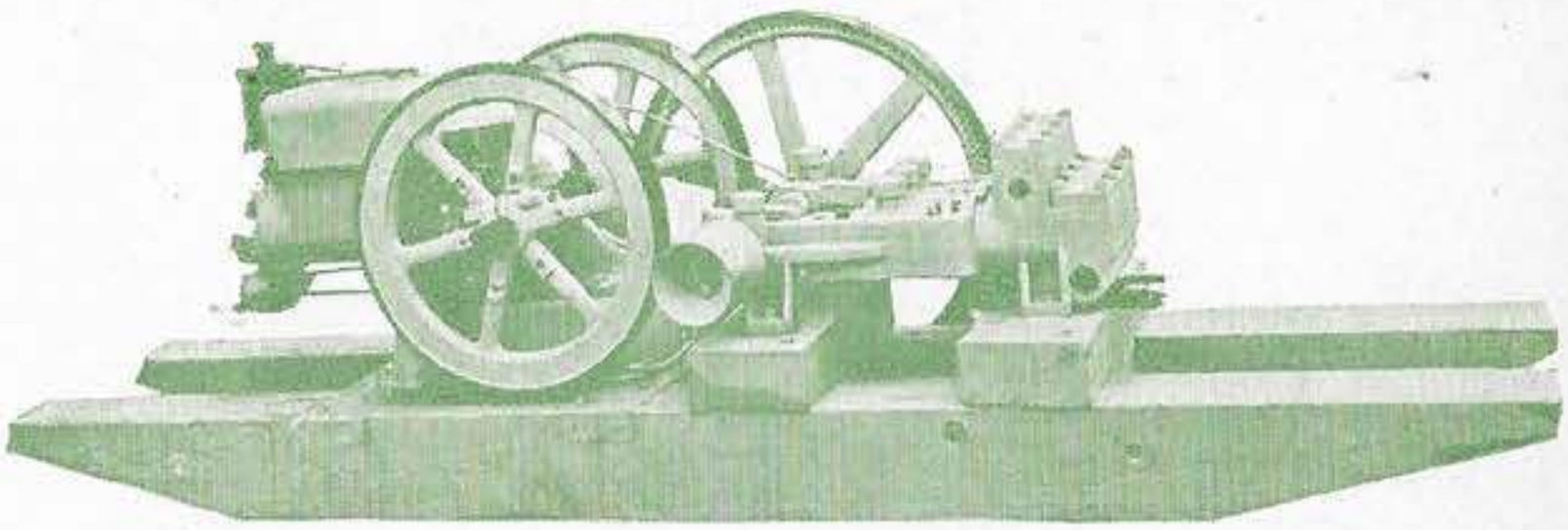
Orders filled promptly, prices depending on design.

Socket Wrench

Figure No. 391

A double end Socket Wrench especially designed for use on logging engines.

Size	PRICES	List
1 and 1⅛-inch Hexagon Nuts	Each	$.....
1⅛ and 1¼-inch Hexagon Nuts	Each	$.....
1¼ and 1½-inch Hexagon Nuts	Each	$.....



Cut shows No. 3 Standard Pump

Fleck Pumping Engines

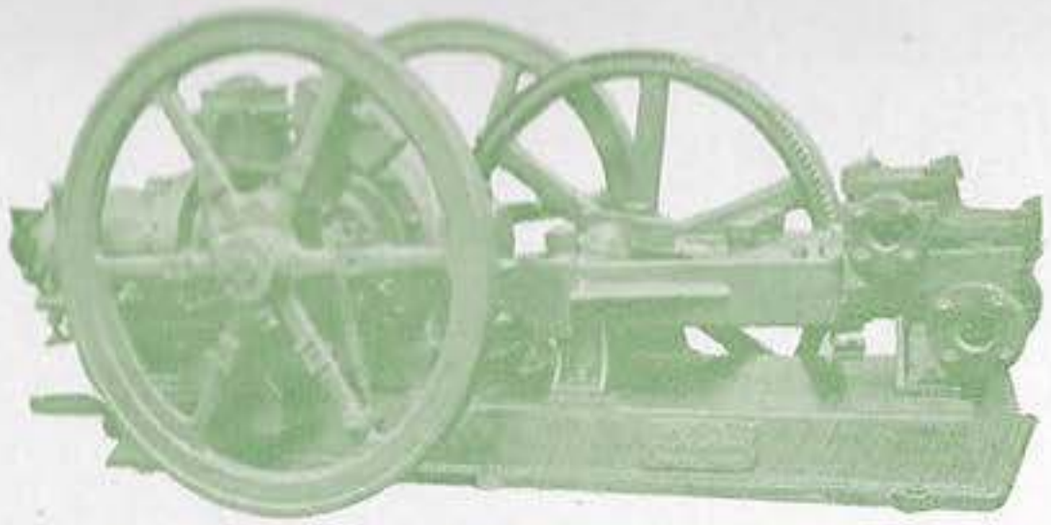
Are standard equipment on the Pacific Coast for furnishing water for donkey engine and camp supply.

Size No.	Bore and Stroke of Pump	Gallons per Hour	Maximum Total Head	Size Intake	Size Outlet	Approximate Total Weight
1 Junior	2 "x3"	400	600 ft.	1¼"	1 "	600 lbs.
2-A	2½"x4"	600	800 ft.	1½"	1¼"	1500 lbs.
2	2½"x4"	900	500 ft.	1½"	1¼"	1500 lbs.
3 Standard	3 "x4"	1300	750 ft.	2 "	1½"	2100 lbs.
3-A	2½"x4"	720	1200 ft.	2 "	1½"	2100 lbs.
4-C	2 "x6"	720	2000 ft.	2 "	1½"	4000 lbs.
4-A	2½"x6"	1500	1000 ft.	2½"	2 "	3800 lbs.
4	3 "x6"	2000	750 ft.	2½"	2 "	3700 lbs.
5-B	2 "x8"	1200	2000 ft.	2 "	1½"	5000 lbs.
5-A	3 "x8"	2500	1000 ft.	3 "	2½"	5000 lbs.
5	4 "x8"	3600	600 ft.	3½"	3 "	4900 lbs.

The No. 1, No. 2, No. 2-A, No. 3 and No. 3-A machines are equipped with gipsy on the crank shaft of pump for moving the outfit under its own power and are shipped complete, mounted on sled and ready to connect suction and discharge pipes and put to work.

The machines larger than No. 3 are of the same general type of construction as the No. 3 Standard Pump, but with such modification of design as appears desirable because of greater size and weight.

These larger machines are not equipped with gipsy, but if desired special winch can be furnished so that the outfit can be moved under its own power.



Cut shows No. 4 S.-D. Pumping Engine

Fleck Semi-Diesel Pumps

These Semi-Diesel type pumping engines will operate on fuel oil of much lower grade and lower cost than the distillate or kerosene used by electric ignition engines listed on previous page. As ignition in this type of engine is caused by heat due to compression only (after starting) no magneto, igniter, spark plug or wires are required.

Consequently a much lower operating cost is possible as well as freedom from any trouble due to electric ignition and there are no valves or timing gears.

All parts are large and of the simplest construction and the engine is a fit mate for the sturdy water end it drives.

We can, if desired, provide winch for mounting with these Semi-Diesel pumping engines. Cast sub-base as shown is standard construction and sled is not furnished unless ordered.

Size No.	Bore and Stroke of Pump	Gallons per Hour	Maximum Total Head	Size Intake	Size Outlet	Approximate Total Weight
S.-D. 4-C	2 "x6"	720	2000 ft.	2 "	1½"	4400 lbs.
S.-D. 4-A	2½"x6"	1500	1000 ft.	2½"	2 "	4400 lbs.
S.-D. 4	3 "x6"	2000	750 ft.	2½"	2 "	4300 lbs.
S.-D. 5-B	2 "x8"	1200	2000 ft.	2 "	1½"	5600 lbs.
S.-D. 5-A	3 "x8"	2500	1000 ft.	3 "	2½"	5600 lbs.
S.-D. 5	4 "x8"	3600	600 ft.	3½"	3 "	5500 lbs.
S.-D. 6-C	3 "x12"	2700	1500 ft.	3½"	3 "	
S.-D. 6-B	4 "x12"	4500	800 ft.	4 "	3½"	
S.-D. 6-A	5 "x12"	7000	500 ft.	5 "	4 "	

Other Special Sizes Built to Meet Any Requirements
Up to Pressures of 5000 Lbs. per Square Inch

WATER FOR THE DONKEYS and camps has become a factor of first importance in successful logging operations and the means to be employed in furnishing a continual, economical and abundant supply is a vital question. THE FLECK CAMP PUMP is the proven answer to that question and hundreds of operators on the Pacific Coast already know it from actual experience.

Bottomless Self-Emptying Scrapers With Manganese Steel Teeth

We make a complete line of bottomless, self-emptying scrapers of design shown below and of capacities from one and one-third to five yards, for use with our logging and special scraper engines.

The body of scraper is made of flanged boiler steel, heavily reinforced. The blade is made of Dipper Steel with reversible cutting edges. Teeth are made of genuine manganese steel.

These scrapers are especially adapted for moving large quantities of dirt a considerable distance, and can be used for nearly every kind of grading work, ditch work, making reservoirs, mill ponds, handling sand and gravel, making cuts in railroad work, etc.

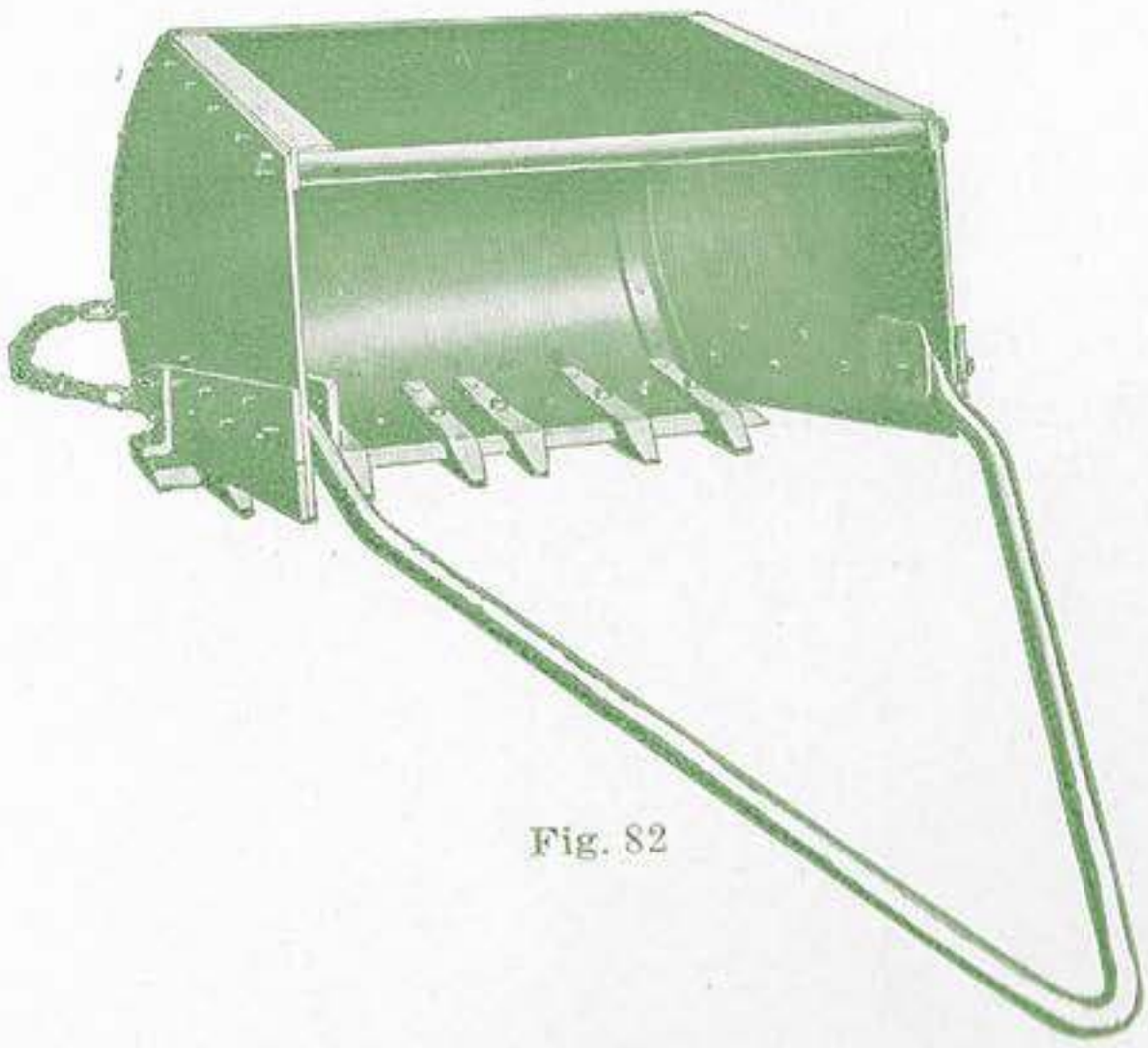


Fig. 82

PRICES

Code Word	Capacity	List
Yam	1⅓ yards	
Yawn	2 yards	
Yawl	2½ yards	
Yule	3 yards	
Yacon	4 yards	
Yelt	5 yards	

"Soule" Patent Grader

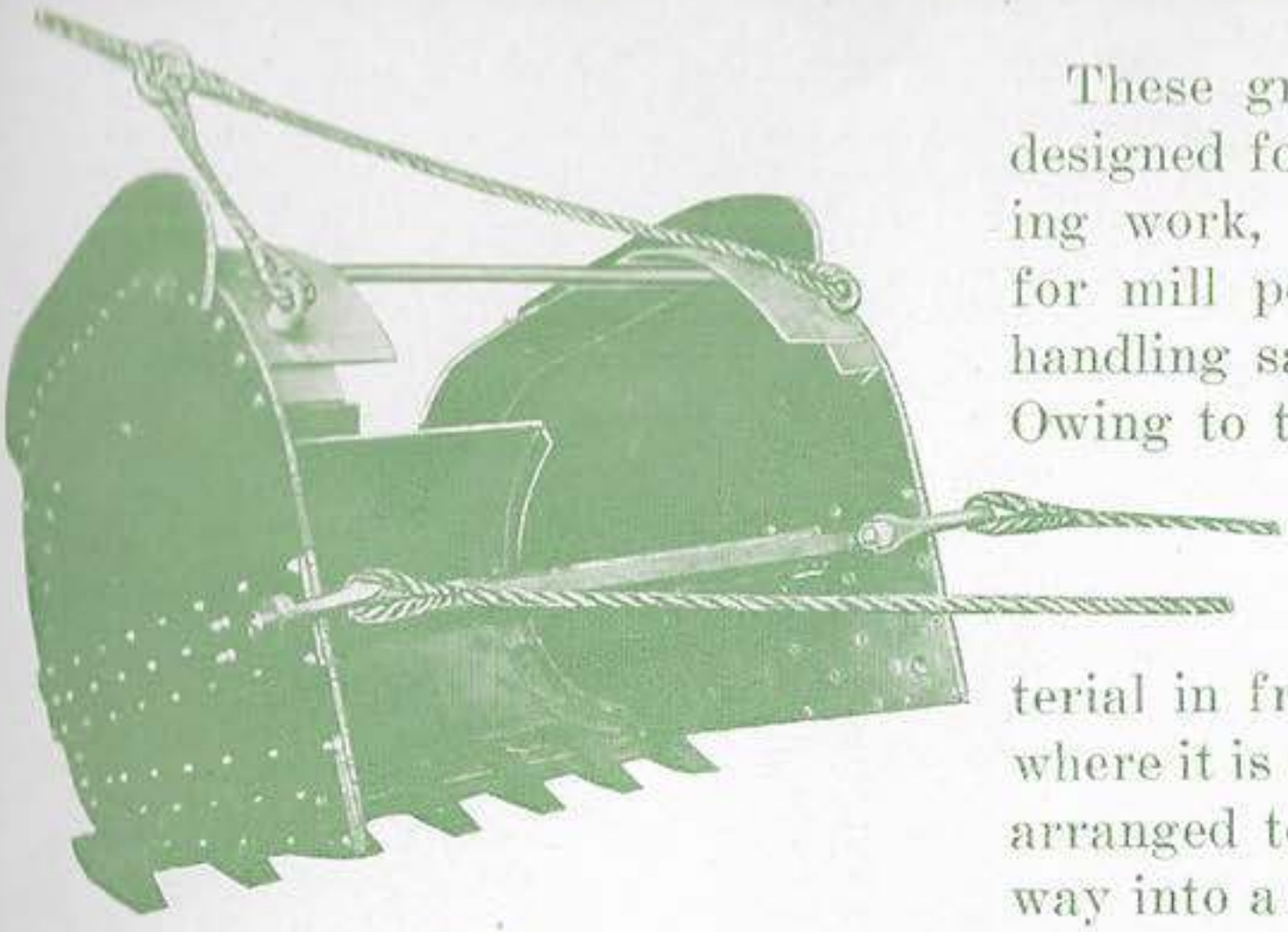


Fig. 400

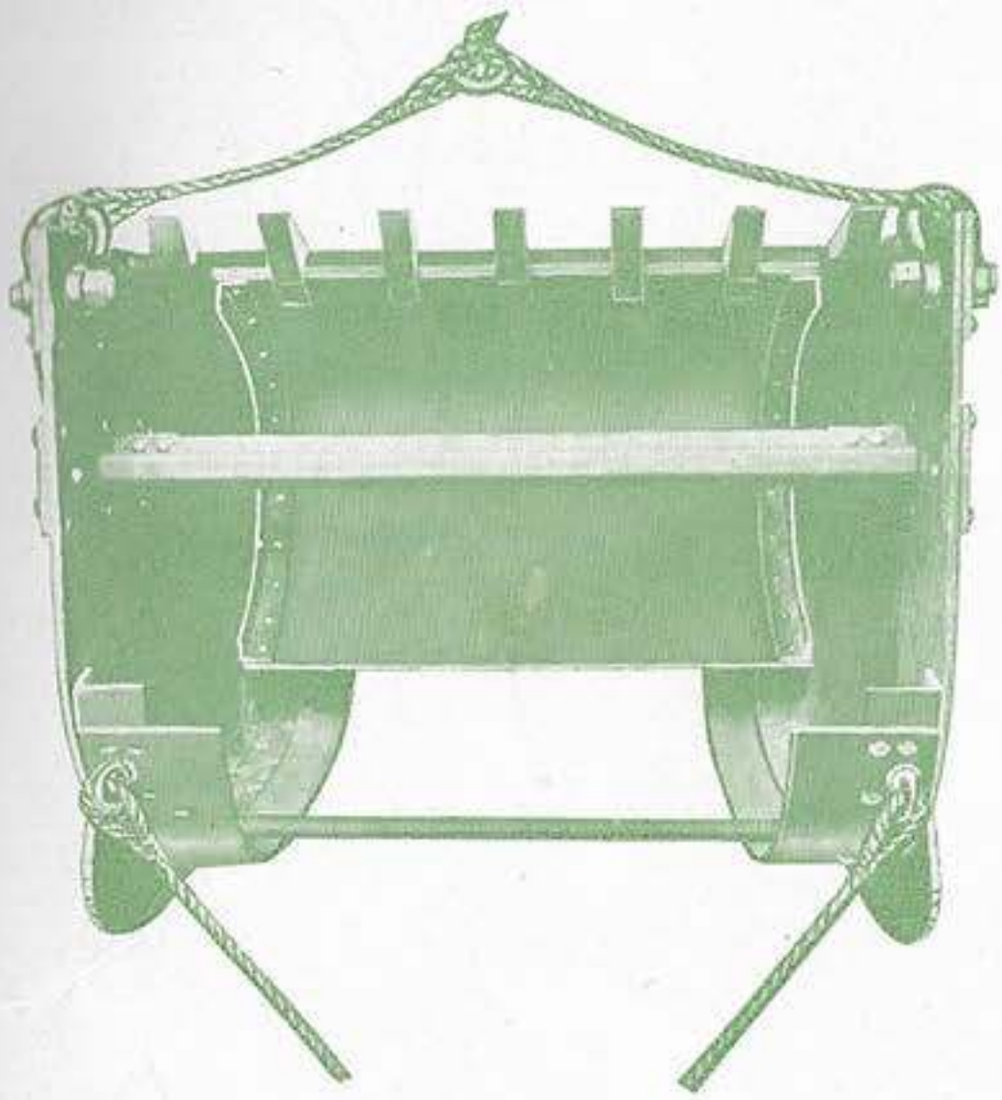


Fig. 401

These graders are specially designed for any kind of grading work, such as excavating for mill ponds, railroad cuts, handling sand and gravel, etc. Owing to the curvature of the back, no bottom is used — the grader pushing the material in front of it, leaving it where it is stopped; or it can be arranged to dump over a runway into a hopper.

On returning, the tension in the Haulback line pulls the bucket over onto its back which is equipped with runners (see Fig. 401), lifting the cutting side of the grader clear of the ground, saving wear on knife and teeth, and eliminating a very large per cent of the friction due to hauling the bucket back.

The grader is equipped with tire steel cutting knife and manganese steel teeth.

We manufacture this grader in the following sizes:

PRICES

Code Word	Cubic Yards	Width in Feet	Weight with Teeth	List
False	1¼	3½	3200	.....
Facuy	1¾	4	3400	.....
Fault	2½	5	4200	.....
Fiegn	3½	5½	4850	.....

Patent Boomerang Spark Arrester

Fig. 184
Code Word *Fauna*
Logging Engine Type

Particular attention is called to our Patent Boomerang Spark Arrester. The exhaust, which is the cause of so much trouble with the ordinary Spark Arrester, is made use of in the Boomerang Spark Arrester, and the heavier the draft, the better it works.

The sparks and smoke going through the stack are separated by a cone, which is a little larger in diameter at base than stack. The smoke, being light, takes the course of least resistance around the outer edge of cone and through screen. The sparks, on account of the momentum, travel straight up and are diverted by the steel cone into the boomerang and thence into screen conveyor tube into bucket or half barrel on roof or any convenient place. Briefly stated, the merits claimed for the above Spark Arrester are as follows: Absolutely stops all sparks from passing out of stack.

Made in all sizes for Donkeys and Locomotives.

Fig. 242
Code Word *Agile*
Locomotive Type

Fig. 222
Code Word *Agog*

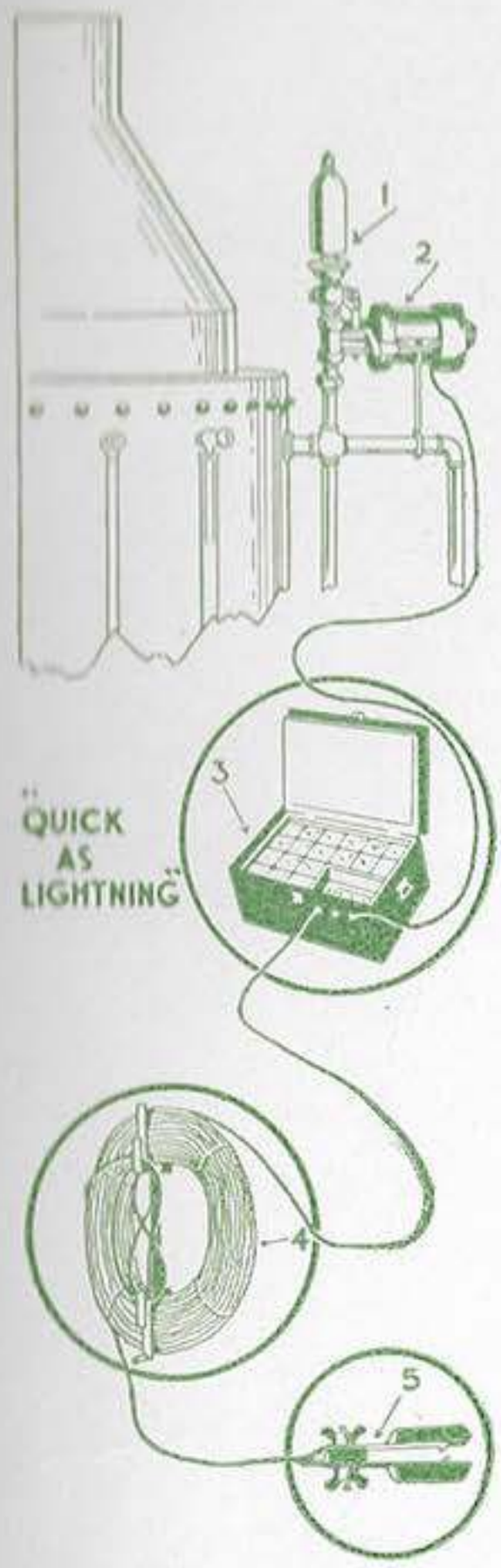
Plain Spark Arrester

We also make plain Spark Arresters (see Figure 222), in all sizes for Logging Engine Stacks.

*Prices on application.

*Note—In ordering Spark Arresters give exact diameter, or preferably exact circumference, of stack on which Spark Arrester is to fit.

TOOTS-E — Electric-Steam Signal System



THE above illustration shows the simplicity of operation of TOOTS-E. A coil magnet (2) opens the whistle throttle (1) when the current from the battery box containing 18 TOOTS-E moisture-proof dry cells (3) is sent along a specially insulated signal cable (4) by making a contact with a spring-grip handle (5).

Just as simple and easy to operate as a push-button.

DELAYS in set-up are costly. With TOOTS-E, one can stretch the signal cable under the track —across fallen trees—through the brush, wherever most convenient. This signal system is ready in an instant. TOOTS-E operates with the line on the ground, or in the brush, across ravines and up hills, at any angle—instantly—always dependable.

Detailed Description

Following is a detailed description of the TOOTS-E, Type E, Electrically-Controlled Signal System:

(1) 3"x6" Steam Whistle Bell and ¾" Valve.

(2) Electrical Operating Mechanism, consisting of Solenoid Coil, Plunger, Plunger Stop and Lever, all mounted in an enameled cast-iron housing.

(3) Battery and Relay. 18 TOOTS-E Dry Cells in partitioned wooden box in substantial metal case, flanged cover.

(4) 1000 feet of Special Weather-Proof, Pliable, stranded, Double-Conductor, Copper Signal Cable, and Reel. Additional lengths of cable may be added as required. The signal has been tested up to 8000 feet.

(5) Spring-Grip Handle for transmitting signals (for Signalman). A similar handle is provided for the Engineer..

Shipped Ready for Installation

The TOOTS-E Signal System is shipped complete in a strong wooden case, securely packed for convenient delivery to the donkey; all assembled, ready to attach to the signal connection. Shipping weight 200 lbs.

When specified on order for new machine, solenoid braces are installed in our plant, and the whistle attached, ready for immediate use.

Stocked in Seattle and Vancouver, B. C.

TOOTS-E Signal Systems Complete and Spare Parts are stocked in Seattle and Vancouver, B. C., for Immediate Shipment.

Manzel Force Feed Oilers

PISTON VALVE TYPE—CLASS XD

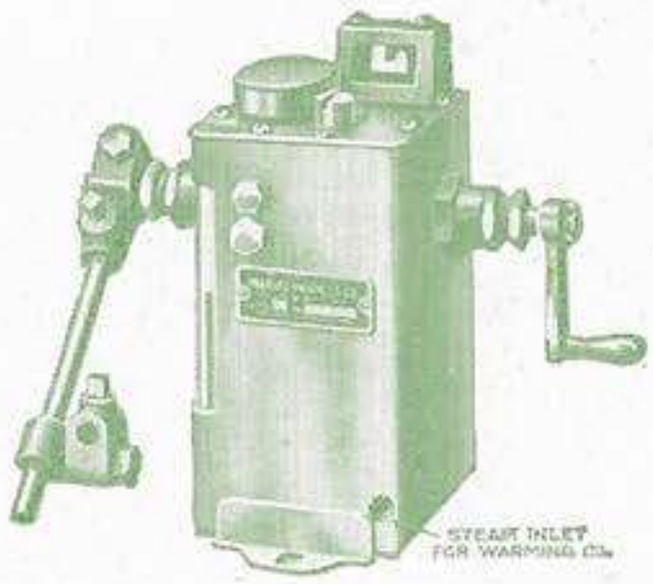


Fig. 395

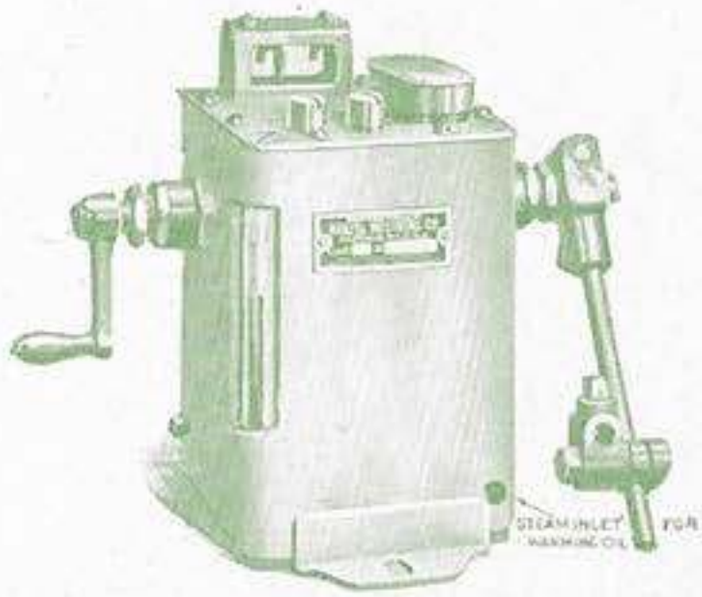


Fig. 398

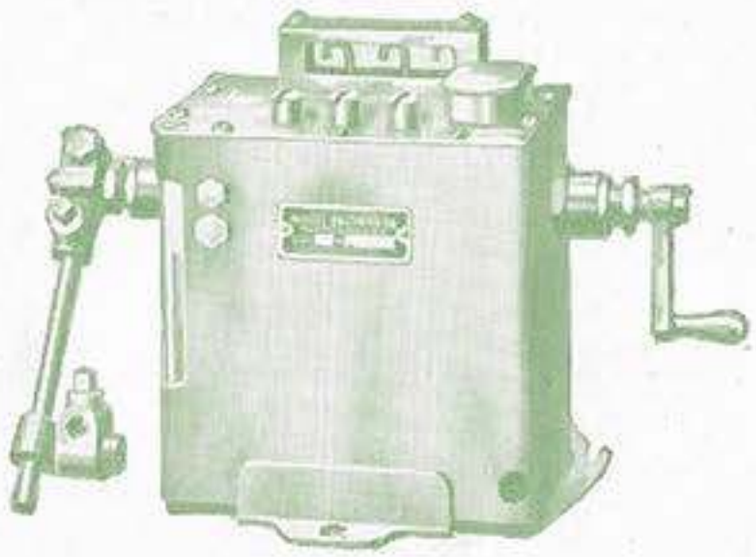


Fig. 396

Fig. 397

Oiling by means of a force feed oiler enables the operator to KNOW—not guess—how much oil is being supplied to each cylinder or bearing. The oil is ALWAYS supplied in accordance with the speed of the engine. When the engine starts, stops, speeds up or slows down, the mechanical oiler also starts, stops, speeds up or slows down. It always supplies the exact amount of oil required by the engine. It never supplies too much or too little. It requires practically no attention. It saves oil and saves the engine.

THE MANZEL IMPROVED FORCE FEED OILER IS EASILY CONNECTED, IS ESPECIALLY ADAPTED TO LOGGING ENGINES, AND WILL GIVE POSITIVE LUBRICATION UNDER EVERY CONDITION OF SERVICE.

We carry in stock Single, Double and Triple Feed Oilers.

Prices on application.

Fig. 285

Fig. 286

SEMI-METALLIC PACKINGS

Semi-metallic rod packings, Fig. 285, are made in sizes especially for Washington logging engines.

Our semi-metallic rod packing stop leaking valve and piston glands.

Will last longer than fibre packings and eliminate scoring of piston and valve rods.

Give engine number when ordering.

SPECIAL HIGH-PRESSURE GASKETS

High pressure boiler hand hole gaskets, Figure 286, made especially for Washington boilers. Price ..... each.

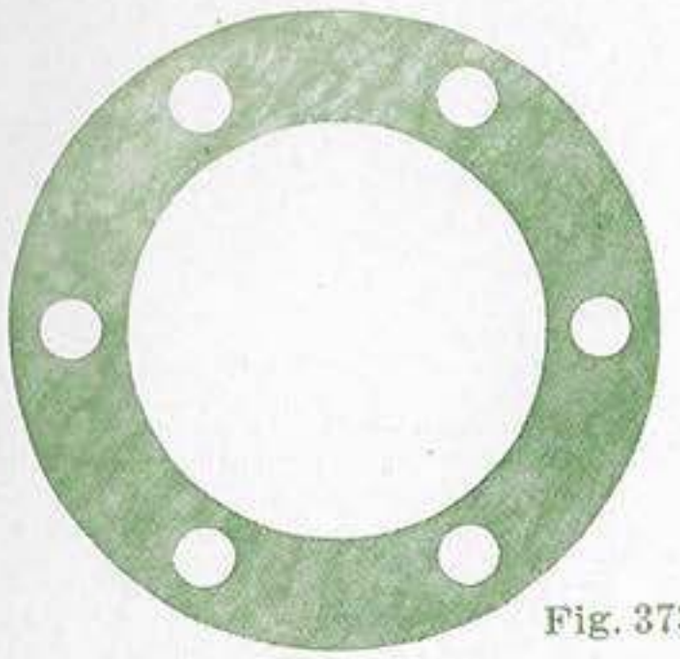


Fig. 373

CYLINDER, VALVE HEAD AND PIPE FLANGE PACKING

Figure 373 illustrates a high-grade compressed asbestos fibre packing made especially for the cylinder heads, valve heads and pipe flanges of Washington engines.

Waste of time and packing eliminated by purchasing these packings which are ready to install.

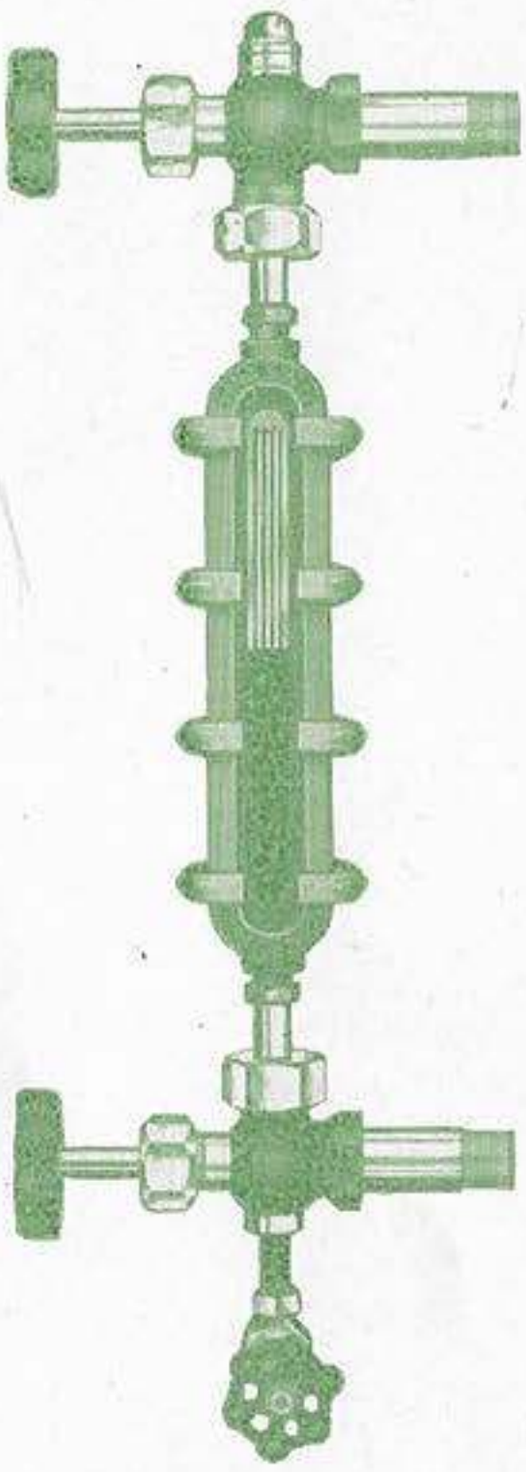
Fig. 367

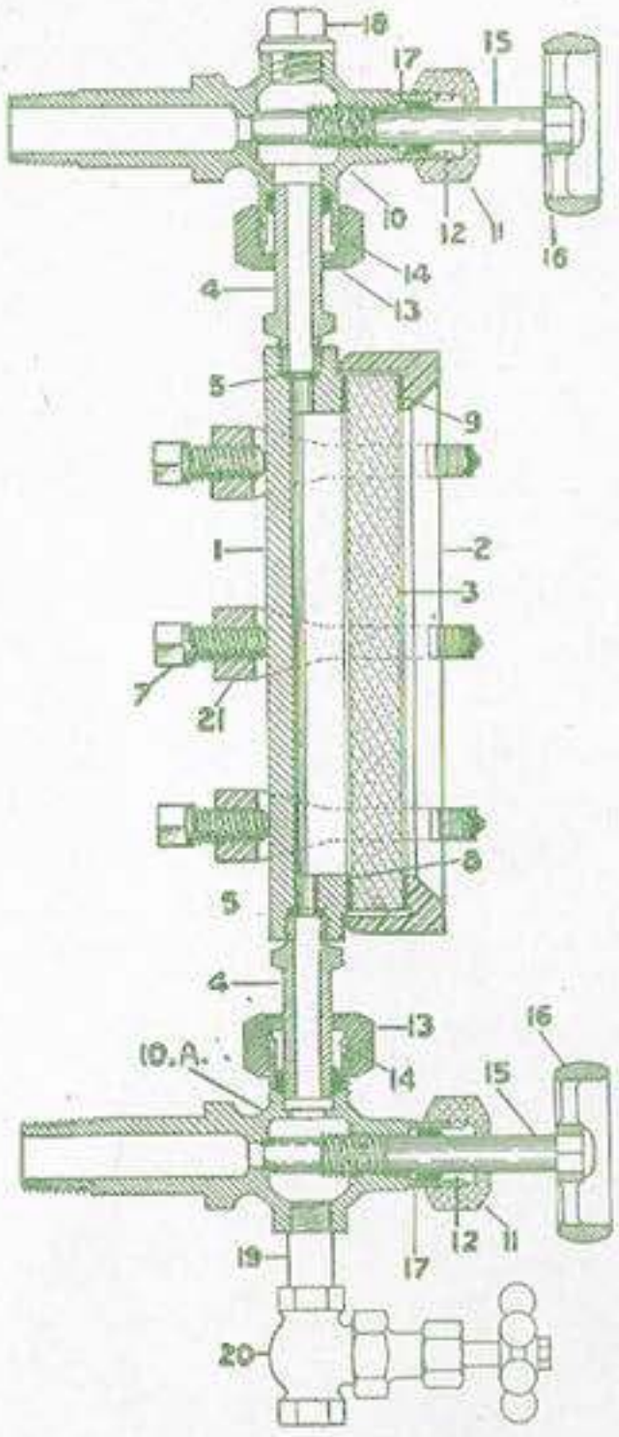
GOETZE'S ELASTIC CORRUGATED COPPER GASKETS WITH ASBESTOS LINING

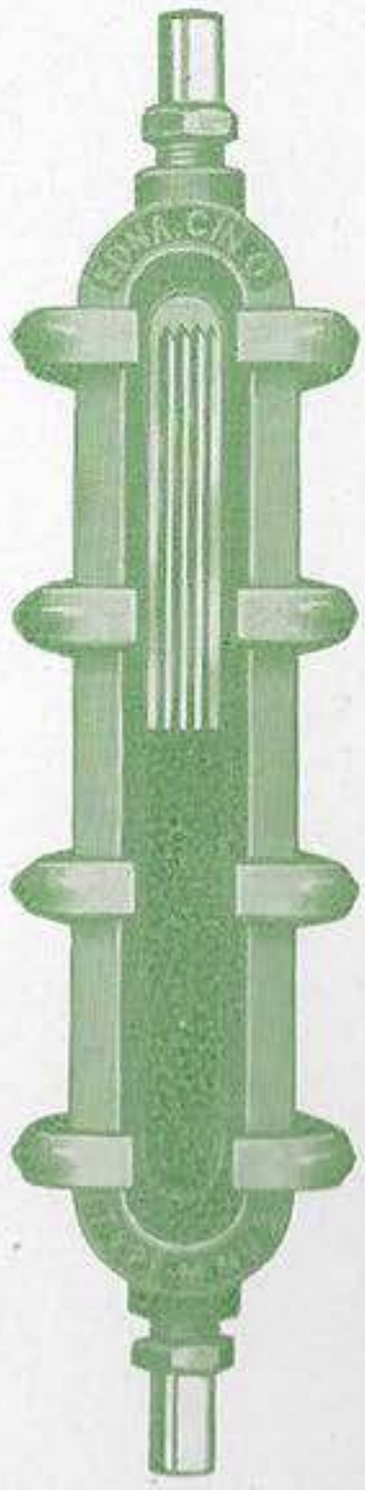
A ring type high pressure gasket that will make a lastingly tight joint where several other kinds fail. Especially recommended for joint between boiler and flanged steam connections.

The Edna Reflex Water Gauge

TYPE M







DESCRIPTION

THE EDNA REFLEX WATER GAUGE Type M introduces a gauge of an entirely new and novel design.

With the improved construction of fastening the front to the back by means of yokes and set screws, it is not necessary to remove the body of the gauge from the boiler fittings for any repair or replacement of glass or gaskets. Unless some boiler work should necessitate the removal of gauge, the application may be considered as permanent.

The construction of the frame and clamps overcome distortion of packing surface by repeated application of glass and gaskets, and the uniform pressure eliminates chipping or breaking of the glass.

The bodies are made of high grade steam metal and the clamps of non-corrosive bronze.

These gauges are furnished with ⅝-inch gauge stems No. 4, 3 inches long, unless otherwise specified. We can also furnish stems in sizes ½ or ¾-inch. Length of all gauge stems not to exceed 6 inches.

Top and Bottom Boiler Fittings are furnished with ¾-inch Shanks, Iron Pipe size, unless otherwise specified.

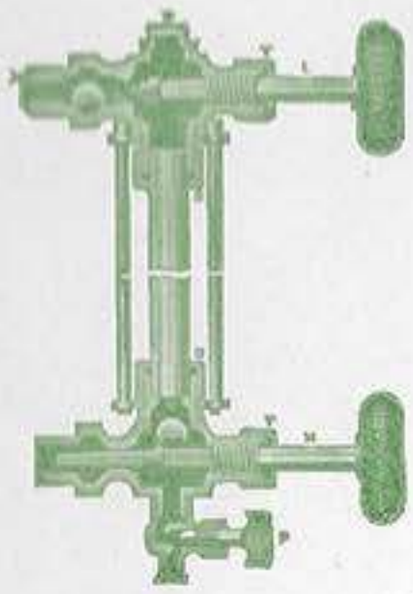
We guarantee all Gauges to stand 250 pounds Steam pressure, and each gauge is thoroughly tested before leaving our factory.

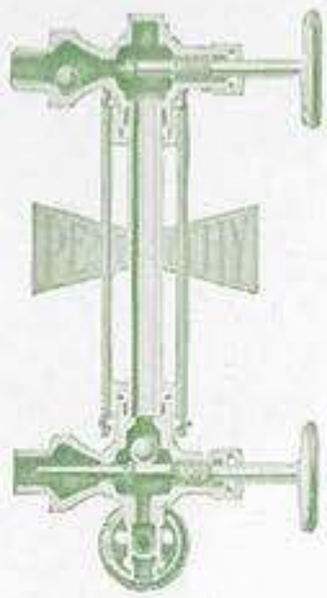
DIMENSIONS

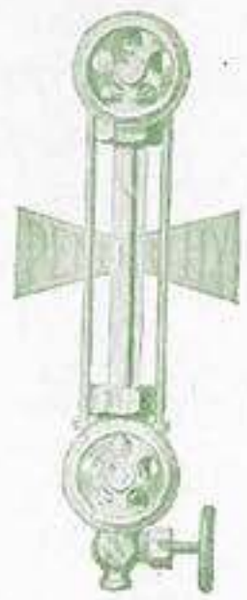
No.	1	2	3	4	5	6	7	8	9
Length of Body	6″	7″	7¾″	8¾″	10″	11¼″	12⅜″	13⅞″	14⅝″
Length of Observation Glass	3⅝″	4½″	5½″	6⅜″	7½″	9″	10″	11¾″	12⅝″
Length of Glass	4 1/16″	5½″	6½″	7½″	8⅝″	9 1/16″	11″	12⅛″	13⅝″
Distance between Nuts of Stuffing Boxes	8–9″	9–10″	10–11″	11–12″	12–13″	13–14″	14–15″	15–16″	16″

"Safeguard" Automatic Water Gauges

(Patented)





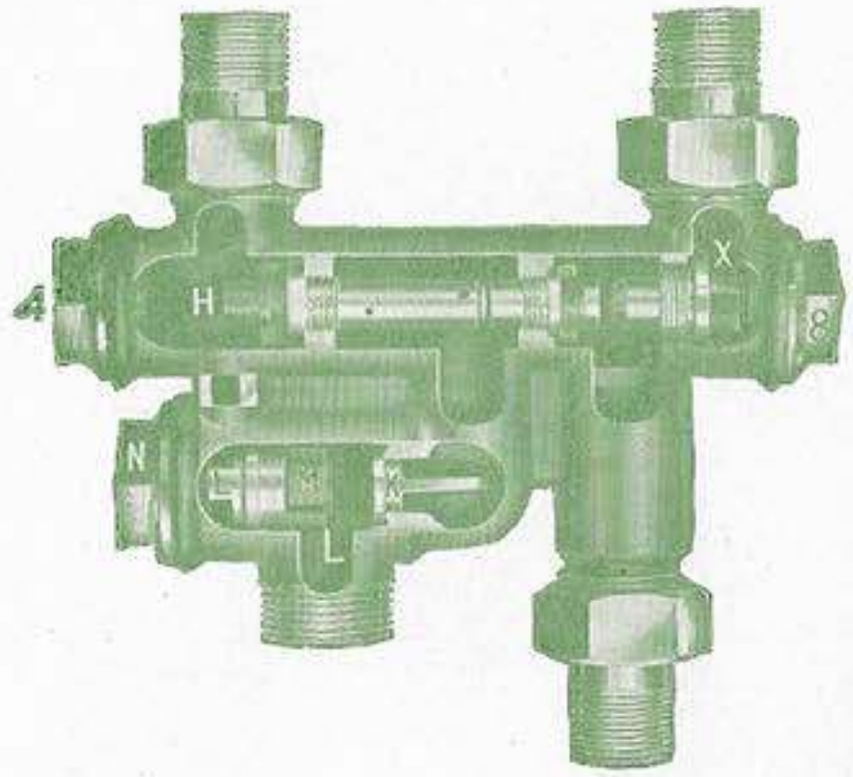


HIGH PRESSURE GAUGE GLASSES

Durabla High Pressure Gauge Glass is a metallic glass possessing elastic properties enabling it to withstand the most sudden and radical changes of temperature and the highest steam pressures. It is clear as crystal and always remains so.

Penberthy "Auto-Positive" Injector

Especially recommended for logging engines using high pressure boilers.



WHAT THE "AUTO-POSITIVE" WILL ACCOMPLISH AUTOMATICALLY

It will start on a short lift at 20 to 25 pounds steam pressure, and operate to 200 pounds pressure, water 74° Fahrenheit, or summer temperature. At winter temperature works to 240 pounds pressure.

It Will Handle a Hot Water Supply as Follows:

130° to 125° Fahr., according to conditions, at.....75 to 100 pounds steam pressure
125° to 130° Fahr., according to conditions, at.....50 to 120 pounds steam pressure
110° to 115° Fahr., according to conditions, at.....35 to 150 pounds steam pressure
90° to 95° Fahr., according to conditions, at.....28 to 175 pounds steam pressure
Under 60°, 30 to 225 pounds Under 40°, 35 to 240 pounds

Vertical Lift—It lifts from 3 feet at 200 pounds pressure to 20 to 23 feet between the pressures 65 and 120 pounds.

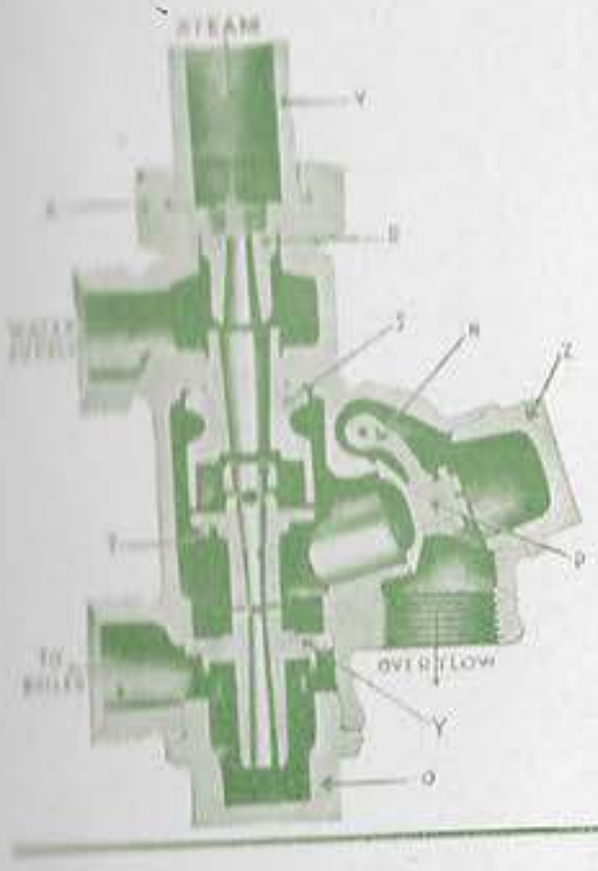
Such results have never before been obtained from an automatic Injector, and are scarcely reached by the "positive" machines with their complicated construction and numerous valves, which must be manipulated by the engineer in charge whenever the Injector is started or stopped.

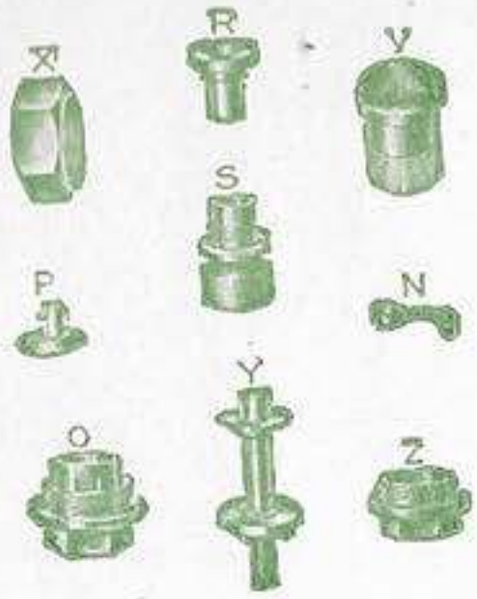
The "Auto-Positive" Injector accomplishes the above MARVELOUS RESULTS with a very simple construction consisting of ONLY FIVE WORKING PARTS, and is operated by a single globe valve in the steam pipe.

By taking out the plugs 4 and 8 you can see straight through this Injector and tell if it is stopped up. All jets can also be taken out by the removal of these plugs without disturbing Injector connections.

Special High Pressure and Hot Water Penberthy Automatic Injector for Logging Engines

With Relief Valve at Bottom for Starting on Low Pressure





R-Steam Jet. V-Tail Pipe
S-Suction " X-Coupling Nut
Y-Delivery" Z-Overflow Cap
O-Plug P- " Valve
N- " Hinge

PRICE LIST

SIZE NO.	Prices	Supply Boiler of Horse Power	Pipe Connections	Capacity per Hr. at 180 lbs. Steam Pressure Lifting Water Having a Temperature of 74° Three Feet
325-O	$ 15 00	3 to 6	¼-inch	55 gallons
326-OO	16 00	4 to 8	⅜-inch	76 gallons
328-AA	20 00	12 to 22	½-inch	170 gallons
330-BB	30 00	20 to 45	¾-inch	350 gallons
332-CC	45 00	45 to 80	1 -inch	570 gallons
334-DD	60 00	75 to 135	1¼-inch	940 gallons
336-EE	90 00	115 to 255	1½-inch	1800 gallons
338-FF	125 00	200 to 400	2 -inch	2850 gallons
340-GG	200 00	375 to 600	2½-inch	4000 gallons

PARTS OR REPAIRS

In ordering Injector parts do not fail to send the serial number and letter, which will be found on top of the overflow, otherwise we must write you for this information, and thus delay shipment.

PRICE LIST OF PARTS OR REPAIRS

Size Injector	OO	AA	BB	CC	DD	EE	FF	GG
R—Steam Jet	$0 25	$0 35	$0 45	$0 55	$0 65	$0 75	$1 00	$2 00
S—Suction Jet	25	35	45	55	65	75	1 00	3 00
Y—Delivery Jet	1 25	1 50	2 00	2 50	3 00	4 50	6 50	9 00
X—Coupling Nut	25	30	40	50	60	1 25	1 50	2 00
V—Tail Pipe	25	30	40	50	60	80	1 00	1 25
Z—Overflow Cap	30	40	50	60	70	80	90	1 50
P—Overflow Valve	40	50	60	75	90	1 10	1 25	1 75
N—Overflow Hinge	10	10	15	15	15	20	20	30
O—Plug	60	80	1 00	1 25	1 50	1 75	2 00	4 00
Strainer	40	45	50	55	60	75	1 00	1 50

Fig. 884

Fig. 885

Samson Extra Heavy Flanged
Globe and Angle Valves

Fig. 554

Lunkenheimer
Swing Check Valve

Fig. 269

"Everlasting"
Blow-Off Valve

No stuffing-box; no packing; no repairing.

Disc rotates and keeps even wear on valve seat.

Valve is self-cleaning.

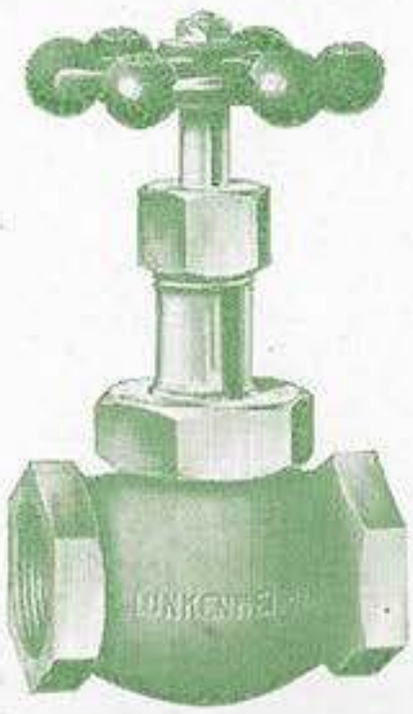


Fig. 407

Fig. 408

Lunkenheimer Regrinding
Globe and Angle Valves

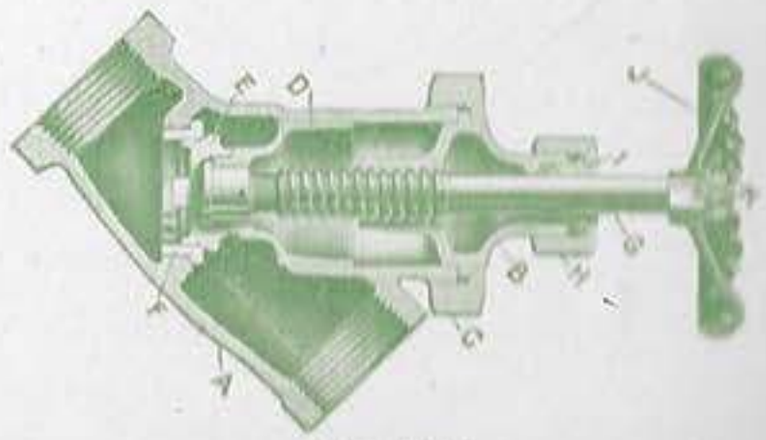


Fig. 183

Lunkenheimer
"Renewo" Straightway
Blow-Off Valve

Fig. 399

Special Logging Engine Cylinder Cock

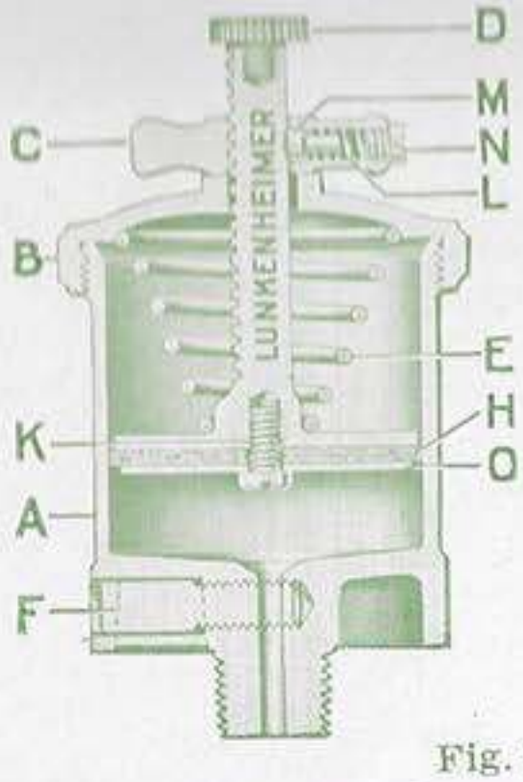


Fig. 1033

Special Majestic Grease Cup for Crank Pins

Fig. 441

Steam Whistle with Valve

Fig. 368

Consolidated Improved "Pop" Safety Valve, A. S. M. E. Code

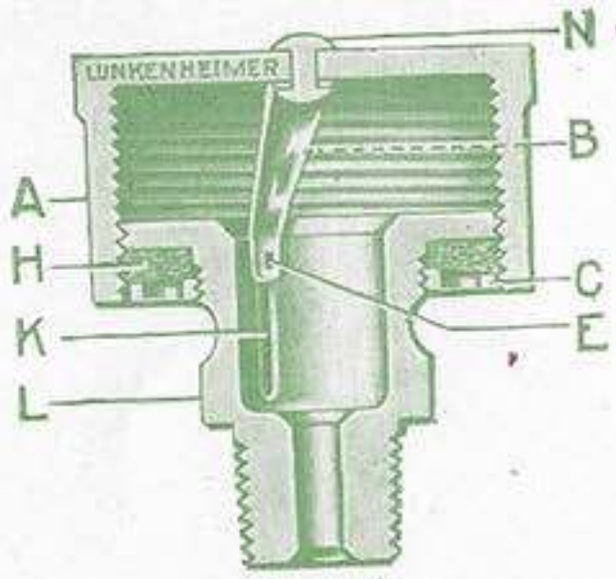


Fig. 512

"Tiger" Grease Cup

Fig. 466

Regrinding Gauge Cock

Fig. 540

Plain Oil Cup

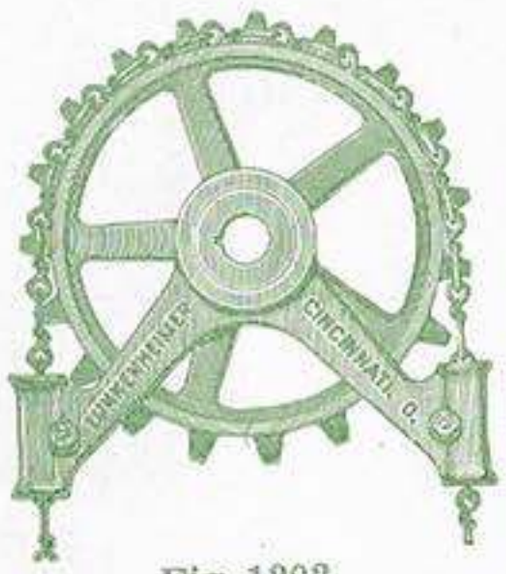


Fig. 1202

Wheel and Chain for Operating Main Stop Valve

Special Drainage Castings

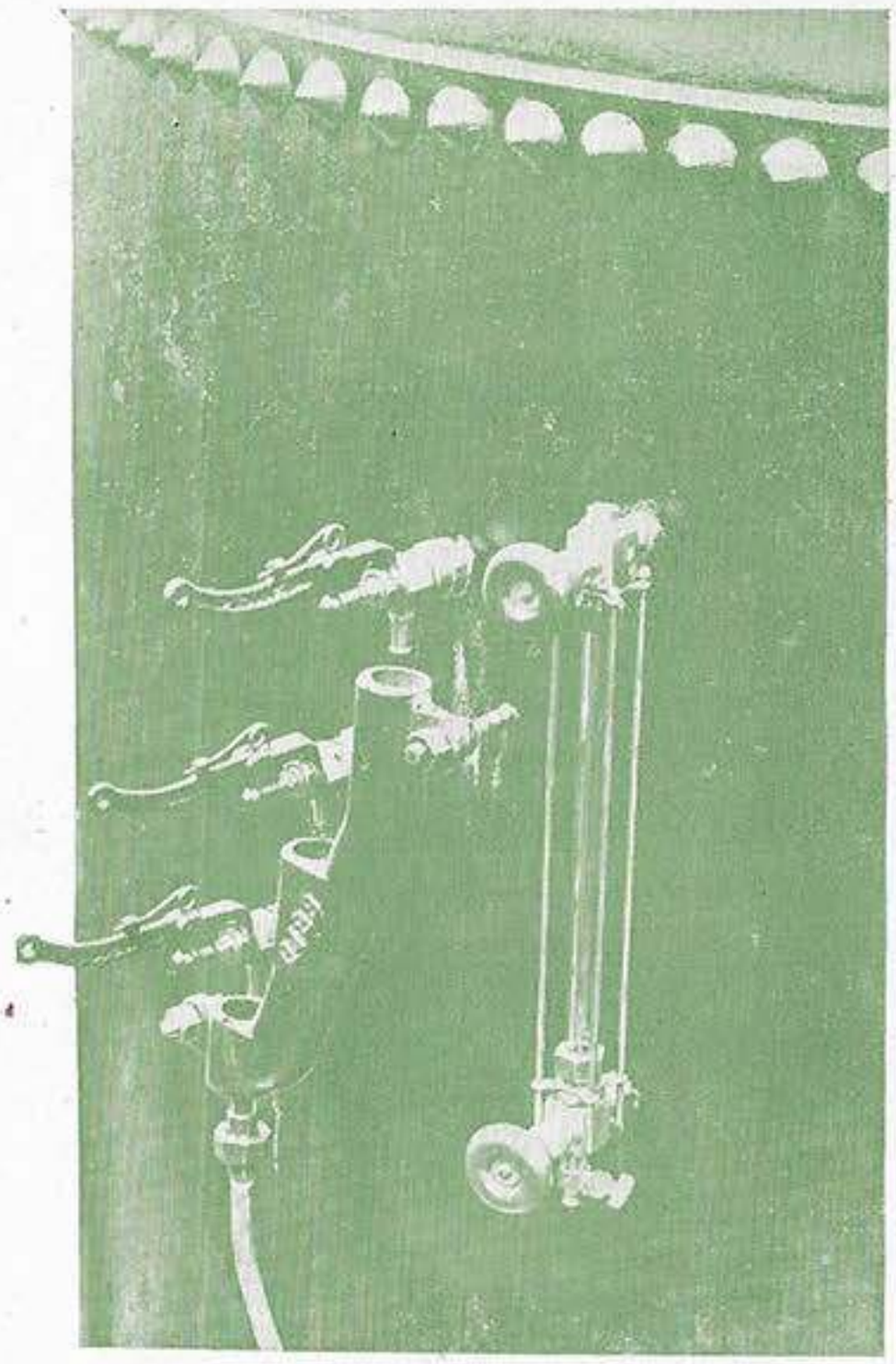
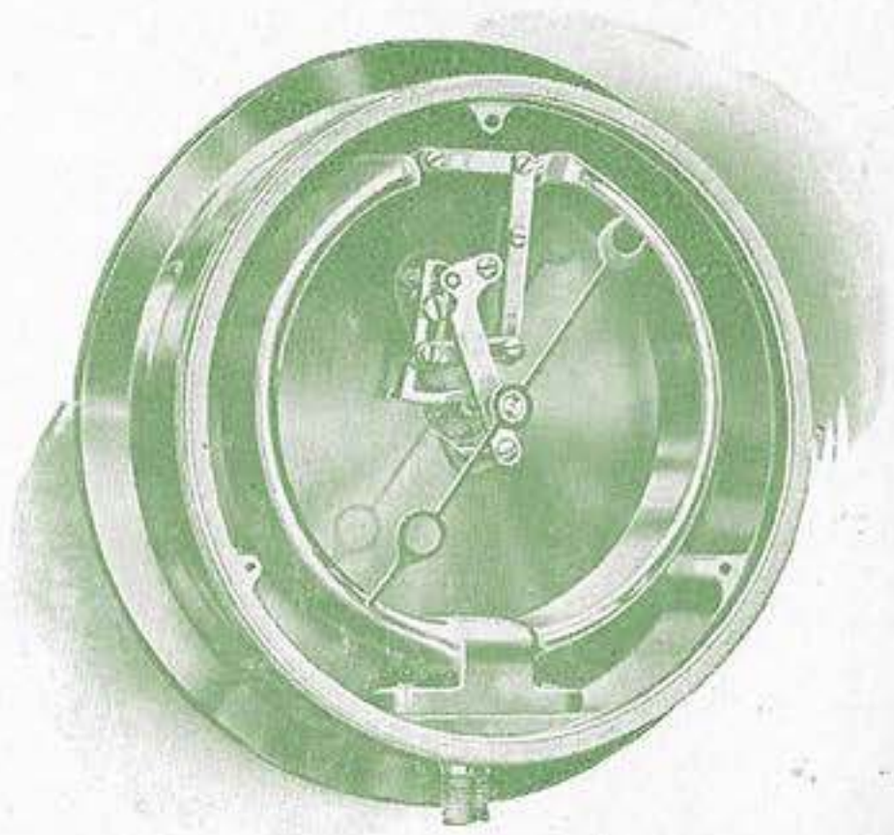


Fig. 284

Figure 284 shows boiler equipped with gauge cock drainage casting, especially designed for Washington engines.

Steam Gauges



Double Spring Steam Gauges, made especially for Washington Iron Works Logging Engines.

Expansion Joint

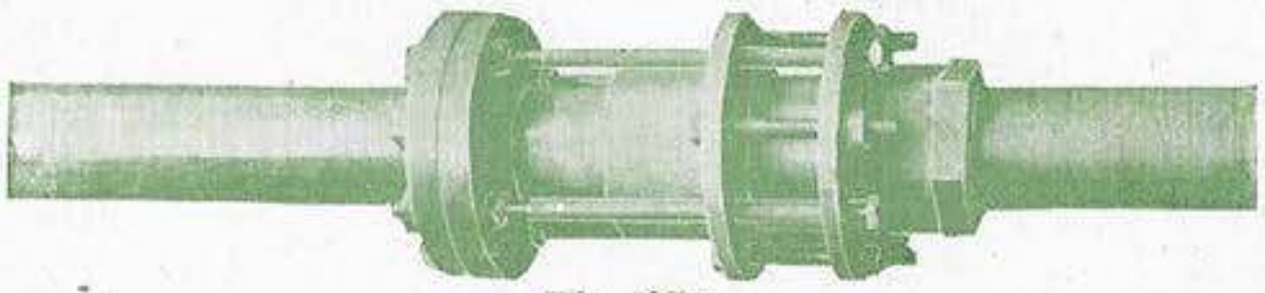


Fig. 350

Improved steel expansion joint especially designed for logging engine service. Made for all sizes of steam lines.

Spar Tree Protector and Rigging Plates

(Patented)

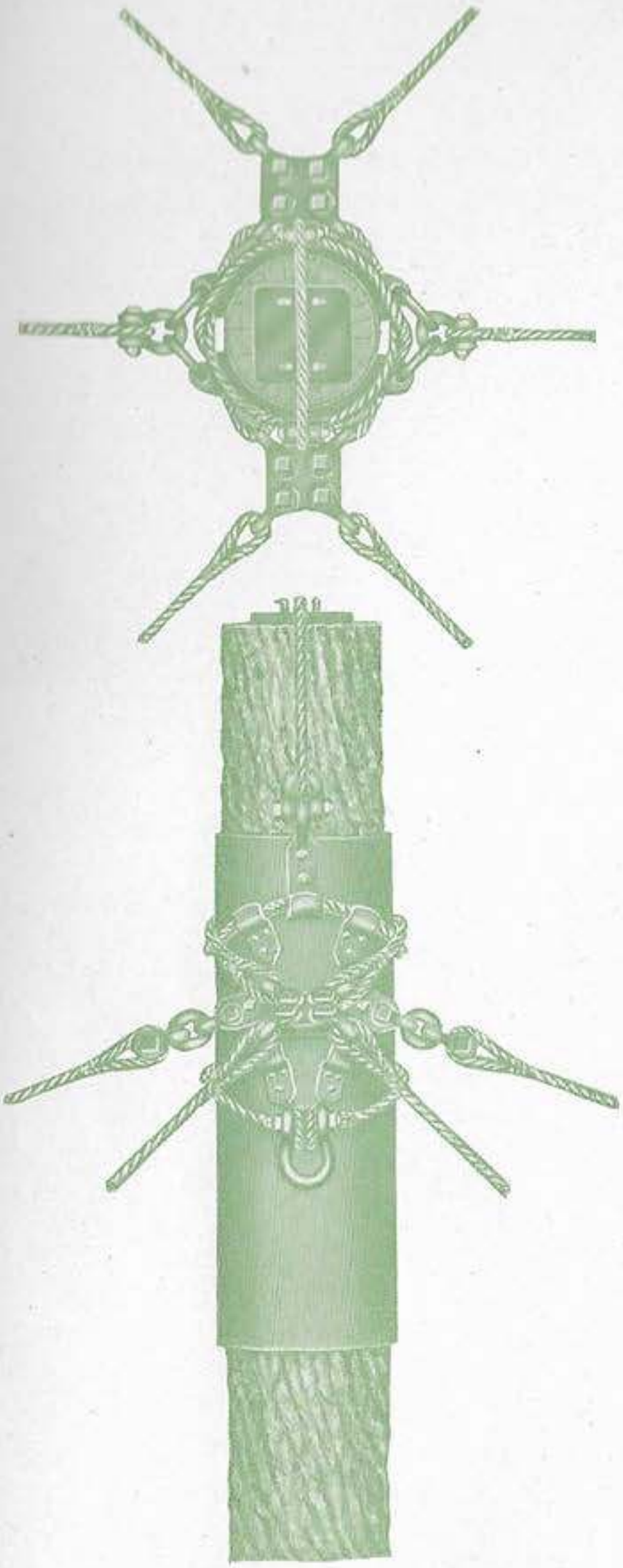


Fig. 403

In high lead and skyline logging operations, the spar trees are not only subject to very heavy strains, but as usually rigged, they are also subject to severe chafing from high lead blocks, guy lines and moving cables which they support.

These destructive agencies sometimes weaken a tree to such a degree as to cause spar tree to break, with consequential great danger to logging crew, cost of re-rigging spar tree, expensive delays in operation and breakage of block equipment.

This patented Spar Tree Protector and Rigging Plates provides a simple safe fastening and protecting device for spar trees; of a weight that makes it practical and easy of installation.

It will be noted that the device is made up of two sections which can closely fit trees of different diameters, the guy members being fastened in such a way that the strain of same causes the separate parts of the protecting device to be drawn tight against the tree, and provides for a distribution and direction of the operating strains which aid in retaining device in its place and distributes the pressure of the operative strain over wide areas of the spar tree without injury thereto.

PRICES

Code Word	List
Fogol	

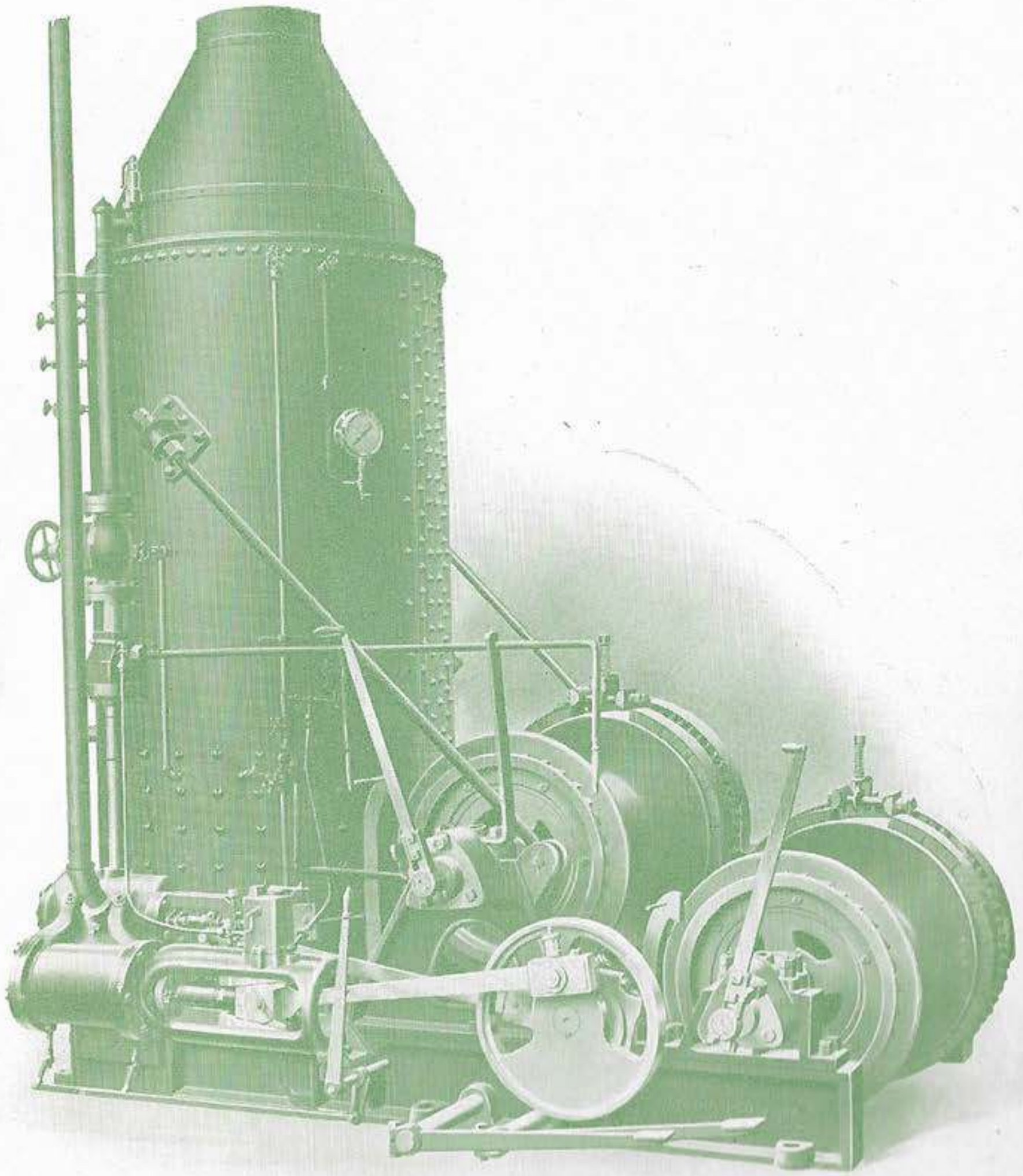


Fig. 329

Washington Double Cylinder, Double Drum Hoisting Engine

Washington Standard Double Drum Hoist

The engine illustrated on the opposite page is specially designed for pile driving and general contracting work and is built with extra large frictions and heavy shafts. As in all our other type engines the boilers are designed and tested for a working pressure of 150 pounds —25 pounds more than any other make of hoisting engine.

This engine is equipped with Balanced Piston Valve Cylinders, Bronze Bushed Drums and Cast Steel Ratchets and is mounted on a solid bed frame. Engines up to 7x10¼ have Machine Cut Cast Iron Gears — above 7x10¼ the gears are made of Electric Steel with machine cut teeth. In all sizes the pinions are cut from Forged Steel blanks.

Horse Power Usually Rated	Cylinders		Weight Hoisted Single Line Usual Speed	Suitable Pile Driving Hammer	Drums		Boiler			Est. Ship'ng Wt.		Code Word	
	Diameter Inches	Stroke Inches			Diameter Inches	Length Inches	Diameter Inches	Height Inches	Number of 2" Tubes	With Boiler	Without Boiler	With Boiler	Without Boiler
8	5	6	2000	1500	10 10	20 16	28	72	37	5200	3250	norie	norma
12	6	8	3500	2200	12 12	20 16	36	72	76	7700	4250	norse	nosed
16	7	8	5500	3000	12 12	20 16	36	84	76	8000	4500	notch	novel
20	7	10¼	7000	3800	14 14	24 20	40	84	96	10500	6000	novum	nucha
30	8	10¼	8000	4500	14 14	29 24	44	96	112	14000	8500	nudge	nudha
40	9	10¼	9500	5000	14 14	29 24	48	96	140	16000	10000	oakum	oasis
50	10	12	12000		16 16	32 26	54	106	185	23000	15000	oaten	odyle
75	12	14	17000		18 18	34 28	60	120	243	26000	17500	offal	ogham

We build all other kinds of Excavating, Dredging and Hoisting machinery and will be glad to quote prices on application.

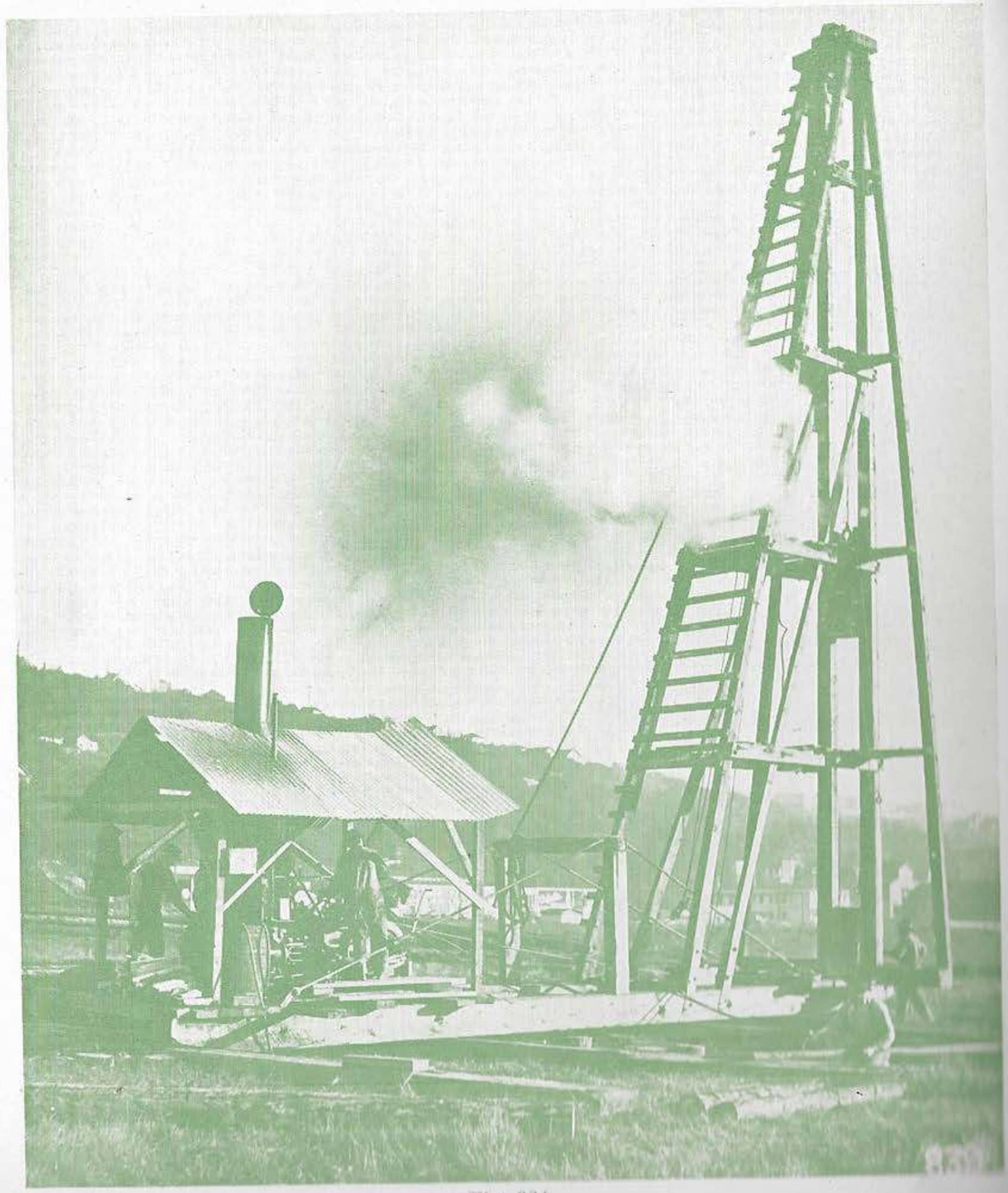


Fig. 364

WASHINGTON PILE DRIVER

We are prepared to furnish detail blue prints of derrick with orders for complete equipment

Equipment for Pile Drivers

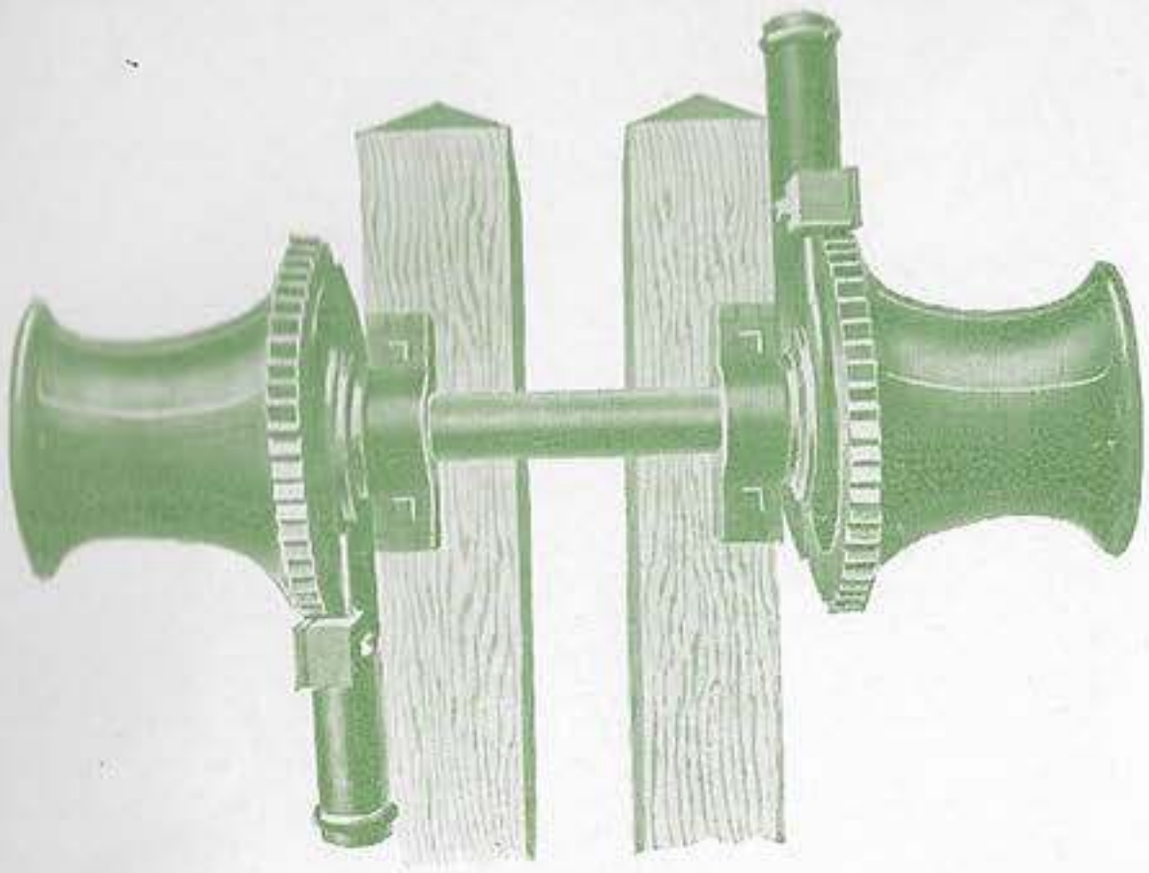


Fig. 124

RATCHET GYPSY WINDLASS

The engraving shows our improved Ratchet Gypsy Windlass, which was specifically designed to meet the demand for a substantial machine for use on floating pile drivers, etc. These windlasses are made in two sizes, with any length shaft. Write for details.

Fig. 125

Fig. 126

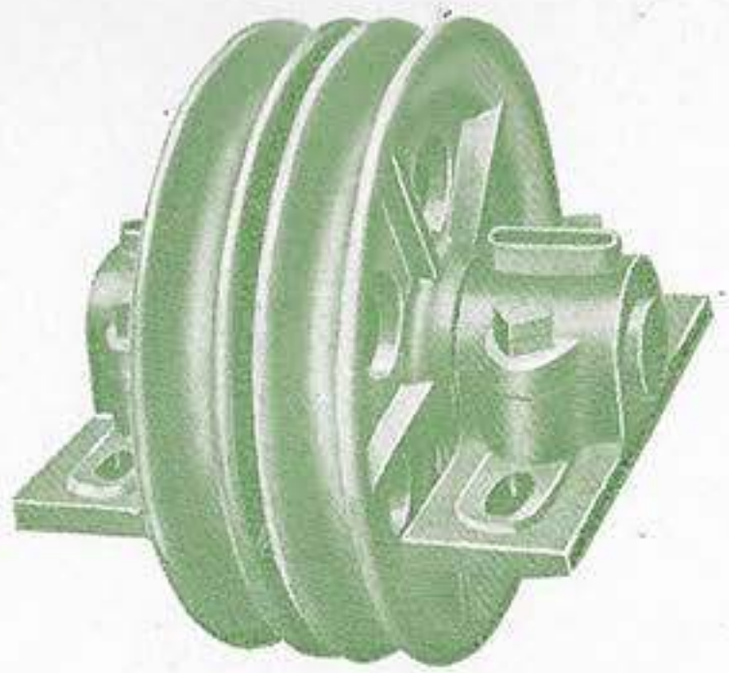


Fig. 359

PILE DRIVER HEAD BLOCK

The sheaves in this Block are made of Electric Open Hearth Cast Steel with deep smooth grooves for wire rope, one of them keyed fast to the shaft and the other has self-oiling bushing. The bearings are made of close-grained cast iron, lined with good grade anti-friction metal.

PILE DRIVER HAMMER

(Fig. 125)

We are prepared to furnish all sizes and weights of Pile Driving Hammers of improved design for prompt delivery.

PILE DRIVER FOLLOWER OR CAP

(Fig. 126)

In connection with Hammers we call attention to our improved Pile Follower or Cap, the use of which prevents piles from splitting or brooming, and does away with the necessity of using pile bands, which frequently break, and in the removal of which, much time is consumed.

Washington Derricks

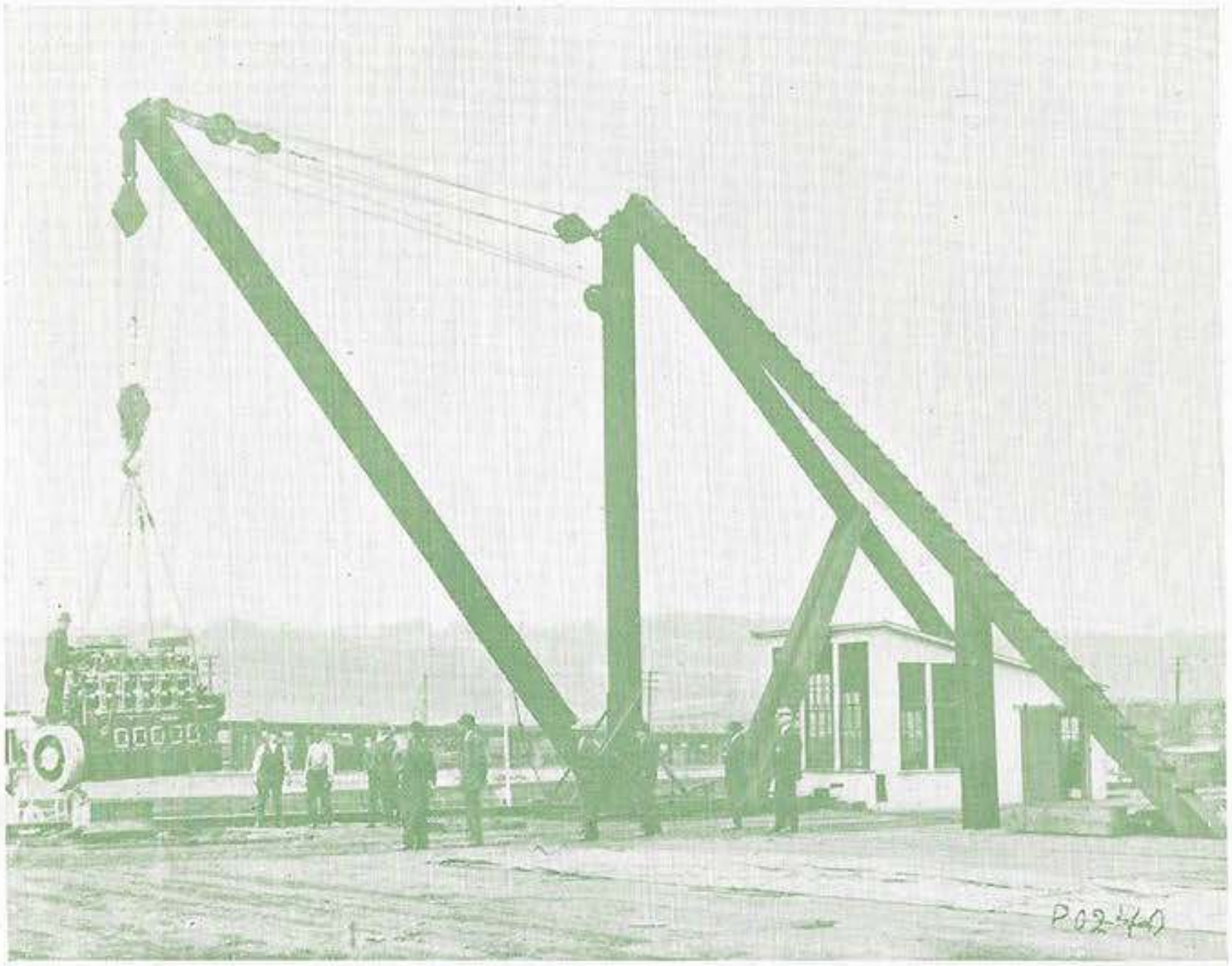


Fig. 326

The "WASHINGTON" line of Derricks has been perfected after years of careful study and development, and embodies great strength and durability.

All Derrick castings, comprising the step, step bearing, mast top and all sheaves above 15-ton capacity are made of ELECTRIC OPEN HEARTH CAST STEEL well annealed, and on all sizes the sheaves are bushed with bronze, running on center bored pins, lubricated by means of Compression Grease Cups, and on the smaller sizes the castings are made of SEMI-STEEL of ample strength but can be made of Open Hearth Steel at slight additional cost.

We use the Anvil Brand Diamond Derrick Blocks of the extra heavy pattern on all derricks.

A few of the more standard types are shown herein and we build special derricks to meet any particular requirements and conditions that you may have, and we will be glad to quote prices on application, and furnish working drawings.

Washington Standard Stiff Leg Derrick

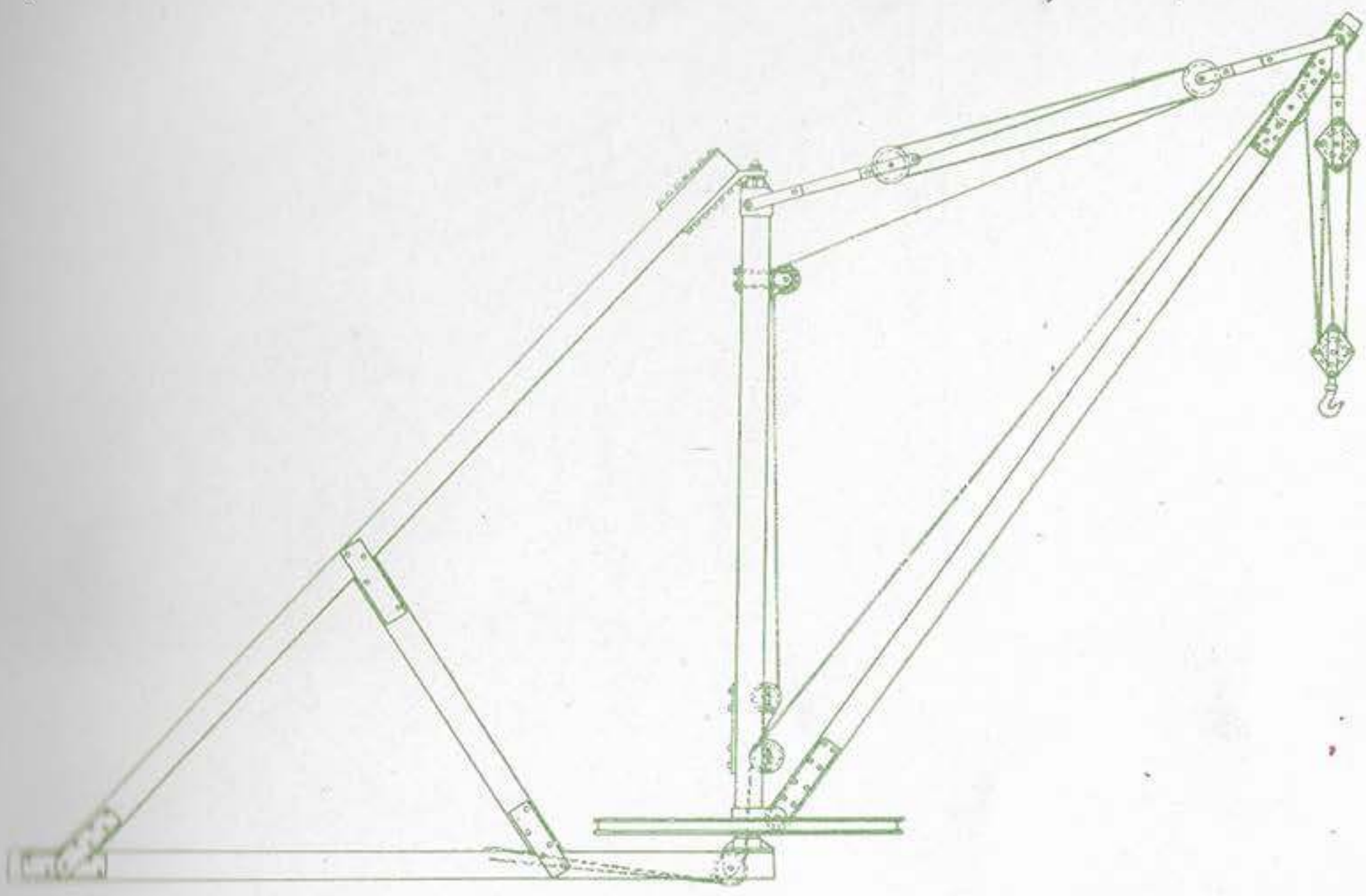


Fig. 275

Number	D 1	D 2	D 3	D 4	D 5	D 6
Code Word	*Scorn*	*Scoth*	*Scour*	*Scrag*	*Sithe*	*Situs*
Capacity (in tons)	5	10	15	20	25	30
Maximum Boom (untrussed) (in feet)	40	44	48	52	56	60
Maximum Mast (in feet)	27	30	32	35	38	40
Size of Boom (in inches)	10x10	12x12	14x14	16x16	18x18	20x20
Size of Mast (in inches)	10x10	12x12	14x14	16x16	18x18	20x20
Size of Stiff Legs (in inches)	8x8	10x10	12x12	14x14	16x16	18x18
Size of Sills (in inches)	8x8	10x10	12x12	14x14	16x16	18x18
Diameter of Hoisting Lines (in inches)	⅝	⅝	¾	⅞	⅞	⅞
No. of Parts Hoisting Line	3	4	4	5	6	8
No. of Parts Boom Fall Line	4	6	6	8	8	10
Shipping Weight	2000	2800	3850	5800	8000	11000

Washington Standard Guy Derrick

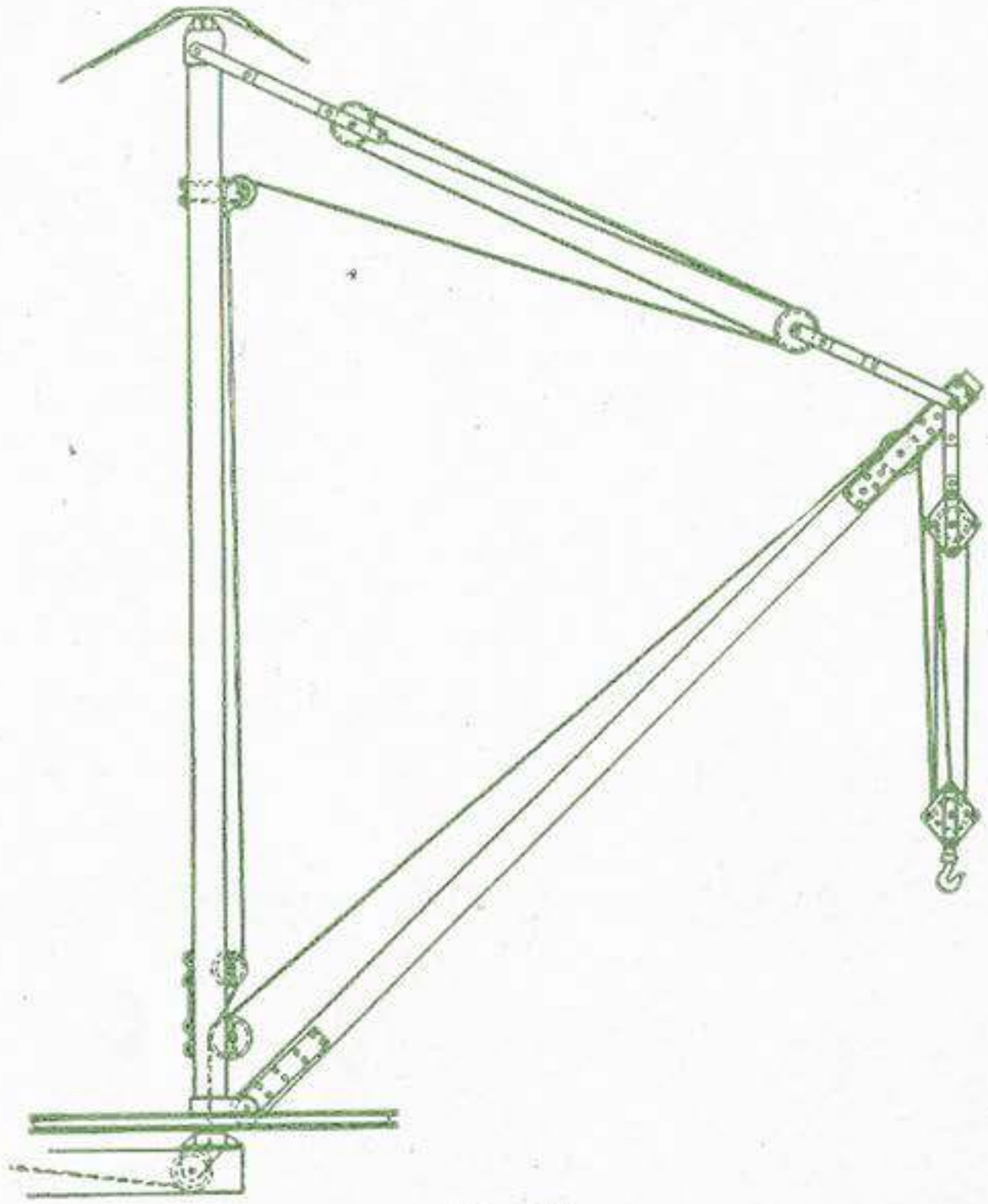


Fig. 279

Number	D 11	D 12	D 13	D 14	D 15	D 16
Code Word	*Sayer*	*Saynd*	*Scald*	*Scamp*	*Scarf*	*Scope*
Capacity (in tons)	5	10	15	20	25	20
Maximum Boom (untrussed) (in feet)	40	45	50	55	60	65
Maximum Mast (in feet)	45	50	56	62	68	75
Size of Boom (in inches)	10x10	12x12	14x14	16x16	18x18	20x20
Size of Mast (in inches)	10x10	12x12	14x14	16x16	18x18	20x20
Diameter of Hoisting Lines (in inches)	5/8	5/8	3/4	7/8	7/8	7/8
Diameter of Guy Lines (in inches)	7/8	1	1	1 1/8	1 1/4	1 1/4
No. of Parts in Hoisting Line	3	4	4	5	6	8
No. of Parts in Boom Fall Line	4	6	6	8	8	10
No. of Guys	6	6	7	7	7	8
Shipping Weight	1200	1750	2250	3500	5000	7250

Washington Standard "A" Frame Bucket Derrick

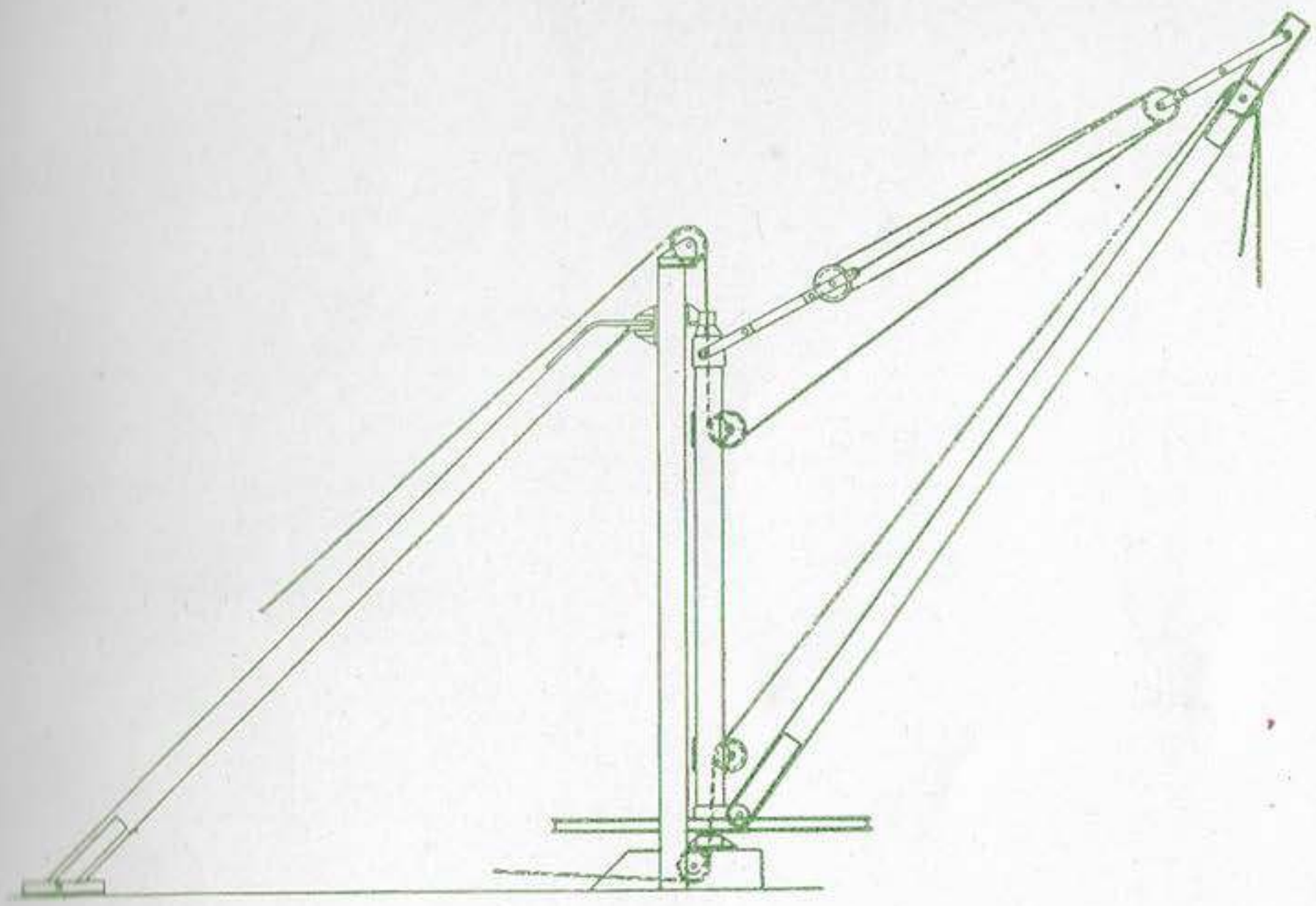
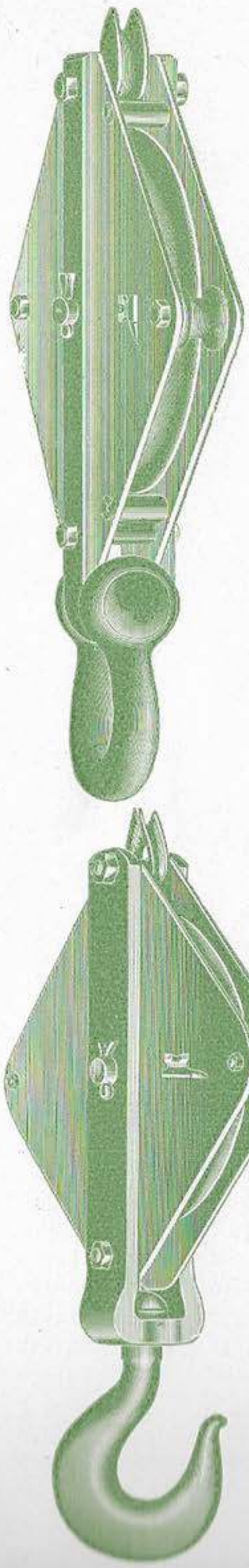
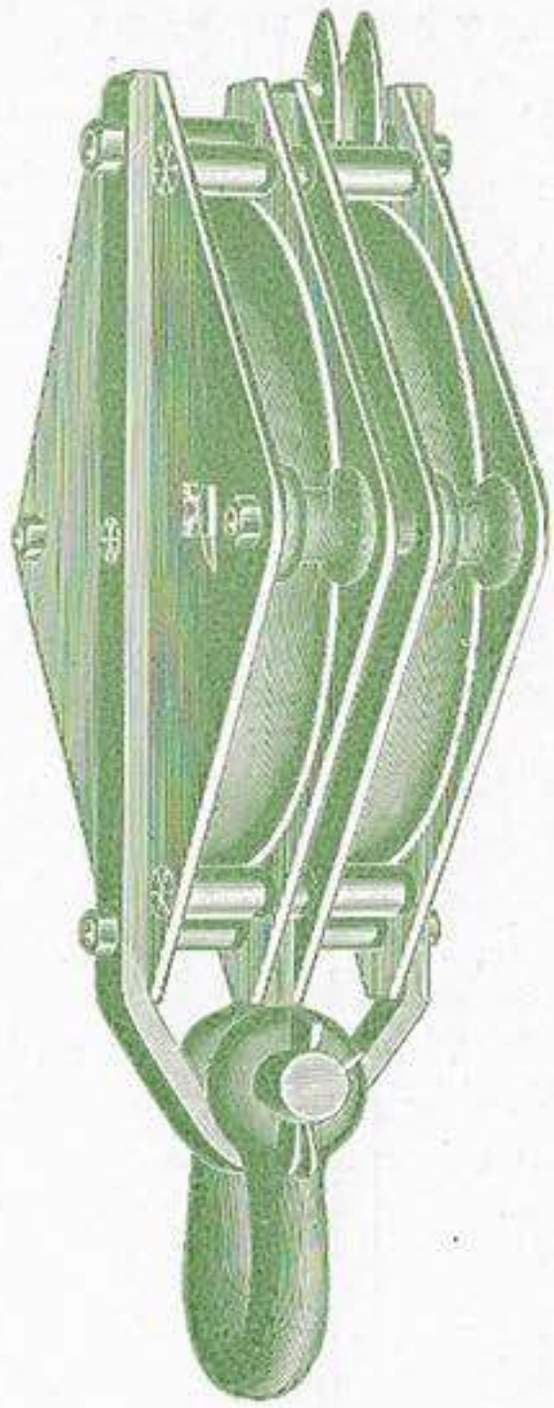
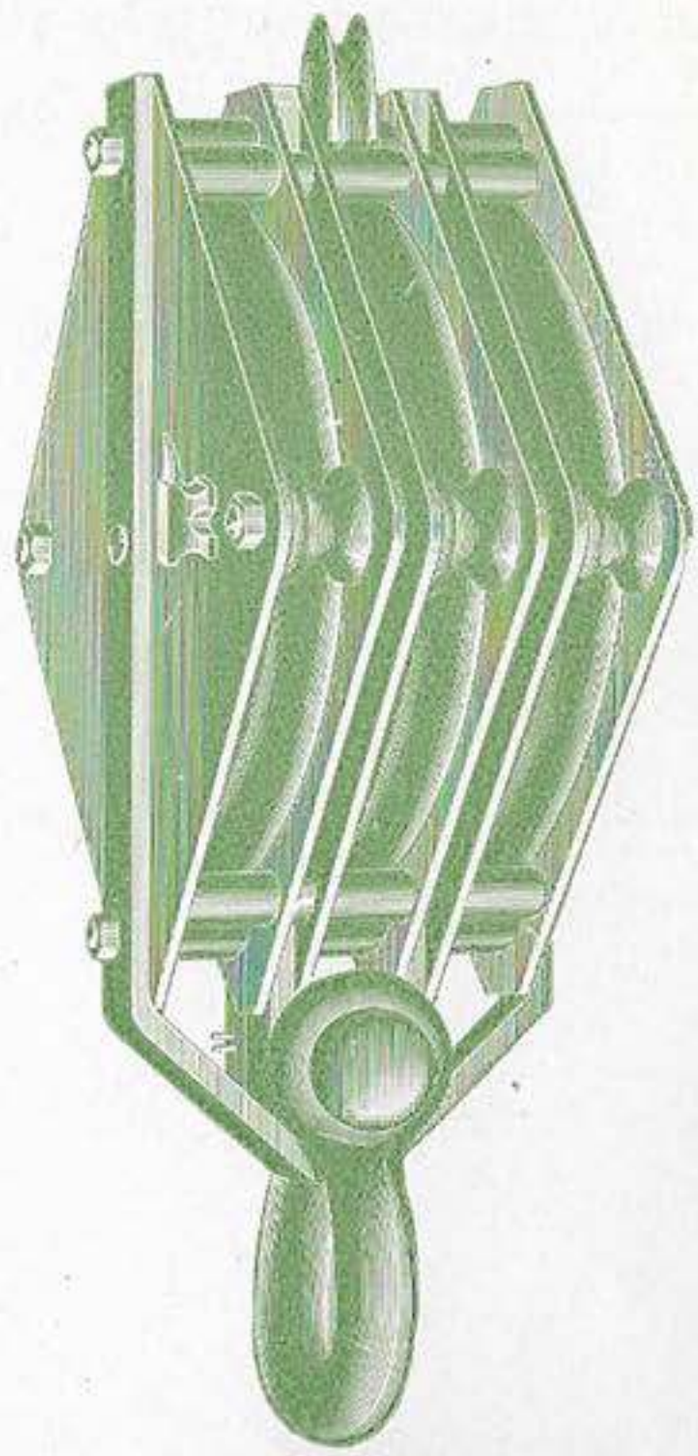


Fig. 274

Number	D 21	D 22	D 23	D 24	D 25
Code Word	*Sizer*	*Snort*	*Snowy*	*Snuff*	*Snug*
Capacity (in tons)	10	15	20	25	30
Maximum Boom (untrussed) (in feet)	44	48	52	56	60
Maximum Mast (in feet)	30	32	35	38	40
Size of Boom (in inches)	12x12	14x14	16x16	18x18	20x20
Size of Mast (in inches)	12x12	14x14	16x16	18x18	20x20
Size of "A" Frame (in inches)	10x12	12x14	14x16	16x18	18x20
Size of Back Legs (in inches)	10x10	12x12	14x14	16x16	18x18
Diameter of Hoisting Line (in inches)	¾	⅞	1	1⅛	1¼
Diameter of Boom Fall Line (in inches)	¾	¾	⅞	⅞	1
No. of Parts of Boom Fall Line	4	6	8	8	10
Shipping Weight	4000	5400	7600	9750	12000







"Anvil" Diamond Derrick Blocks

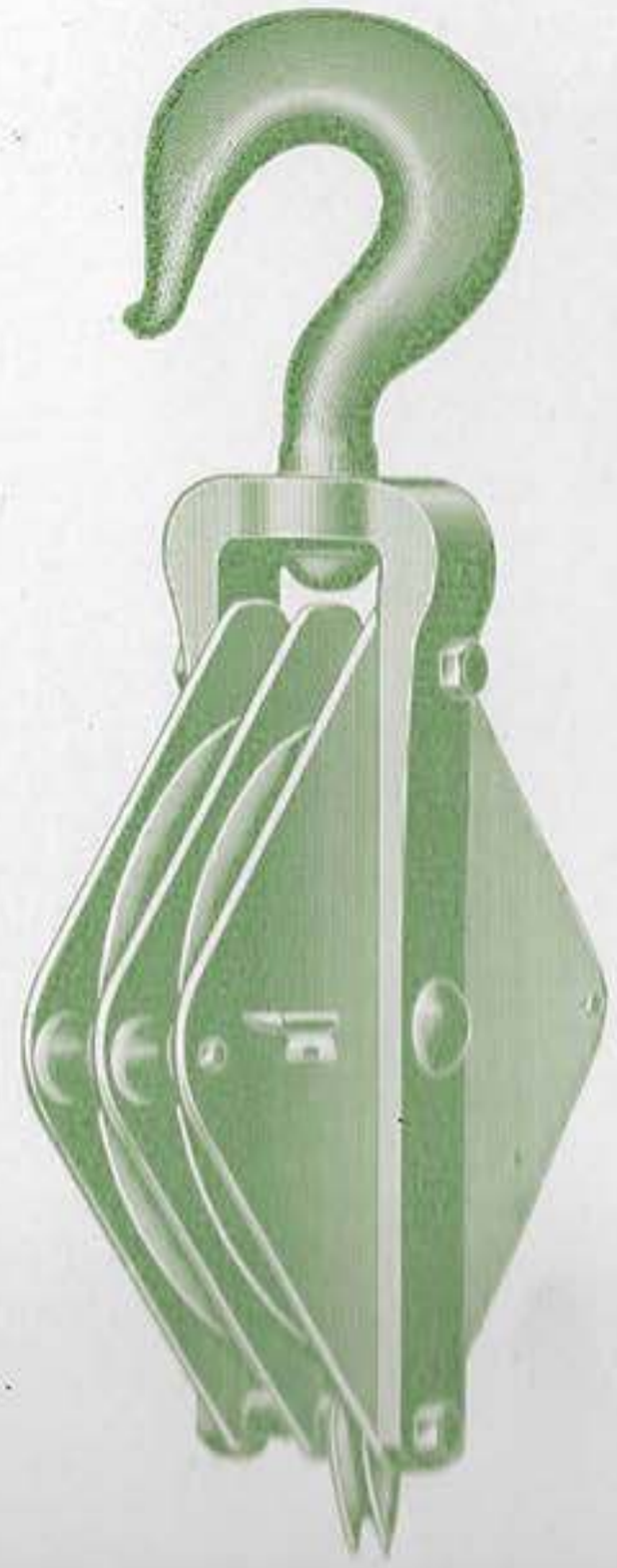
Used on

WASHINGTON DERRICKS

Self-Lubricating Bronze Bushed

Extra Heavy Pattern

Prices on application



Suggestions for Treatment of Carbon Tool Steels

A clear distinction should always be made by the tool hardener between the high temperatures employed in hardening high speed steels, and the low refining heats required for hardening carbon tool steel. If the high heats necessary for the treatment of high speed steel were applied to carbon tool steel, a coarse crystalline structure would be developed, thus defeating the very purpose accomplished by the mill in the final hammering, rolling and annealing operations. While the steel would in most cases harden, it would not have the full strength or cutting properties obtainable by heating to the proper temperature. Furthermore, steel overheated to such an extent cannot be entirely restored by any subsequent heat treatment.

FORGING.—Carbon tool steels are made in a full range of carbon tempers from about .50 to 1.50 per cent. The correct forging heat for any temper will depend on the percentage of carbon, the size of the piece, and the amount of reduction necessary in the forging operation. Generally speaking, the heats would vary from about 1500° F. to 1950° F., the higher heats being used for the lower carbons or for the larger forgings requiring considerable work, and the lower heats for the higher carbon or such pieces as require only a small amount of work. In any case, as the forging approaches the final stages, the hammering should become more rapid with lighter blows so as to finish the work at a dark red heat, refining the grain and leaving steel in better condition for either annealing or hardening.

ANNEALING.—Tool steel should be annealed for several reasons: so that it can be readily machined, and cut with facility in a cold saw or cutting-off machine instead of by nicking and breaking. This prevents waste as well as the danger of starting checks or cracks which might cause the loss of expensive tools in the hardening operation or in actual use, after considerable expense has been put on them.

It is often necessary, however, for the blacksmith or hardener to anneal tools for reworking or to anneal forgings before they can be machined. In such cases the annealing can be done most uniformly if packed in a pipe or box of dimensions sufficient to allow for an inch or more of packing with the fine dry lime or mica chips between the parts and the sides of the box, to exclude the air and prevent oxidation and decarbonization.

The temperature should be brought up slowly and uniformly to about 1300° F. to 1350° F., and held for sufficient time to give the desired results. The time will vary according to the size and shape of the steel being handled and the heating facilities. Cool as slowly as possible and do not expose to the air until cold, or remove the box and cover it with fine dry lime, ashes, mica chips or other non-conductors of heat that will permit the steel to cool slowly.

HARDENING.—Carbon tool steels can be hardened in the forge or in any furnace where the combustion of fuel and atmosphere of the heating chamber can be controlled. A dead forge fire, an excess of blast, a furnace having cracked walls or bottom or one in which the flame comes in direct contact with the surface of the tools, are some of the principal causes of decarbonized or scaled tools and no steel can be made that will harden properly under such conditions.

The best temperature for hardening is the lowest heat that will give the full degree of hardness and show a fine granular fracture. This heat will be found to run about 100° F. to 200° F., above the critical change point and will vary with the percentage of carbon. Within certain limits, the higher the carbon the lower the heat necessary. A reasonable range to cover all tempers from A to C would be from 1350° to 1500° Fahr.

COLORS AND CORRESPONDING TEMPERATURES IN DRAWING TEMPER ON TOOL STEELS

The colors which successively appear on the polished surface of hardened steel, slowly heated, are as follows:

Yellowish White or Light Straw	430	degrees Fahr.	Purple	530	degrees Fahr.
Dark Straw	450	" "	Violet	550	" "
Gold Color	490	" "	Light Blue	580	" "
Brown	510	" "	Dark Blue	600	" "

Formula for Finding Capacity of Tanks

A x L x 7.5 = G Where: A = Area of head in sq. ft. or dia. in ft. squared x .7854.

L = Length of tank in feet.

G = Number of Gallons.

For weight of contents multiply by 8.3.

Capacity of Pipes and Cylindrical Tanks of Various Diameters in Gallons per Foot of Length

Diameter Ft.	In.	Area, Sq. Ft.	Gallons 1 Ft. Depth
1	0	.785	5.87
2	0	3.142	23.50
3	0	7.069	52.88
4	0	12.566	94.00
5	0	19.63	146.88
6	0	28.27	211.51
7	0	38.48	287.88

Method to Estimate Approximate Weight of Steel Bars

ROUNDS

Multiply diameter of bar by 4. Square the result, and divide by 6. For example:

Size 3" Round — 3 x 4 = 12

12 x 12 = 144

144 ÷ 6 = 24 lbs. per foot.

SQUARES

Square the section and add a cipher. This gives the weight per yard. Divide by 3 to get weight per foot. For example:

Size 4" Square — 4 x 4 = 16

Add a cipher = 160 lbs. per yd.

160 ÷ 3 = 53.33 lbs. per foot.

FLATS

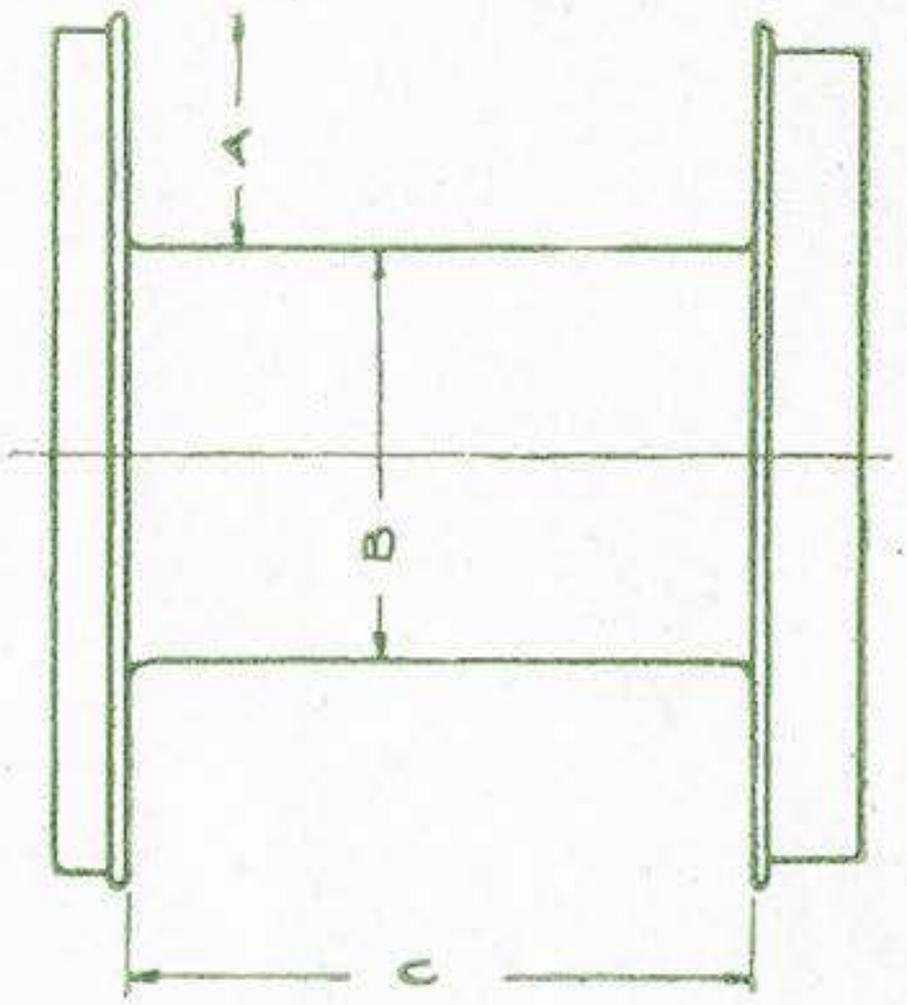
Multiply the width by thickness. Add a cipher and divide by 3. For example:

Size 4" x 1" — 4 x 1 = 4

Add a cipher = 40

40 ÷ 3 = 13.33 lbs. per foot.

Formula for Computing Cable Capacities of Drums



RULE—Add the diameter of the drum (B) to the depth of the flange (A). Multiply the sum by the depth of flange (A). Multiply the result by the length between flanges (C), all in inches. Multiply the product by the figures in the right hand column opposite the size cable required. The result will be the amount of cable, in feet, that the drum will hold.

FORMULA—(B + A) × A × C × Number opposite required size of cable.

Size Cable		Size Cable		Size Cable	
1/4" diameter	4.16			1 5/8" diameter	.099
5/16" diameter	2.67	3/4" diameter	.465	1 3/4" diameter	.085
3/8" diameter	1.86	7/8" diameter	.342	1 7/8" diameter	.074
7/16" diameter	1.37	1" diameter	.262	2" diameter	.066
1/2" diameter	1.05	1 1/8" diameter	.207	2 1/8" diameter	.058
9/16" diameter	.828	1 1/4" diameter	.167	2 1/4" diameter	.052
5/8" diameter	.672	1 3/8" diameter	.138	2 3/8" diameter	.046
11/16" diameter	.554	1 1/2" diameter	.116	2 1/2" diameter	.042

Wire Rope

Sizes and Strength Plow Steel Wire Rope composed of six strands and a hemp center 19 wires to the strand.

Diameter of Line in Inches	Circumference in Inches	Approximate Weight per Foot	Ultimate Strength tons of 2000 lbs.
¼	¾	.10	2.65
5/16	1	.15	3.8
⅜	1⅛	.22	5.75
7/16	1¼	.30	8
½	1½	.39	10
9/16	1¾	.50	12.3
⅝	2	.62	15.5
¾	2¼	.89	23
⅞	2¾	1.20	29
1	3	1.58	38
1⅛	3½	2.	47
1¼	4	2.45	58
1⅜	4¼	3.	72
1½	4¾	3.55	82
1⅝	5	4.15	94
1¾	5½	4.85	112
1⅞	5¾	5.55	127
2	6¼	6.3	140
2¼	7⅛	8.	186
2½	7⅞	9.85	229
2¾	8⅝	11.95	275

Formula for Finding Pulling Power of Drums

The mean or average pulling power of any drum can be obtained by the following formula:

$$W = \frac{r \times G \times P \times A}{R}$$

W = Weight or pull on cable in pounds.
P = Mean effective pressure = about 175 pounds where 200 pounds boiler pressure is used.
A = Area of one cylinder in square inches.
r = Radius of crank or one-half stroke of engine in inches.
R = One-half spool diameter of drum when spool is half full of cable.
G = Gear ratio = drum gear diameter divided by pinion diameter.

Useful Information

To find circumference of a circle multiply diameter by 3.1416.

To find diameter of a circle multiply circumference by .31831.

To find area of a circle multiply square of diameter by .7854.

To find area of a triangle multiply base by half perpendicular height.

To find surface of a ball multiply square of diameter by 3.1416.

To find solidity of a sphere multiply cube of diameter by .5236.

Diameter of circle times .8862 equals side of a square with same area.

To find cubic inches in a ball multiply cube of diameter by .5236.

Doubling the diameter of a pipe increases its capacity four times.

A gallon of water (U. S. Standard) weighs 8⅓ lbs. and contains 231 cubic inches.

A cubic foot of water contains 7½ gallons, 1728 cubic inches, and weighs 62½ lbs.

To find the pressure in pounds per square inch of a column of water multiply the height of the column in feet by .434.

Steam rising from water at its boiling point (212 degrees) has a pressure equal to the atmosphere (14.7 lbs. to the square inch).

A standard horse power: The evaporation of 30 lbs. of water per hour from a feed water temperature of 100 degrees F. into steam at 70 lbs. gauge pressure.

To find capacity of tanks any size: given dimensions of a cylinder in inches to find its capacity in U. S. Gallons: Square the diameter, multiply by the length and by .0034.

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