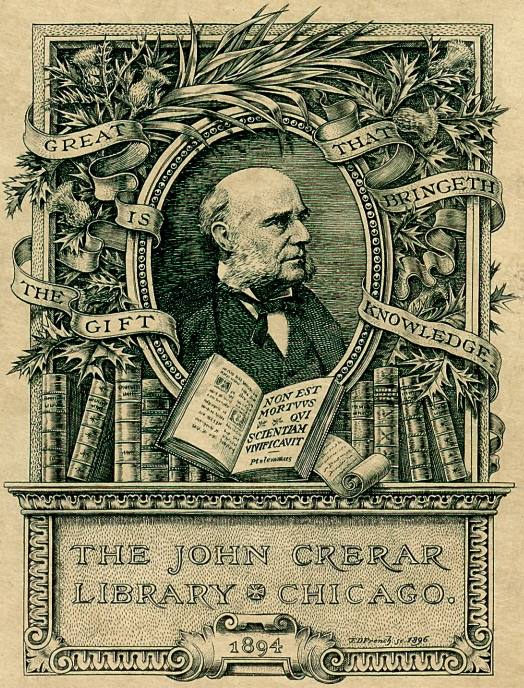
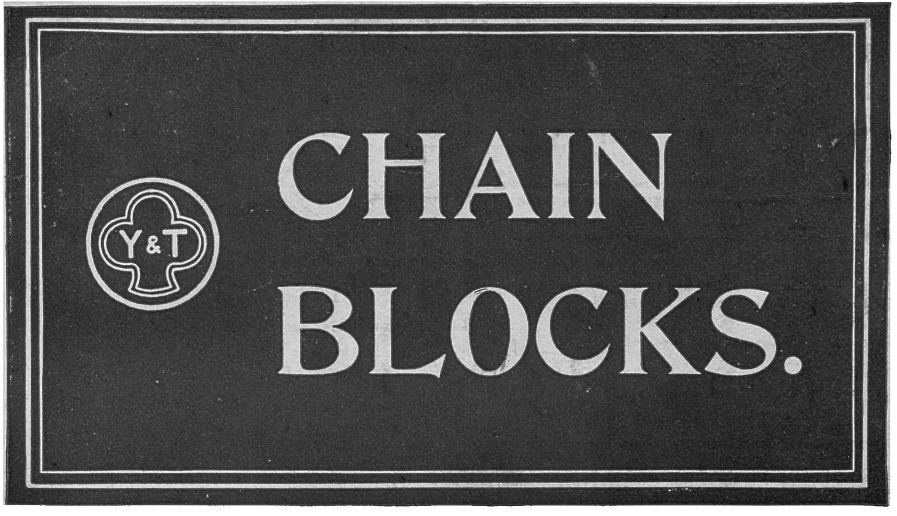
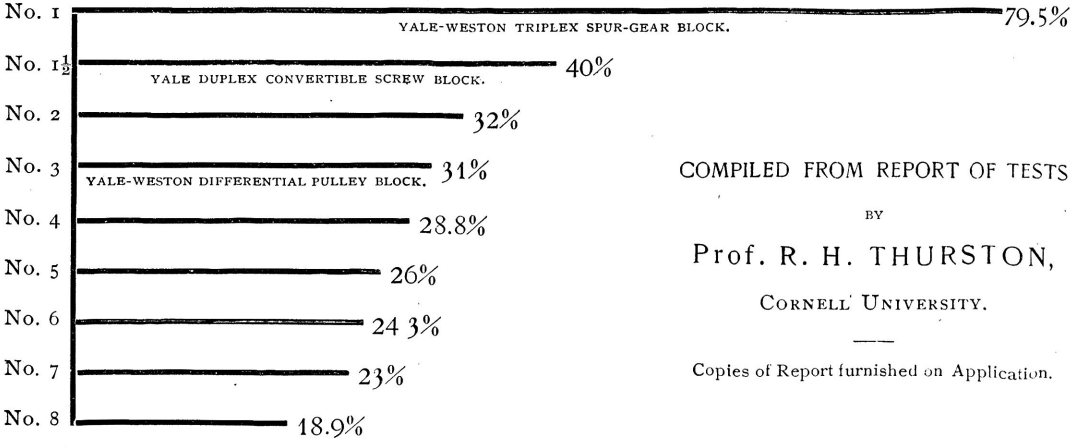

GREAT IS THE GIFT THAT BRINGETH KNOWLEDGE
NON EST MORTUUS QUI SCIENTIAM VIVIFICAVIT
THE JOHN CRERAR LIBRARY ✪ CHICAGO.
1894


Y&T
CHAIN
BLOCKS.

A Graphical Comparison, showing the great superiority in efficiency of the Yale & Towne Blocks over all competitors. The length of the lines indicates the relative efficiency of the blocks tested. Where no names are given the blocks are those of other makers.



COMPILED FROM REPORT OF TESTS

BY

Prof. R. H. THURSTON,

CORNELL UNIVERSITY.

Copies of Report furnished on Application.

SEE TABLE OF CONTENTS ON INSIDE OF BACK COVER.

CHAIN BLOCKS

THE YALE & TOWNE MANUFACTURING CO.

SALESROOMS:

NEW YORK, 84-86 CHAMBERS STREET
CHICAGO, 152-154 WABASH AVENUE
PHILADELPHIA, 1120 MARKET STREET
BOSTON, 224 FRANKLIN STREET
BUFFALO, BUILDERS' EXCHANGE
SAN FRANCISCO, MILLS BUILDING

GENERAL OFFICES:
280 Broadway, New York

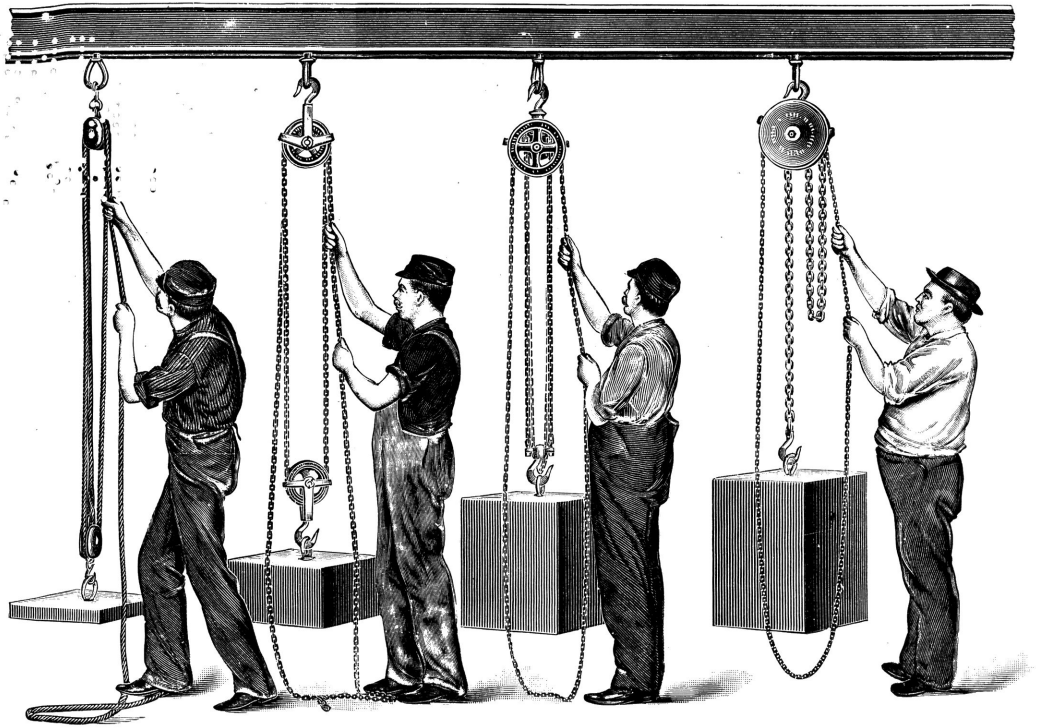
WORKS: { Stamford, Conn.
Branford, Conn.

SEE TABLE OF CONTENTS ON INSIDE OF BACK COVER.

GILLESPIE BROS., PRINTERS, STAMFORD, CONN.

A

ILLUSTRATION OF RELATIVE EFFICIENCY OF BLOCKS.



Four Part Rope Tackle Block.
Load NOT self-sustained.
One man can lift 200 lbs. about 15 feet per minute.

Yale-Weston Differential Block.
Load always self-sustained.
One man can lift 800 lbs. nearly 4 feet per minute.

Yale Duplex Convertible Screw Block.
Load always self-sustained.
One man can lift 1700 lbs. about 1½ feet per minute.

Yale-Weston Triplex Spur-Gear Block.
Load always self-sustained.
One man can lift 2000 lbs. about 3 feet per minute.

NOTE.—Pull on hand-chain in each case 82 lbs., or about the efficiency of one able man. The SIZES of weights indicate the proportionate load in each case.

Each CHAIN Block automatically sustains its load; the operator only supplying power to hoist or lower. This means perfect SAFETY.

The ROPE Block runs down unless the operator sustains the load with one hand while shifting other hand for fresh hoist. This means constant DANGER.

RELATIVE EFFICIENCIES OF CHAIN BLOCKS.

The picture on opposite page shows actual facts relating to the relative *powers* and *speeds* of the several kinds of blocks; *i. e.*, the power applied, the load, and the distance.

The purpose of a common ROPE tackle block is to obtain leverage or "power," whereby the operator, with a given pull (by passing many feet of rope or chain through his hands), may lift a heavier load a shorter distance. CHAIN blocks have a higher "power," and also the valuable quality of holding the load automatically suspended at all times, so that it cannot run down, even if the operator lets go; whereas the common tackle block will run down, and allow the load to drop, unless the operator maintains a constant pull on the rope at all times.

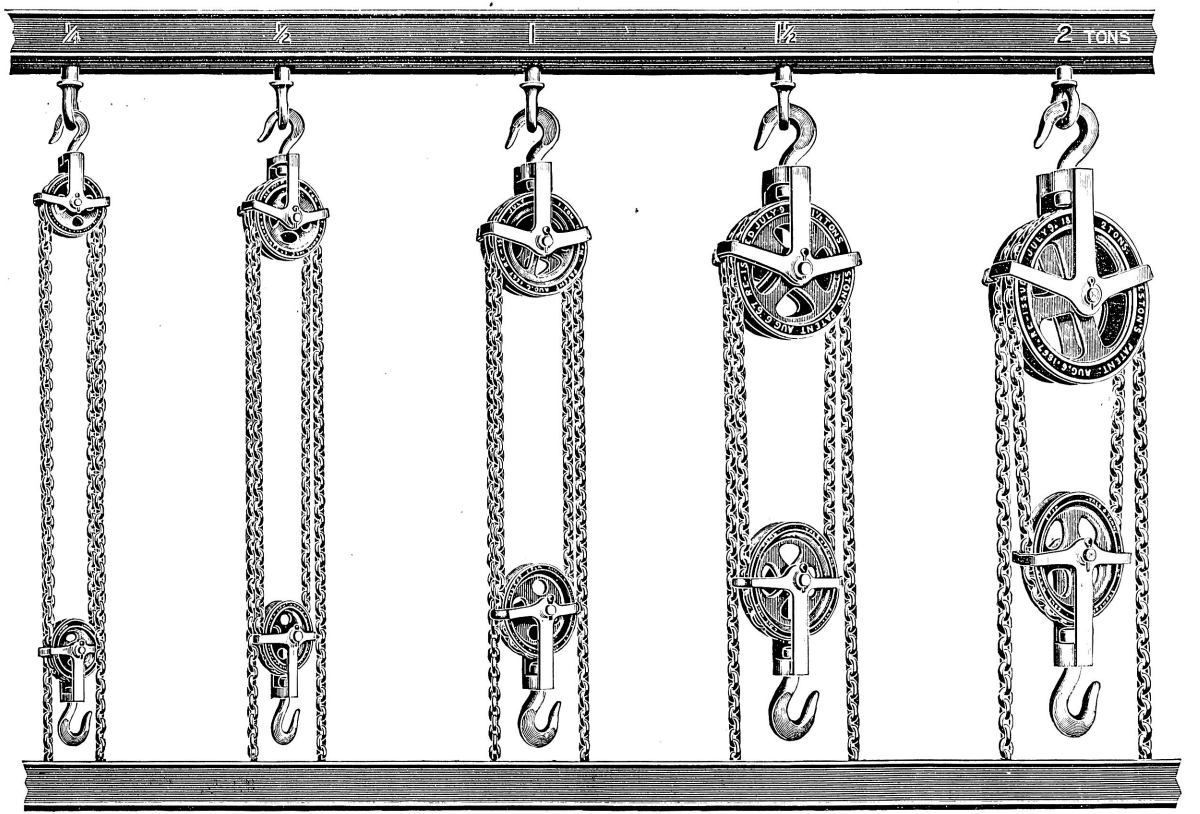
Each of the three types of chain blocks greatly multiplies the power of the operator, but with varying leverage, or "velocity ratio," and the load is always self-sustained, except that the Duplex Block can, if desired, be converted from "Safety" to "Dispatch" lowering.

The DIFFERENTIAL Block obtains its power through a *differential sheave*, and is the simplest and cheapest chain block in the world. It may be used under the worst conditions of dirt and exposure, and will always operate.

The DUPLEX Block obtains its power through a *worm wheel and screw*, and its action is very smooth and easy. It requires good lubrication, but, as its mechanism is enclosed in an oil-tight box, it may be used under any ordinary conditions. It is especially adapted to foundry use.

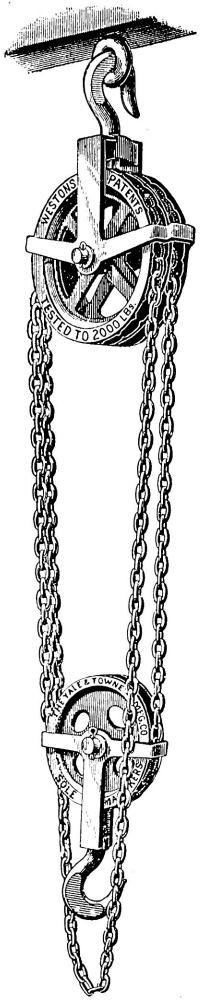
The TRIPLEX Block obtains its power through a *train of spur gearing*, and hence has a higher mechanical efficiency than any other similar device ever invented. A man can do more work with it than with any other block, and do it more easily. Where the use is frequent and the conditions reasonable, this is the *best*, and ultimately the most economical of all portable hoists.

THE YALE-WESTON DIFFERENTIAL PULLEY BLOCK.



CAPACITY IN TONS.

ONE-QUARTER. ONE-HALF. ONE. ONE AND ONE-HALF. TWO.



THE YALE-WESTON DIFFERENTIAL PULLEY BLOCK.

This is now treated in the text books as a permanent addition to the so-called "mechanical powers," and is in world-wide use. Its unapproachable simplicity, and resulting freedom from derangement under the roughest usage, assure it a permanent place for all uses where extreme simplicity is desired and the highest efficiency is not needed.

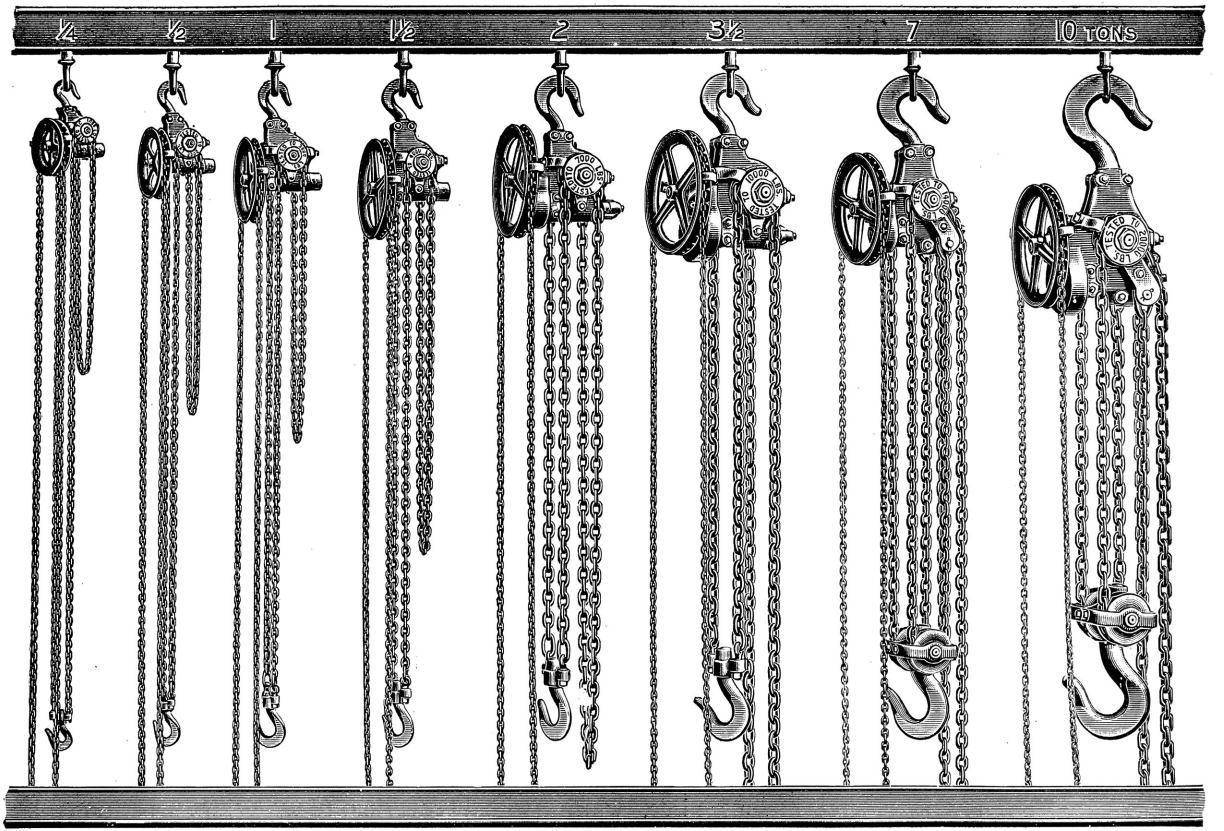
CAPACITY In Tons.	Price Complete.	Hoist.*	Price Extra Hoist.		Net Weight in Lbs.
			First Foot.	Additional Foot	
¼	**$13.**	6	$1.72	$1.44	22
½	**15.**	7	1.85	1.52	30
1	**20.**	8	1.90	1.60	50
1½	**25.**	8½	2.02	1.68	81
2	**30.**	9	2.11	1.76	121

For Dimensions of Blocks see page 14.

*NOTE.—Figures denote height in feet which blocks, with regular lengths of chain, will hois from level on which operator stands. Each additional foot of hoist requires 4 feet of additional chain.

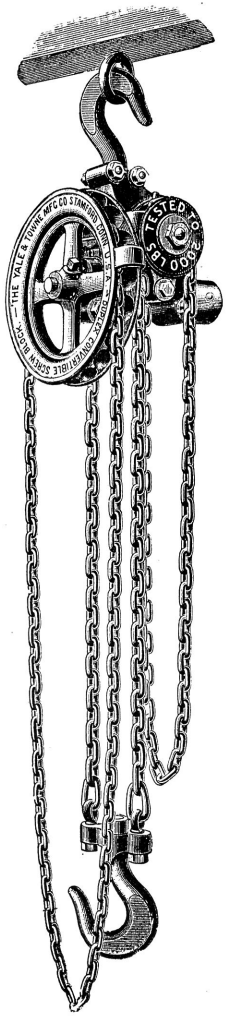
The name DIFFERENTIAL refers to the device for obtaining power, and for automatically sustaining the load. This consists of a double differential sheave, cast in one piece, which (without gearing of any kind) performs both of these functions. It is the reduction of a mechanical problem to its simplest terms.

THE YALE DUPLEX PULLEY BLOCK.



CAPACITY IN TONS.

ONE-HALF.	ONE.	ONE AND ONE-HALF.	TWO.	THREE AND ONE-HALF.	FIVE.	SEVEN.	TEN.



THE YALE DUPLEX CONVERTIBLE SCREW BLOCK.

This latest addition to the line of Chain Blocks made by this Company is intermediate in efficiency and price between the Differential and Triplex types, and is adapted to the widest range of uses.

CAPACITY In Tons.	Price Complete.	Hoist.*	Price Extra Hoist.		Net Weight in Lbs.
			First Foot.	Additional Foot.	
½	**$25.00**	8	$1.80	$1.52	43
1	**30.00**	8	1.85	1.56	57
1½	**40.00**	8	1.95	1.60	76
2	**55.00**	9	2.00	1.64	104
3½	**90.00**	10	2.25	1.88	210
5	**140.00**	12	2.40	2.00	340
7	**175.00**	12	3.55	2.96	378
10	**260.00**	12	3.85	3.20	570

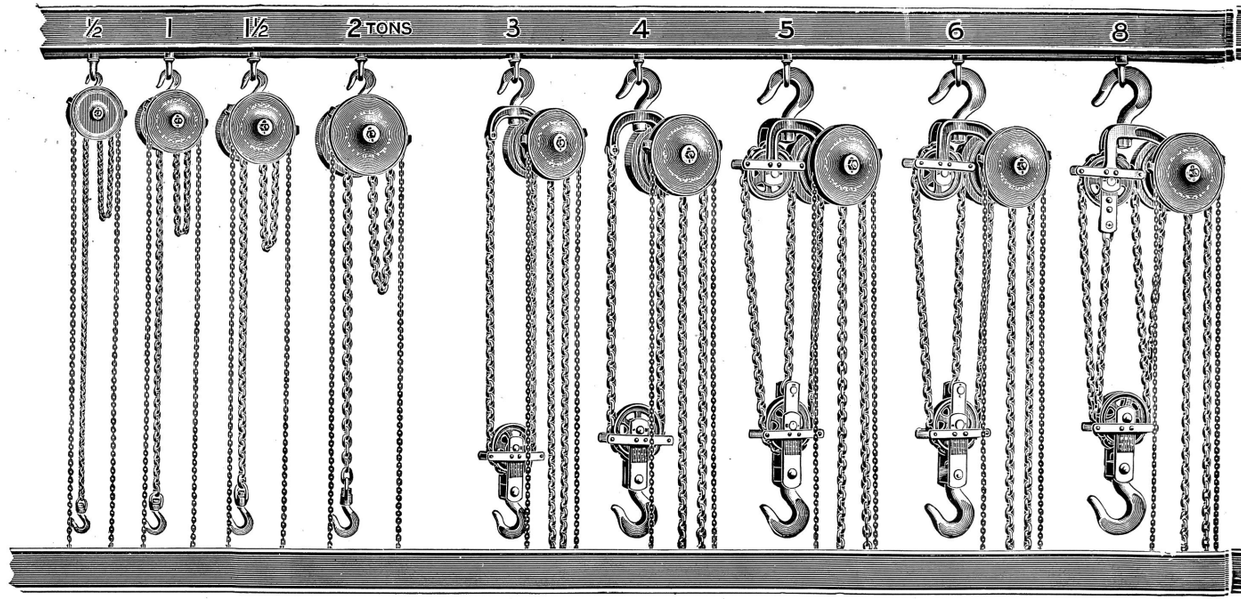
For Dimensions of Blocks see pages 15 and 16.

*NOTE.—Figures denote height in feet which blocks, with regular lengths of chain, will hoist from level on which operator stands.

As indicated by its name, SCREW BLOCK, the leverage by which the hoisting capacity is obtained is that of a screw or, more properly, a worm and worm wheel. The device by which the load is sustained, and which acts in conjunction with the worm, is capable of *conversion* at the will of the operator so that a Dispatch lowering action may be obtained when so desired.

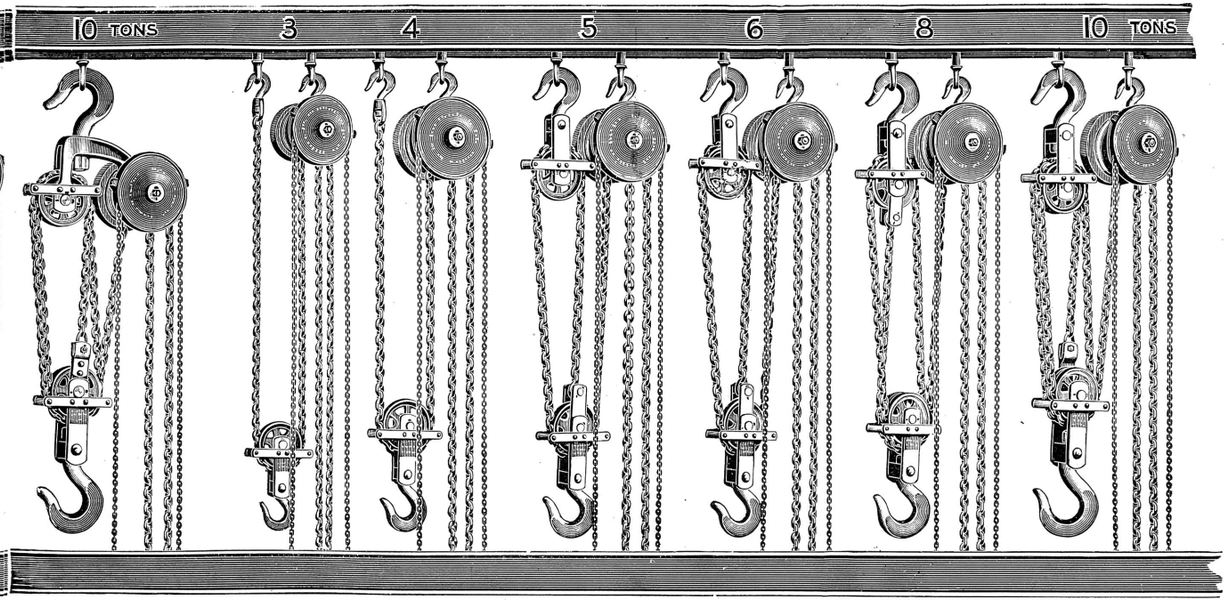
THE YALE-WESTON TRIPLEX BLOCK.

Direct form. — Type A.—Combination with ONE upper hook.



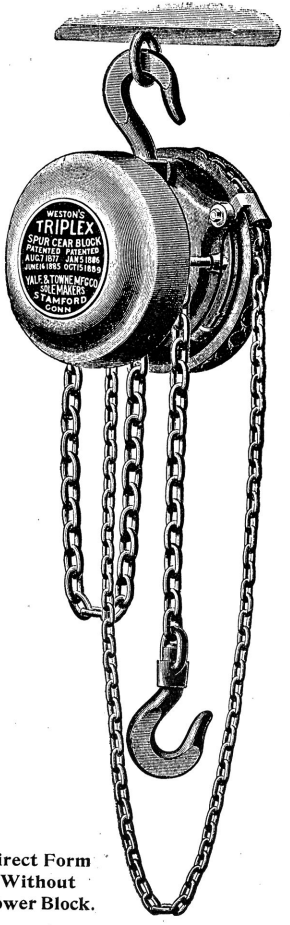
THE YALE-WESTON TRIPLEX BLOCK.

Type B.—Combination with TWO upper hooks

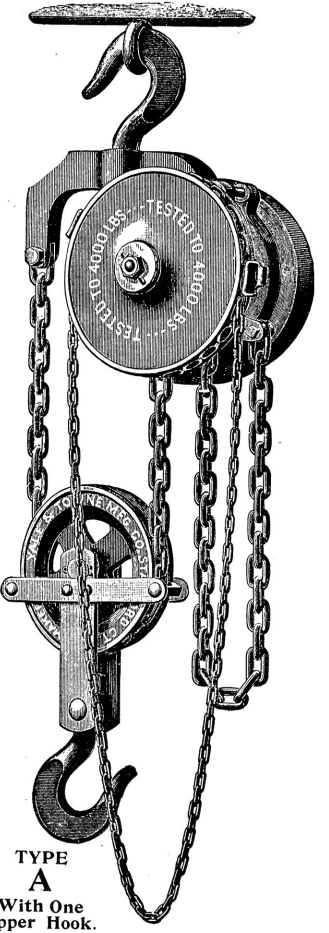


	DIRECT FORM.				TYPE A—COMBINATION.						TYPE B.—COMBINATION.					
CAPACITY IN TONS	½	1	1½	2	3	4	5	6	8	10	3	4	5	6	8	10
Price Complete	$30.00	40.00	50.00	60.00	80.00	100.00	125.00	150.00	180.00	225.00	70.00	85.00	105.00	130.00	160.00	200.00
Hoist in feet	8	8	8	9	10	10	12	12	12	12	10	10	12	12	12	12
Extra Hoist { First Foot	1.90	2.05	2.25	2.50	2.80	3.15	3.60	4.15	4.80	5.50	2.80	3.15	3 60	4.15	4.80	5.50
Extra Hoist { Additional Foot	1.20	1.30	1.40	1.50	1.70	1.95	2.25	2.60	3.00	3.45	1.70	1.95	2.25	2.60	3.00	3.45
Net Weight in Lbs.	51	89	133	203	206	307	397	417	505	622	195	287	380	387	471	593

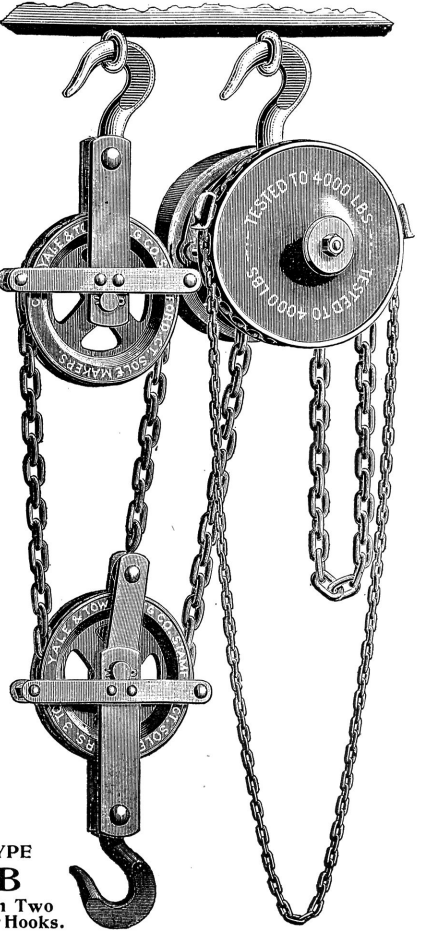
THE YALE-WESTON TRIPLEX BLOCKS.



Direct Form
Without
Lower Block.



TYPE
A
With One
Upper Hook.



TYPE
B
With Two
Upper Hooks.

THE YALE-WESTON TRIPLEX SPUR-GEAR BLOCK

Has an actual efficiency of 79%, or nearly three-fold that of any other block, and constitutes a most remarkable advance upon all previous inventions in this class of machines.

The trade name **Triplex** (Latin for three-fold or triple) has been adopted for this block because it has the three following important features, viz :

1. A triple gear, having the equivalent of three parallel shafts, each pair geared together.
2. A triple sun-and-planet-wheel motion, with three pairs of double pinions, ensuring equal distribution of the load and large wearing surfaces.
3. Three-fold the efficiency of its predecessors.

For sizes *above* two tons capacity the Triplex Block is made in the "*combination*" *form* (as shown on page 10), in which, by using as many parts of chain as may be required, the capacity of the Triplex Block may be multiplied to any desired extent, retaining the high efficiency of the direct block.

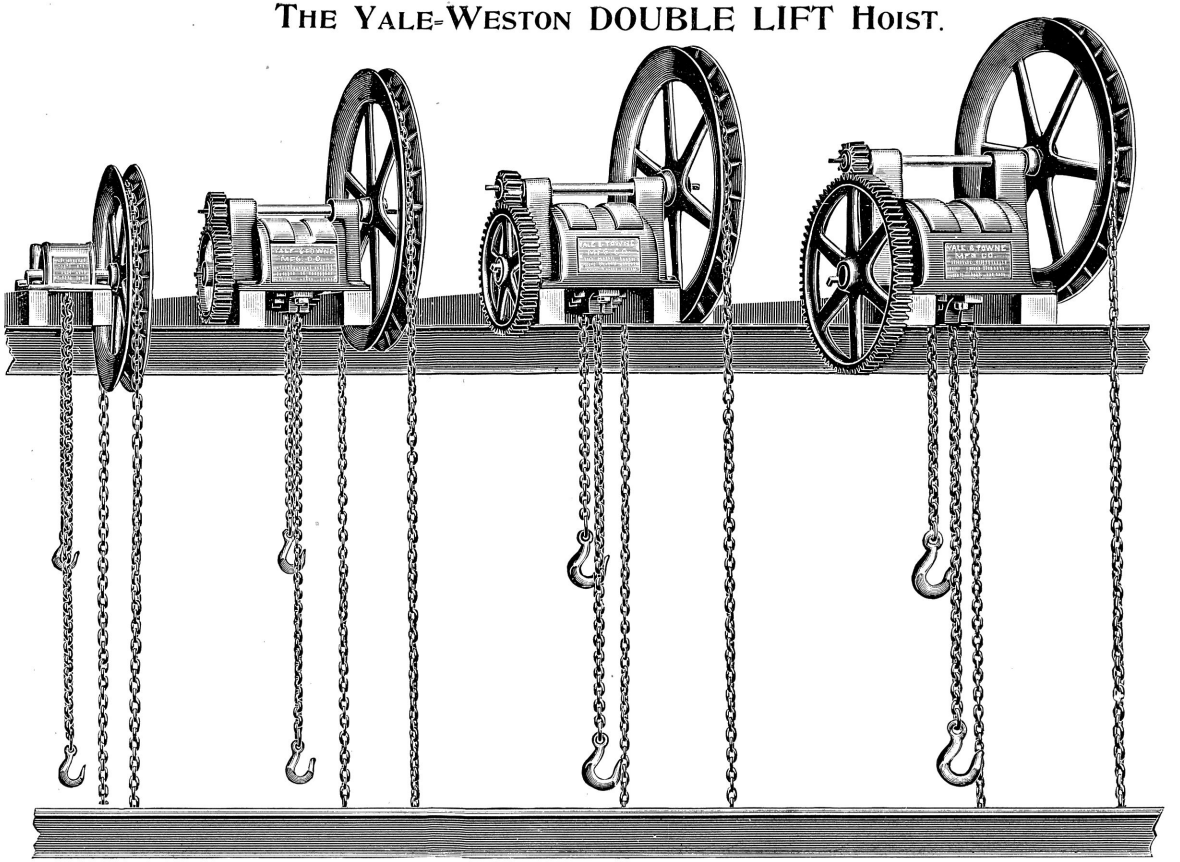
Two forms of TRIPLEX COMBINATION BLOCK are made, to meet the practical requirements.

TYPE A (see opposite page) is made with a wrought iron yoke, from one end of which the Triplex Block is suspended, while the end of the chain, or in larger sizes, the upper sheave, is held at the other end. The yoke is carried by the single upper hook and the entire combination is self-contained. This is the form more generally used, and meets the usual requirements completely.

TYPE B (see opposite page), omits the yoke, and uses instead *two* hooks, the Triplex Block and the upper sheave being separately suspended. This form is adapted for use with trolleys for overhead tramrail, or for permanent suspension from fixed eye-bolts.

The difference between Type A and Type B consists entirely in the mode of suspension; by varying the sheave combinations either form can be adapted to any capacity desired.

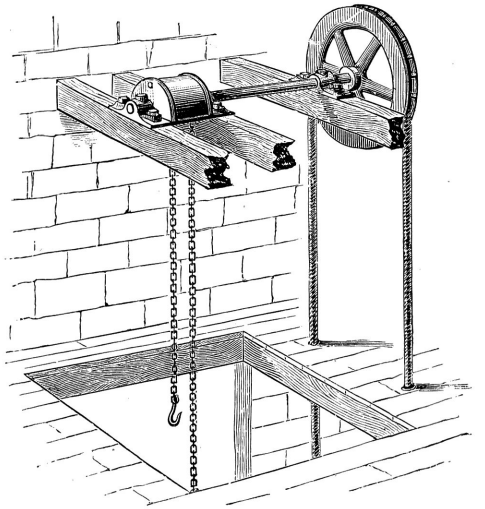
THE YALE-WESTON DOUBLE LIFT HOIST.



CAPACITY IN POUNDS.

FIVE HUNDRED.	ONE THOUSAND.	FIFTEEN HUNDRED.	TWO THOUSAND.

THE YALE=WESTON DOUBLE LIFT HOIST.



"DOUBLE LIFT,"
With Lengthened Shaft, for Use over Hatchways.

This device is particularly adapted for the quick handling of light yet bulky loads, work over hatchways, &c.

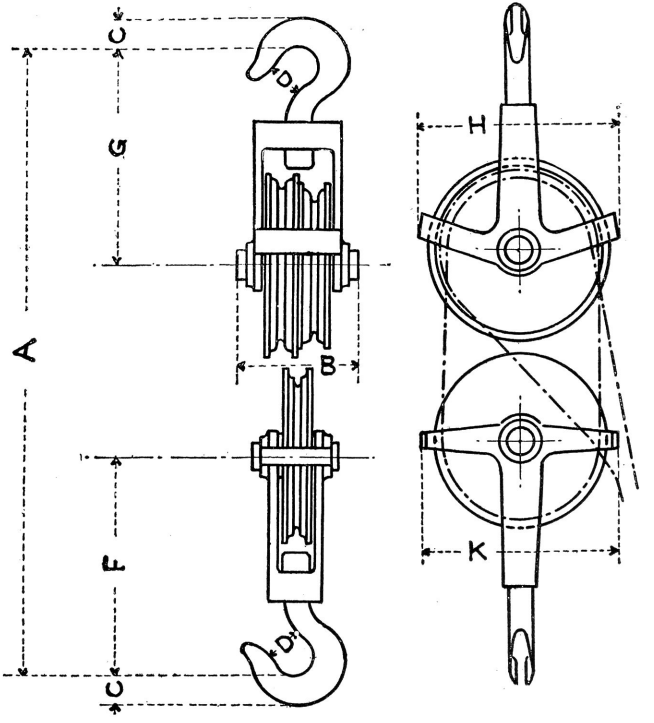
CAPACITY In Lbs.	Price Complete, (except Hand-rope or Chain).	Hoist.	Price, For Extra Hoist, per Foot.	Hand-rope or Chain extra.		Distance from center of Rope Wheel to center of Chain Sheave.
				Rope.	Chain.	
500	**$25.**	16 feet.	$0.40	$3.00	$5.00	$4\frac{9}{16}$ ins.
1000	**50.**	24 "	.44	4.00	7.00	$8\frac{5}{8}$ "
1500	**65.**	28 "	.48	4.50	8.00	$9\frac{1}{8}$ "
2000	**80.**	32 "	.52	5.00	9.00	$10\frac{1}{8}$ "

With the five hundred pound size one man can lift the full capacity at a speed of about 12 feet per minute and lighter loads at a correspondingly increased speed.

As its name implies, the DOUBLE LIFT consists of a chain (with hook on either end) passing over a sheave, which can be rotated by the hand-rope and wheel. Pulling one side of rope causes opposite side of chain to rise with load. In descending the load moves only as long as the rope is pulled, being controlled by the Weston Automatic Safety Brake.

DIMENSIONS OF DIFFERENTIAL BLOCKS.

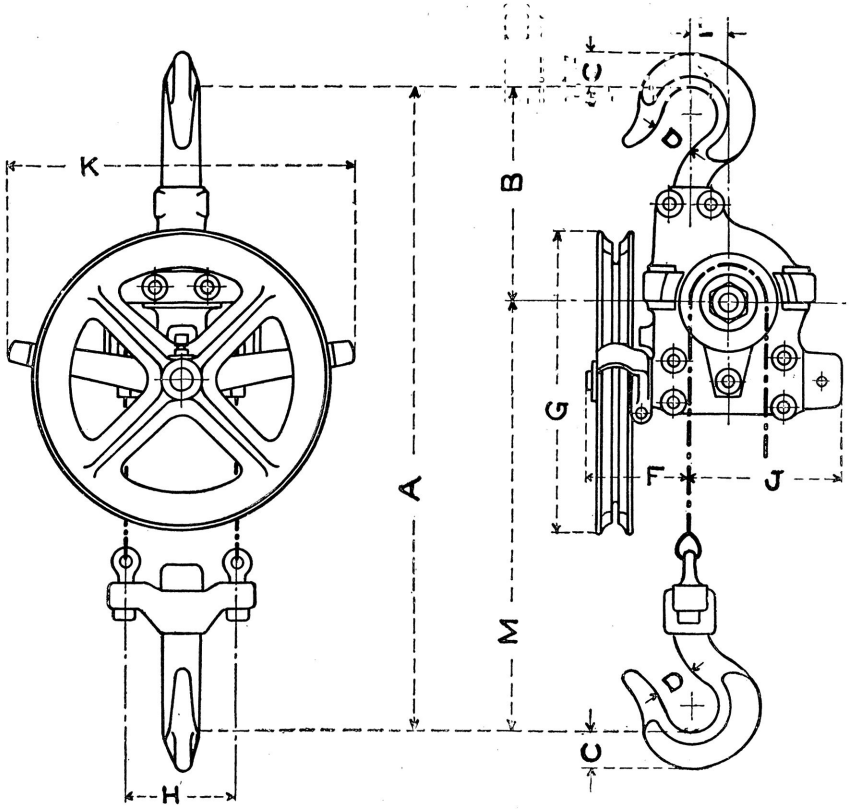
Reference Letters.	CAPACITY IN TONS.				
	¼	½	1	1½	2
	All Dimensions in Inches.				
A	17⅛	20 13/16	26⅜	32¼	39
B	3⅞	4	4⅞	5¾	6
C	¾	27/32	1 3/16	1⅜	1½
D	1	1⅛	1 5/16	1½	1 11/16
F	6⅜	7¼	9⅜	11	12⅝
G	6½	7⅝	9⅜	11⅝	14⅛
H	5¾	7⅛	8⅝	12⅛	14 15/16
K	5 7/16	6 9/16	8⅜	10 5/16	11¾
Diam. of Chain Stock.	¼	¼	9/32	5/16	⅜



DIMENSIONS OF DUPLEX BLOCKS.

(½ TO 5 TONS.)

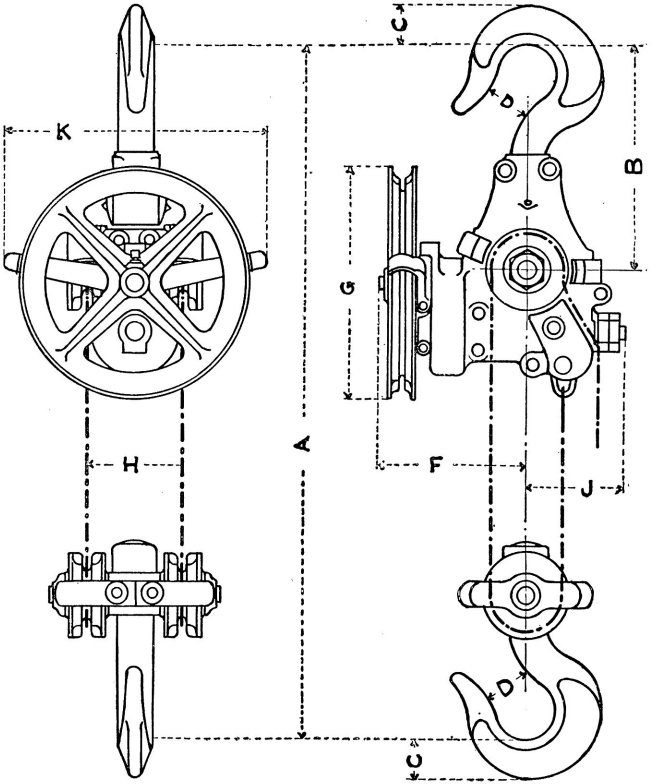
Reference Letters.	CAPACITY IN TONS.					
	½	1	1½	2	3½	5
	All Dimensions in Inches.					
A	13 5/16	16 3/16	19¼	21 3/8	25¾	30 5/8
B	5 15/16	7 3/16	8½	9 5/8	11¼	13 5/8
C	7/8	1¼	1 3/8	1½	2	2¼
D	1⅛	1 5/16	1½	1 11/16	2 1/16	2 7/16
F	3¼	3½	4½	4½	7	8¼
G	7	9	11	12¾	14½	16
H	3¾	3¾	4½	4¾	6	7
J	5¼	5¾	6¼	6½	8	8¾
K	8¾	10½	12½	14½	16	17¾
L	1⅜	1½	1⅝	1⅝	2¼	2¾
M	7⅜	9	10¾	11¾	14	17
Diam. of Hand Chain.	¼	¼	¼	¼	9/32	9/32
Load Chain.	¼	9/32	5/16	⅜	½	9/16



Dimensions of DUPLEX Blocks.

(7 AND 10 TONS,)

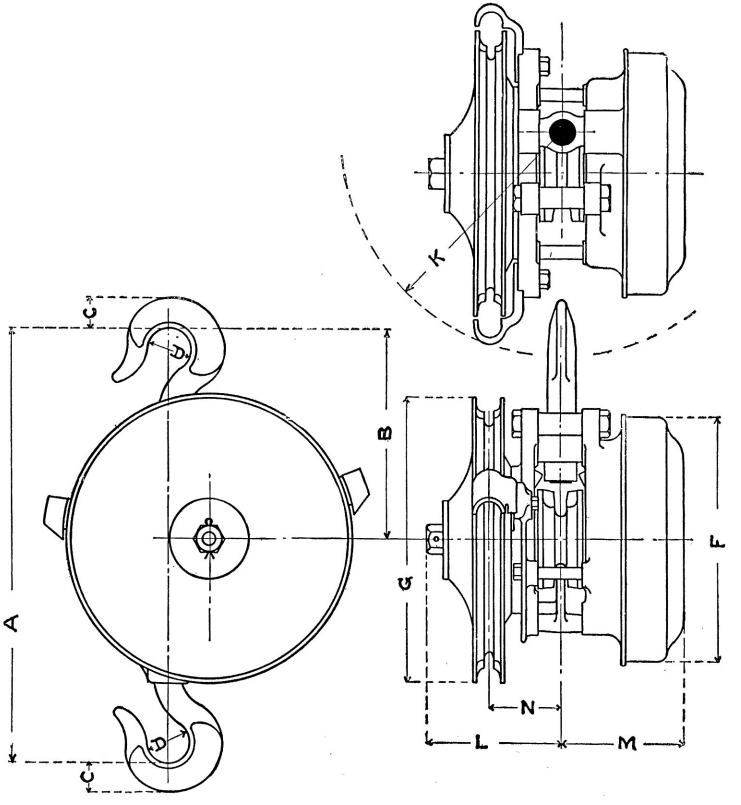
Reference Letters.	CAPACITY IN TONS	
	7	10
	All Dimensions in Inches.	
A	33 7/8	45 1/4
B	14 7/16	19 7/8
C	2 1/2	3 1/4
D	2 13/16	3 7/8
F	9	11
G	14 1/2	16
H	6	7
J	5 3/4	7
K	16	17 3/4
Diam. of Hand Chain.	9/32	9/32
Load Chain.	1/2	9/16



Dimensions of TRIPLEX Blocks.

(DIRECT FORM.)

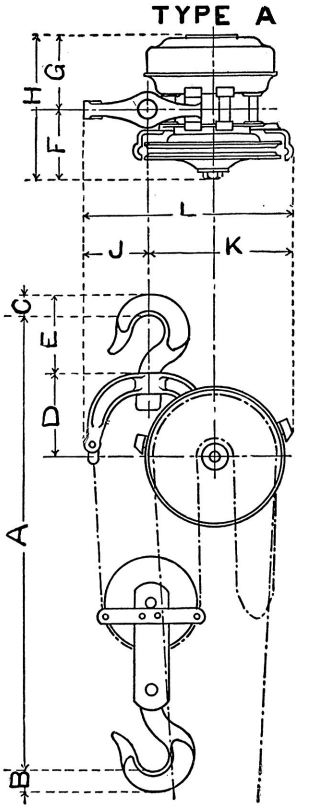
Reference Letters.	CAPACITY IN TONS.			
	½	1	1½	2
	All Dimensions in Inches.			
A	15	17	19½	24
B	6⅝	8⅛	9¼	10⅝
C	⅞	1⅜	1½	1¾
D	1½	1¾	2	2¼
E	1¼	1⅝	1⅞	2⅜
F	8⅜	9⅝	10⅞	13⅝
G	9½	11⅜	12¾	14⅝
H	5⅞	6½	7⅜	8½
J	7⅛	8⅛	9¼	10½
K	7⅜	8⅝	10	11½
L	4¾	5⅜	6⅜	7
M	4	4⅞	6¼	7¼
N	2½	2⅞	3⅝	4
Diam. of Hand Chain.	¼	¼	¼	¼
Load Chain.	9/32	⅜	7/16	½

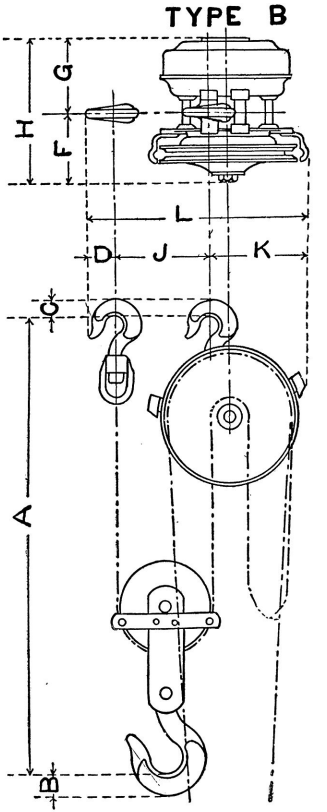


Dimensions of Types A & B Combination TRIPLEX Blocks.

(3 AND 4 TONS.)

Reference Letters.	CAPACITY IN TONS.			
	TYPE A.		TYPE B.	
	3	4	3	4
	All Dimensions in Inches.			
A	32	37	31	36
B	$1\frac{15}{16}$	$2\frac{1}{4}$	$1\frac{15}{16}$	$2\frac{1}{4}$
C	$1\frac{15}{16}$	$2\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{3}{4}$
D	$6\frac{3}{4}$	$8\frac{1}{4}$	$2\frac{9}{16}$	$2\frac{7}{8}$
E	$6\frac{15}{16}$	8	..	..
F	$6\frac{3}{8}$	7	$6\frac{3}{8}$	7
G	$6\frac{1}{4}$	$7\frac{1}{4}$	$6\frac{1}{4}$	$7\frac{1}{4}$
H	$12\frac{5}{8}$	$14\frac{1}{4}$	$12\frac{5}{8}$	$14\frac{1}{4}$
J	$5\frac{3}{4}$	$6\frac{3}{4}$	9	$9\frac{3}{4}$
K	$13\frac{5}{8}$	$15\frac{1}{4}$	$9\frac{1}{4}$	$10\frac{1}{2}$
L	$19\frac{3}{8}$	22	$20\frac{13}{16}$	$23\frac{1}{8}$
Diam. of Hand Chain.	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
Load Chain.	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{7}{16}$	$\frac{1}{2}$

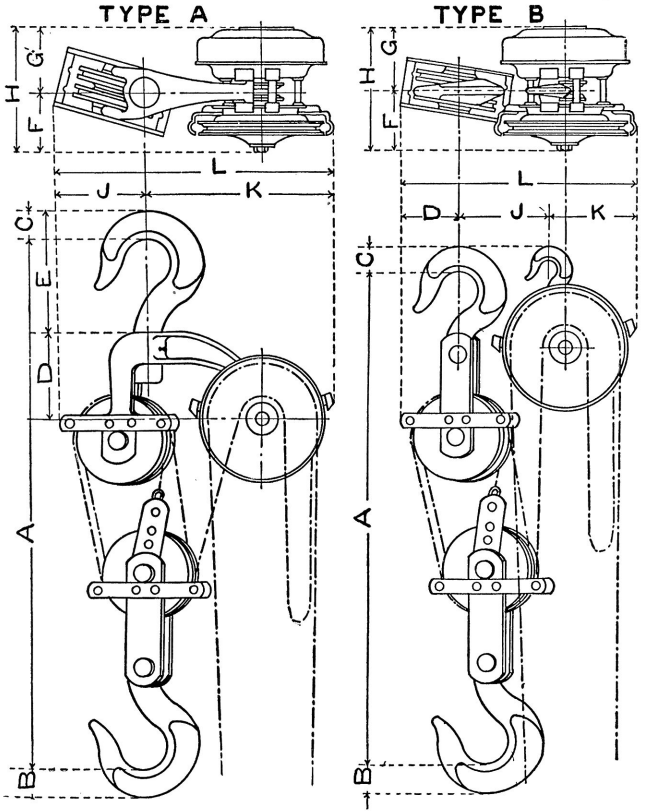




Dimensions of Types A & B Combination TRIPLEX Blocks.

(5 TO 10 TONS.)

Reference Letters.	CAPACITY IN TONS.					
	TYPE A.			TYPE B.		
	5 & 6	8	10	5 & 6	8	10
	All Dimensions in Inches.					
A	45	51	57	43¾	51	56½
B	2½	2 13/16	3¼	2½	2 13/16	3¼
C	2½	2 13/16	3¼	2¼	2 13/16	2 13/16
D	8¼	9¼	9¼	6½	7	8
E	9 3/16	10⅜	12¾	..	..	..
F	7	7	7	7	7	7
G	7¼	7¼	7¼	7¼	7¼	7¼
H	14¼	14¼	14¼	14¼	14¼	14¼
J	10⅜	9 7/16	10¼	12	12	12
K	18¼	19½	22	10½	10½	10½
L	28⅝	28 15/16	32¼	29	29½	30½
Diam. of Hand Chain.	¼	¼	¼	¼	¼	¼
Load Chain.	½	½	½	½	½	½



YALE & TOWNE PITCH CHAIN.

The requirements of our block business compelled us many years ago to undertake the manufacture of pitch or gauged chain, suitable for use in the pocketed wheels or sheaves of chain blocks. To meet the growing demands of our business a few years ago we built a new and large shop expressly for chain making, which is provided with the best facilities, in which we employ only the most skilled and experienced workmen, and in which we produce all the chain used in our blocks.

This chain is made of a very high grade of ductile iron, by a patented process which insures accuracy in the *pitch* of the links, thus adapting it to mesh into, or gear with, toothed or pocketed wheels (as used in our several varieties of chain blocks), whereby the wheel is driven by the chain, or vice versa, as positively as one gear wheel is driven by another.

Pitch chain-wheels are available for the transmission of power in cases where the speed is not great but the power transmitted is considerable, and where it is desirable to preserve a fixed relationship between the driving and driven wheels or sheaves.

PRICE LIST OF YALE & TOWNE PITCH CHAIN.

Nominal Capacity in Tons,* . . .	½	1	1½	2	3	4	5	6	8	10
Diameter of Iron in Inches,. . . .	¼	9/32	5/16	3/8	7/16	½	9/16	5/8	11/16	13/16
Price per Foot, cts., ...	38	40	42	44	48	54	60	70	85	$1.00

*The upper line indicates the load which can be safely carried on *two parts* of the chain, i. e., as used in a one-sheave tackle block. Each part of the chain thus carries one-half of the total load. If the load is to be carried by a single chain, select a chain of a nominal capacity of twice the intended load.

Technical Facts Relating to Chain Blocks.

THE two most important elements in a hoisting machine are the *velocity ratio* and the *mechanical efficiency*. The "velocity ratio" or leverage, is the number of feet of rope or chain which the operator must overhaul with his hands to lift the load one foot. With a low velocity ratio, the operator can lift only a small load, but can lift it quickly; with a high velocity ratio, he can raise a large load, but only slowly. The choice between these conflicting conditions is a matter requiring great experience and good judgment, and depending also upon the purposes for which the machine is intended. The velocity ratios adopted by various blockmakers are stated on page 23. As a rule, the blocks which are lowest in efficiency have the highest velocity ratio, the purpose of the makers being thus to conceal their inefficiency by making them to appear to work easily. A study of the figures in the table on page 23 will indicate the waste of energy involved in the use of such blocks.

The "mechanical efficiency" of a hoist is a term which indicates the percentage of the applied power which is utilized in lifting the load, the difference between the power applied and the power utilized being the amount of power consumed or wasted in overcoming the friction of the machine. Common hoists rarely have an efficiency of more than 50 per cent., which means that of each 100 foot-pounds of energy applied by the operator, one-half is utilized in lifting the load and the other half is wasted in overcoming friction. In most chain blocks the efficiency is necessarily less because of the unavoidable friction of the chain, and still more because of the "self-sustaining" feature which such blocks usually possess. The best chain blocks heretofore obtainable have had an efficiency of less than 33 per cent. and some of less than 20 per cent. (See table on page 23.) Believing that the heavy loss of power which this implies could be obviated, we began, some years ago, a series of experiments with spur-geared blocks which resulted finally in the invention of the Triplex Block, whereby we have obtained *an actual efficiency of almost 80 per cent.*

More recently we have, in like manner, developed an improved Worm-gear, or Screw block, having an efficiency of about 40 per cent., which is at least 25 per cent. better than any screw block previously made. Our original Weston Differential Block has an efficiency of 31 per cent., which, with one exception, is higher than that of any other chain block, except our Duplex and Triplex blocks.

ABSTRACT OF REPORT OF TESTS MADE TO DETERMINE THE EFFICIENCY OF CHAIN BLOCKS.

By Prof. R. H. THURSTON, OF SIBLEY COLLEGE, CORNELL UNIVERSITY.

IN order to obtain an impartial test of the comparative efficiency of the various chain blocks in use, Prof. R. H. Thurston was requested to procure in the open market, and test for *efficiency*, a one ton block of each of the following makes: Yale-Weston Differential, Harrington, Box, Teal, Olsen, Wharten and Batt, as well as the new Yale-Weston Triplex Block.

The results of these tests are fully given in the complete report of Prof. Thurston, copies of which will be furnished upon application. The following abstract will serve to indicate the general results.

In describing the various blocks tested, Prof. Thurston explains that all of them, except the Triplex Block, depend for their self-sustaining feature upon the use of some gearing or purchase having a very low mechanical efficiency, so that the friction of the working parts, which is a positive resistance to motion, in *hoisting* as well as in lowering, serves to prevent the running down of the load. Proceeding, he says:

COMPARATIVE EFFICIENCY OF BLOCKS,

Both in Hoisting and Lowering.

WORK OF HOISTING. [Load of 2,000 Pounds.]			NUMBER OF BLOCK. ALL BLOCKS OF ONE TON CAPACITY.	WORK OF LOWERING. [Load of 2,000 lbs. lowered 7 feet in each case.] Inclusive of Time.	
Actual Efficiency. Per Cent.	Relative Efficiency.	Velocity Ratio.		Time in Minutes.	Relative Efficiency.
79.50	**1.00**	32.50	**1** (Yale-Weston Triplex.)	0.75	**1.000**
32.00	**.40**	62.44	2	1.20	**.186**
31.00	**.39**	30.00	**3** (Yale-Weston Differential.)	1.50	**.050**
28.80	**.36**	28.00	**4** (Weston's Imported.)	2.50	**.035**
26.04	**.33**	48.00	**5**	2.80	**.380**
24.34	**.31**	53.00	**6**	1.80	**.036**
23.00	**.29**	44.30	**7**	2.75	**.029**
18.97	**.24**	61.00	**8**	3.75	**.018**

"The New Yale-Weston Triplex Block, on the contrary, has a very simple and compact triple train of spur gearing and thus develops a remarkably high efficiency as compared with any of the other types of chain block. Its efficiency is so high, indeed, that it becomes impossible to rely upon the friction of the apparatus to sustain the load. For the latter function a separate and simple friction device is introduced. This independent sustaining mechanism automatically holds the load suspended, and yet enables it to be lowered at will with the exertion of a very slight effort and at a high velocity, but without acceleration or danger."

The results of the tests are

then given in tabulated form, the Yale-Weston Blocks being given by name and the other blocks by number only, as it was not the intention of the report to make any criticism upon the actual performance of the other blocks, but only to show the very low efficiency which all of them unavoidably possess. The Yale-Weston Differential Block shows as high an efficiency as the best of its competitors, while the Triplex Block, as will be seen in the table, far outstrips them all in efficiency, both of hoisting and lowering.

In referring to this table, Prof. Thurston says: "The foregoing figures indicate fairly the relative efficiencies of the several blocks, and show that the new Yale-Weston Triplex Spur-Gear Block excels all its predecessors to a remarkable extent. The secret of its excellence lies in the fact that while in other blocks a wasteful friction is chiefly relied upon to prevent the load once raised from running down, the Triplex Block is designed with a view of reducing the lost work of friction, both in hoisting and in lowering, to a minimum, and to obtaining the highest mechanical efficiency; a new and independent device being introduced to control the action of lowering, this device causing no friction in hoisting, and being perfectly reliable and effective for its intended purpose during the act of lowering.

A glance at the figures will show that the Triplex Block returns *79½ per cent. of the work of the operator*, while the *best* of its competitors cannot do better than 32 per cent."

DESCRIPTION OF THE YALE-WESTON DIFFERENTIAL PULLEY BLOCK.

The "Differential" is the simplest chain block in the world, has the fewest parts and is the least likely to get out of order. It is a powerful hoist and is self-sustaining. so that the load cannot run down even if the chain be entirely let go. It is the combination of these admirable qualities which has given the block its world-wide popularity.

FIG. 1.

It consists of a pair of pocketed chain wheels above, and a single wheel below (fig. 1). The endless chain passes over one upper sheave, down around the bottom block, and then over the other upper sheave, its remaining portion hanging in a loose loop. The two upper sheaves are in one piece and differ in circumference by only one chain pocket. The weight thus pulls with equal force on both parts of the chain B and C (fig. 2), and if the two upper sheaves were of equal diameter the load would not run down and could not be either raised or lowered Pulling part A rotates the upper sheave so that part B is taken up while part C is paid off, and the load is lifted a distance equal to one-half the difference between the amount of chain taken in and paid out by the action of the "differential" sheave. Pulling part D reverses the motion and effects lowering.

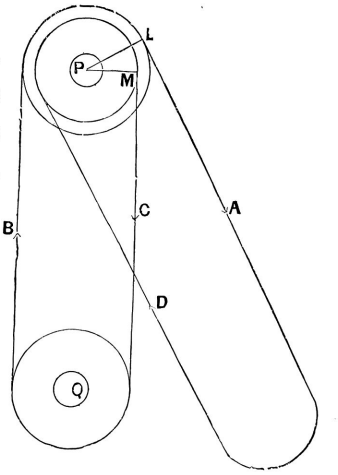


FIG. 2.

The slight difference in the radii of the upper sheaves constitutes the leverage or purchase whereby the block obtains its power. This difference causes a slight tendency to run down, which, however, is neutralized by the friction of the parts, the latter thus serving the useful purpose of holding the load without resort to a brake or similar device, and constituting the self-sustaining feature of the block.

DESCRIPTION OF THE YALE DUPLEX CONVERTIBLE SCREW BLOCK.

THE accompanying illustrations show the latest addition to the line of chain blocks made by this company. It is intermediate in efficiency and price between the Differential and Triplex types, and is adapted to the widest range of uses. As indicated by its name, Screw Block, the leverage by which the hoisting capacity is obtained is that of a screw motion, or more properly, a worm and worm wheel motion. The construction is such as to permit a much higher efficiency to be obtained than is practicable with an ordinary worm wheel motion, and the device by which the load is sustained, and which acts in conjunction with the worm, is capable of *conversion* at the will of the operator, so that a dispatch lowering action may be obtained when desired.

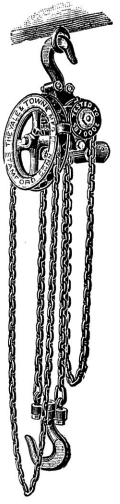


FIG. 1.

As shown in the engraving the new block is exceptionally neat in appearance, the worm wheel being placed between the two chain sheaves and all the parts symmetrically disposed. The worm and worm wheel motion, as well as the device for sustaining the load, are all enclosed in an oil-tight casing, thus insuring thorough and continuous lubrication of the working parts, and preventing the entrance of dust and grit. The two

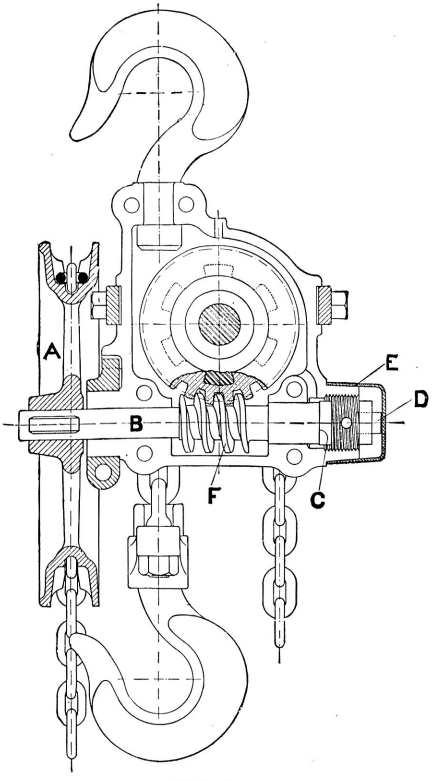


FIG. 2.
DUPLEX CONVERTIBLE SCREW BLOCK.
(Sectional View.)

hoisting chains are attached at their lower ends to a yoke to which the hook is secured, each chain having a swivel connection, so that kinking or entanglement of chains is impossible.

The SUSTAINING FEATURE is obtained by means of a friction plug which receives the end thrust of the worm shaft. The friction of the end of the shaft upon this plug furnishes sufficient resistance to prevent the running down of the load, and hence lowering must be effected by pulling on the hand chain.

The CONVERTIBLE FEATURE is the most notable point of the block. By means of it the change from Safety to Dispatch lowering may be made. It is well shown in the sectional view, in which also the internal construction of the block is made clear. The load hanging upon the hook causes an end thrust upon the worm shaft, and this thrust is received by a plug screwed into the casing of the block and pinned through to prevent rotation. By backing out the pin, the cap E may be removed and the plug taken out and reversed. The end C of the plug, which in the figure is shown in contact with the worm shaft, is formed so that the bearing is upon an annular or ring surface at the circumference of the end of the plug, and hence the distance from the center at which the friction acts to retard the rotation of the shaft is great enough to keep the shaft from running down. Under these conditions the load will only continue to descend so long as the hand chain is operated, this constituting the Safety lowering arrangement. If, however, the user desires Dispatch lowering, he unscrews and reverses the plug so that the end thrust is taken by the reduced end D. With this arrangement the load will continue to descend after it has once started, and in this manner the block can be *converted* from Safety to Dispatch lowering. The Dispatch lowering is especially convenient for bridge works and for many situations in which it is desirable for the operator to stand clear of the load. The feature of *convertibility* possessed by this block thus enables the varying requirements of customers to be met in a manner not otherwise possible.

DESCRIPTION OF THE YALE=WESTON TRIPLEX SPUR=GEAR BLOCK.

HERETOFORE it has been an established fact that chain blocks possessed a low "efficiency," the *best* of those hitherto made giving back only about 32 per cent. of the work expended by the operator, the other 68 per cent. disappearing in wasteful friction and its unavoidable wear.

FIG. 1.

The object sought in the Triplex Block was to increase the efficiency and diminish the enormous loss; the result is a block which utilizes 80 per cent. of the workman's labor.

This extraordinary result is accomplished by separating the sustaining mechanism from the hoisting gear, so that the operator is not wasting a large part of his effort in overcoming the resistance of the friction upon which the sustaining feature of the block depends.

The HOISTING MECHANISM is clearly shown in Figs. 2 and 3, and consists of a direct train of spur gears from the small pinion on the central shaft to the internal gear wheel cast within the main frame. The three intermediate gears between the pinion and the internal gear are carried on the circular frame or cage, and roll around with the internal gear, thus forming a sun and planet motion by which the desired leverage is obtained.

The great advantages resulting from this triple arrangement of gears are, increased wearing surface, subdivision of strains, and an accurate equalizing of the load. The frame upon which

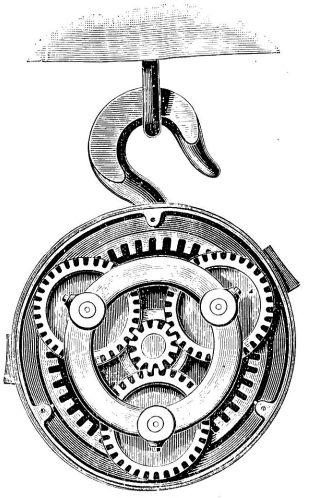


FIG. 2.

these intermediate gears are mounted is keyed fast to the hub of the hoisting chain sheave, and the central pinion shaft is operated by the hand chain wheel, so that the power of the operator is transmitted from the hand chain to the load chain through a direct spur-gear train of high efficiency, with a leverage of about 30 to 1.

The SUSTAINING MECHANISM is placed at the hand chain end of the block (the left of Fig. 3), and consists of a set of brass friction discs, the discs being alternately attached to the central axis and to a ratchet check wheel. The hand chain wheel is screwed upon the central spindle as shown, and the construction is such that it is clamped tightly by the friction discs to the shaft, either if it is rotated in the direction for hoisting, or if the shaft attempts to revolve in the opposite direction under the pull of the load. The parts being thus clamped together act as one, and the ratchets offer no resistance to the effort of the operator in hoisting. When the direction of the hand chain is reversed the alternate discs are released, and the others being held by the ratchets the load is lowered against their friction at a rate entirely controlled by the movement of the hand chain, while the stoppage of the hand chain movement causes the discs to tighten at once and sustain the load perfectly.

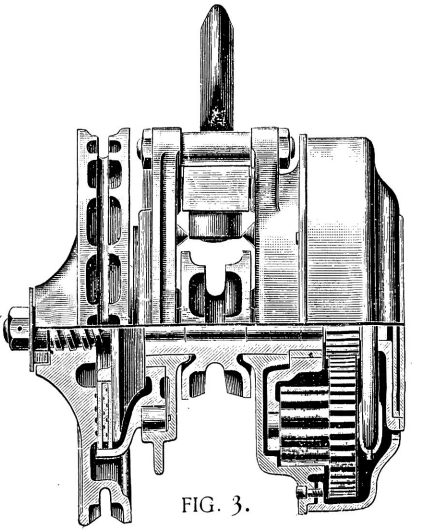


FIG. 3.

THE YALE LOCK.

FIG. 1.

THE NAME YALE in connection with lockmaking stands not only for the highest quality of design and for best workmanship, but also recalls the historical fact that the ideas embodied in the original Yale lock by its inventor, Linus Yale, Jr., before his death in 1868, have since completely revolutionized the art of lock construction. Those inventions, by separating the key mechanism from the bolt mechanism, and by combining a sheet-metal key with a corresponding key-way contained in a rotating plug, opened the way for the subsequent adaptation of the Yale lock to its present wide range of uses and for its latest and highest development, the Paracentric key and escutcheon.

The new Paracentric key and key-way increase vastly the original security of the Yale lock. The peculiar shape of the key-way, as shown by Fig. 1, effectively precludes the introduction or use of picking tools or false keys. The operation of the Yale cylinder or escutcheon by its key is clearly illustrated by the cross-sectional view in Fig. 2. The Paracentric key is made by special and patented machinery, developed by years of study and experiment, and its cross-section is such as practically to preclude its illicit duplication, even if the original key is available as a model. The Yale Paracentric lock and key thus combine to give unapproachable security against picking, duplication or accidental interchange of keys.

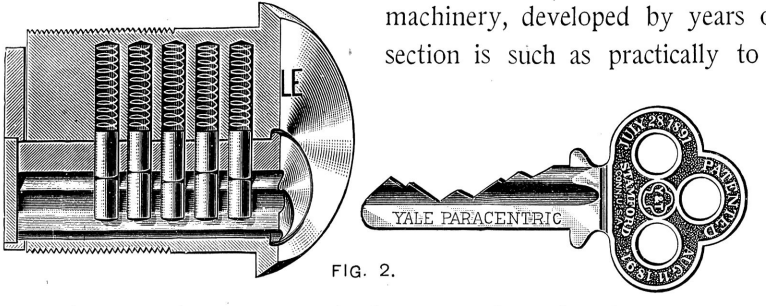


FIG. 2.

The Yale locks are made in more than *five hundred* styles and sizes, adapting them to almost every conceivable use. They are for sale by all prominent hardware merchants, any of whom, on request, will exhibit illustrated catalogues descriptive of the The Yale Locks, Art Hardware, and other products of the company.

YALE MASTER-KEY SYSTEM.

THE mechanical characteristics of the original Yale Lock made possible a development of master-key work almost as radical, in improvement over preceding practice, as the original Yale invention, viz: the Yale Duplex Master-key System (patented).

Heretofore the use of a master-key has involved increased complexity, decreased security and much greater liability to derangement of the lock, the possible number of locks controlled by a single master-key being very restricted. The Yale Duplex System retains the full security of the lock, is absolutely simple, and permits of the grouping of an almost infinite number of locks to a single master-key, while subordinate groups of locks may, if desired, be controlled by sub-master-keys.

Factories, Mills, Office Buildings and Residences may thus be supplied with a full equipment of locks for every purpose, provided with any desired arrangement of individual and sub-master-keys, all in turn controlled by a single grand master-key. Full information furnished on request, and estimates for *complete equipments of master-key locks* submitted on application.

THE YALE & TOWNE MANUFACTURING COMPANY,

MANUFACTURERS OF

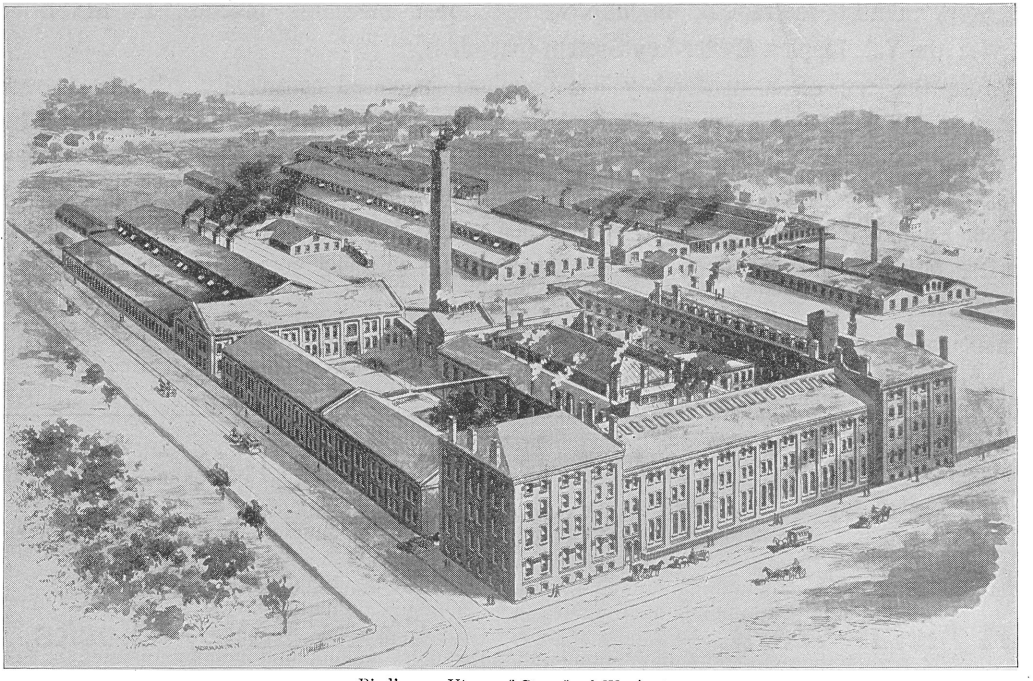
The Yale Locks,
Art Metal Work,
Builders' Hardware,

Bank Locks,
Chain Pulley Blocks,
Post-Office Lock Boxes.

Special Catalogues relating to any of our lines of products will be furnished on application.

For addresses of our Branch Offices see page 32.

THE YALE & TOWNE MANUFACTURING COMPANY.



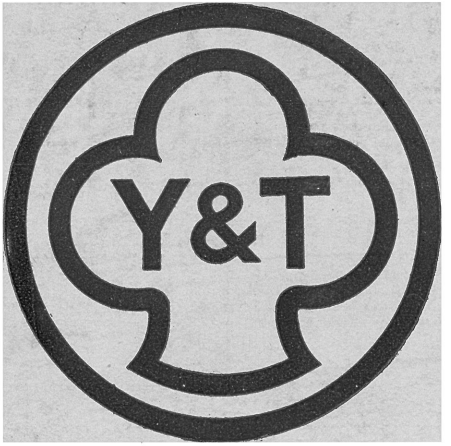
Bird's-eye View of Stamford Works.

GENERAL OFFICES:
84-86 Chambers Street, New York.

WESTERN OFFICE:
152-154 Wabash Avenue, Chicago.

Local Offices: Philadelphia, Boston, Buffalo and San Francisco.

CONTENTS.


Y&T