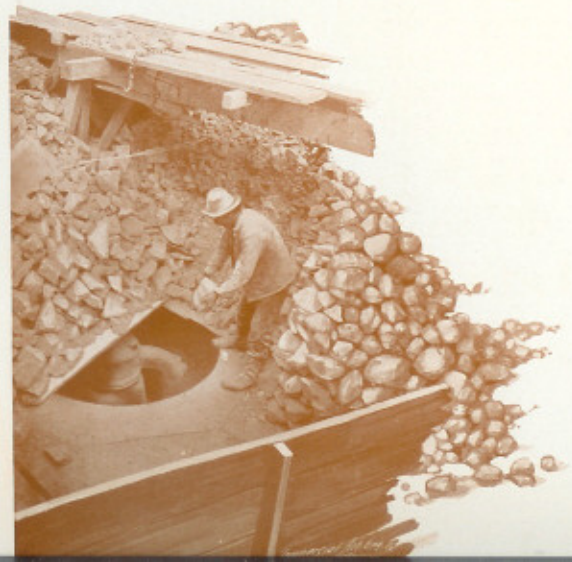
SYMONS CRUSHERS

"Half the Size—Half the Weight"

THE T. L. SMITH COMPANY



SYMONS *CRUSHERS*

BUILT BY

SMITH & POST COMPANY

EXCLUSIVE SELLING AGENTS

THE T. L. SMITH COMPANY

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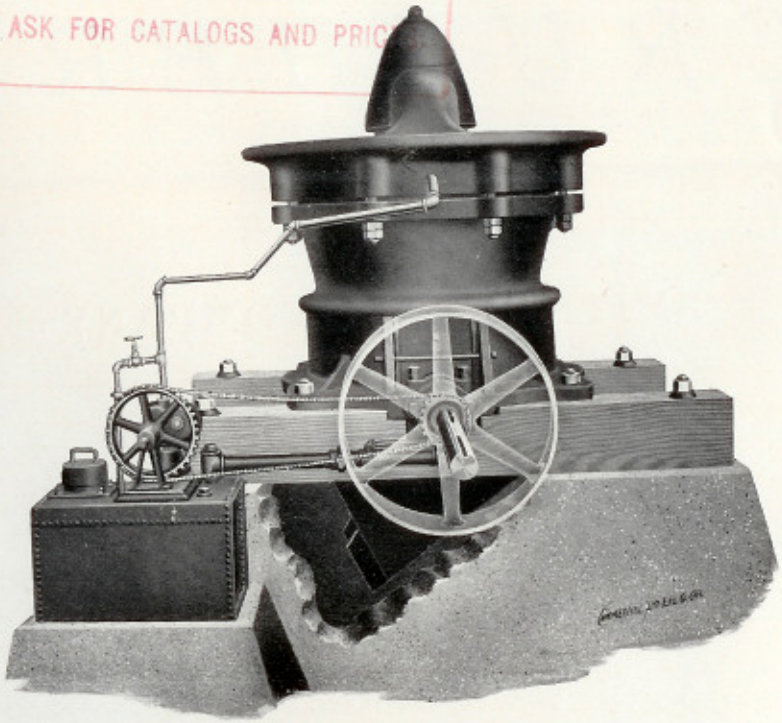


Figure 1. Style C Symons Crusher

SYMONS CRUSHER

THIS catalog will go to many places in advance of our traveling salesmen. If it leads to a clear understanding of the Symons Crusher, we shall be satisfied. Self-evident facts have a convincing power, all their own. Such facts form the strongest argument in support of the Symons Crusher. Having explained how this machine is constructed and how it operates, we shall leave to the judgment of the reader the reasons which underlie our claims.

We fully recognize the merits of the "old-line" gyratory crushers. Their excellent qualities are freely admitted. Comparisons are made herein only to make clear those radical improvements embodied in the Symons Crusher — for *progress is measured from the boundary line of previous achievement.*

GENERAL DESCRIPTION

FOR the guidance of the reader, we show, on page six, a sectional view of our Style "C" machine. The outer structure of this breaker consists of only two castings, the frame and the two-arm, upper spider. A three-arm, bottom spider is cast into and reinforces the short, heavy frame. Into this lower spider, is keyed the central shaft, which serves as an immense bolt, clamping the upper spider firmly to the main frame. The outer rim, of this upper spider, is further secured to the main frame by heavy bolts, in the usual way. The *main frame, upper spider, and central shaft* thus form a *compact unbreakable unit.* The eccentric sleeve, babbitted both inside and outside, extends the full distance between the upper and lower spiders. The eccentric rotates around the stationary central shaft, being driven by a removable steel gear. In this rotation, the thick part of the eccentric follows

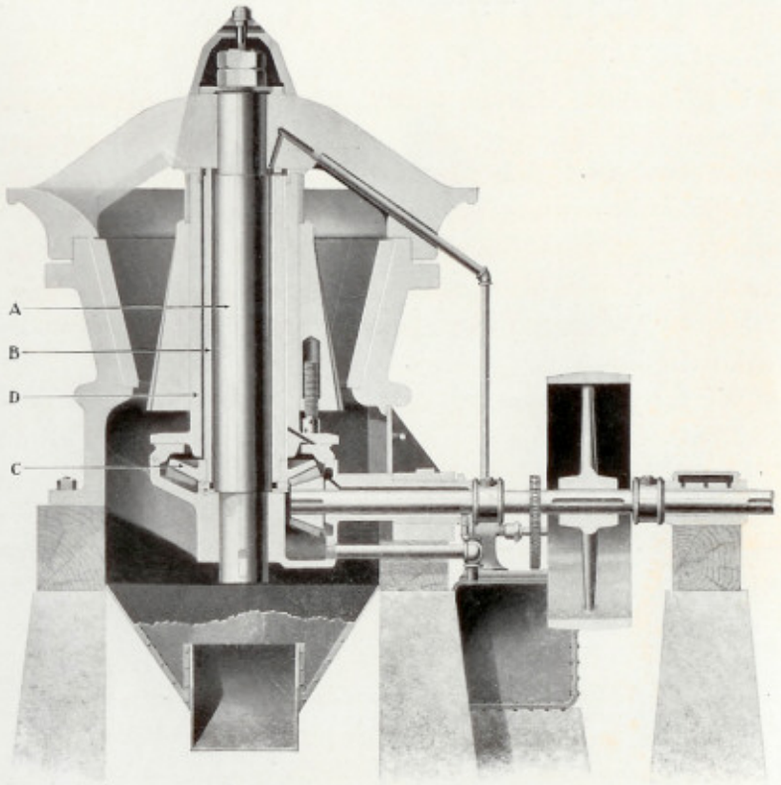


Figure 2. Sectional View of Style C Symons Crusher.
A Stationary Central Shaft. C Detachable steel gear.
B Revolving Eccentric Sleeve. D Head-lining.

the thinner portion, after the manner of a curved wedge, in circular travel, forcing the head outwardly against the stone, with a movement equal at all points.

The crushing head is provided with a lining, which completely encases the eccentric. The head and its liner are a unit, in crushing movement; but their connection allows the head to be raised and lowered along the lining, without disturbing the eccentric bearings. *Neither the shaft nor the head rotates*; but the rotating eccentric crowds the head outwardly, along horizontal lines, away from the fixed shaft, thus producing a crushing stroke *equal at top and bottom.*

INCREASED STRENGTH

BY the direct application of the rotating wedge, to the crushing head, as hereinbefore explained, the length of the central shaft, and the height of the entire crusher structure are greatly reduced. This central shaft, although equal in diameter to the lever shaft of other crushers, is only half as long between its supports, thus doubling the strength of this very important member. Being fixed at its extremities, and uniformly loaded throughout its length, the proportionate strength of this great bolt is again approximately doubled. The long eccentric, head-lining and head, serially enclosing the shaft, combine to increase the margin of safety.

Just as a short bar, although lighter, will sustain a greater load than a long one of like diameter, so the short, compact Symons breaker is strongest among crushers, although its design eliminates fully forty per cent of the weight of other machines.

DECREASED WEIGHT

BY eliminating the necessity of a long, central lever shaft, we cut down the length of the crusher frame, dispensing with much surplus metal and effecting a great economy in weight. Our Nos. 3, 4, 5 and 6 are preferably shipped, all

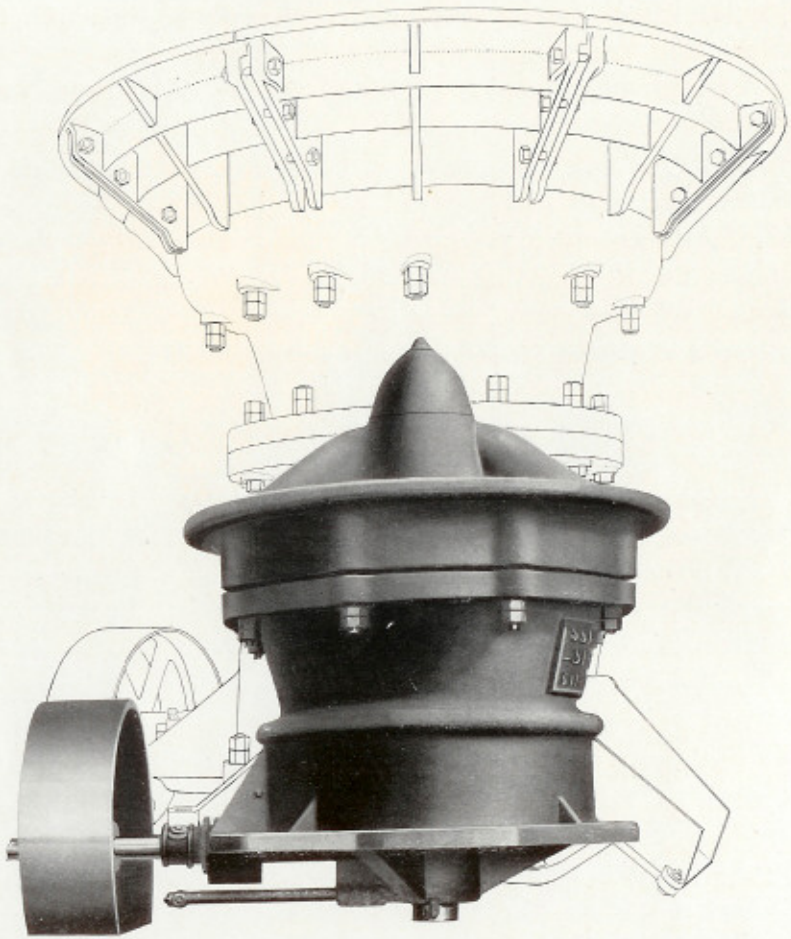


Figure 3. Illustrating important saving in height and weight, effected by the Symons Crusher.

assembled, ready to place on the foundation, at the quarry. Since the customer saves the freight on forty per cent of the weight, and lessens the work of installation correspondingly, this saving in weight becomes a matter of dollars worth calculating.

REDUCTION IN HEIGHT

THE reduction in height, peculiar to the Symons Crusher, even when the bottom chute is included, amounts to fully one-half of the total height of other gyratory machines, of corresponding capacity. When the bottom chute, made separate and removable, is not considered, the saving in height is still more striking. Add nine inches to the length of an ordinary yard-stick, and you have the total distance from the bottom of our No. 5 machine to the top rim of the spider. The consequent economy in headroom generally decreases the cost of installation, while the convenience afforded, in the delivery of stone to the crusher, is too apparent to require argument.

CAPACITY

OUR claim that the Symons Crusher has a greater capacity, than any other, is based on two facts. First, the crusher head is, of necessity, made larger in diameter than in other crushers, to contain the eccentric and head-lining as well as the central shaft. When the customary width of feed opening is added, the crusher frame must also be made of greater diameter than the ordinary frame. It follows that the receiving opening is longer, and the capacity of the crushing cavity greater. Each crusher size, although numbered as others, according to the width of opening, in reality represents a *larger crusher*, than machines of the older type.

The head, having an equal movement at top and bottom, has a greater average stroke, than one moving mainly at the bottom. Every part thereof is brought into active service, in crushing stone.

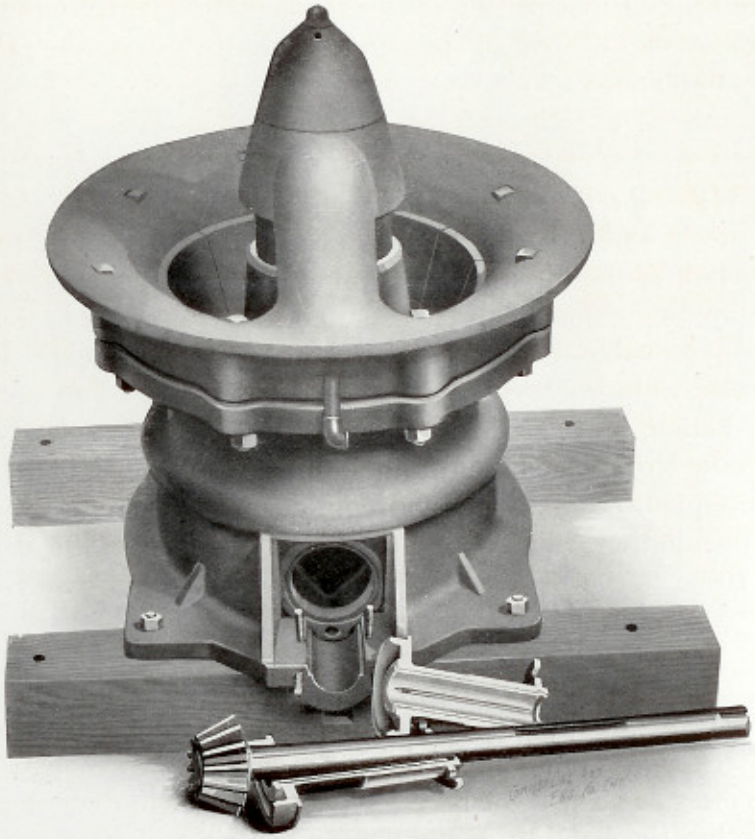


Figure 4. Showing Symons Crusher, viewed from above, with driving shaft and pinion removed.

It is evident that, enlarging the head and crushing cavity and increasing the crushing movement, results in greater capacity. This increase in capacity easily amounts to from 15 per cent to 30 per cent.

DURABILITY

SINCE the advantages of added strength, less weight, reduced height and greater capacity, are features of the Symons Crusher, so apparent as to be self-evident, the question of its durability becomes of prime importance.

Those parts subjected to the greatest wear are the head, the concaves, the gears and the bearings. The life of head and concaves obviously depends largely on the quality of material used. We use the best, whether of chilled iron or manganese. It pays. But we claim no advantage here.

The gears are all of cast steel. They operate in a bath of clean oil, protected from dust, under conditions most favorable to long wear.

The bearings deserve special consideration. Mark, first, that the usual troublesome spider bearing, and all the special parts that go with it, have been eliminated from the Symons Crusher, greatly simplifying the machine. Owing to the very limited contact possible in such a bearing, and the great load thrown thereon, it has been the source of considerable concern among crusher men, as evidenced by the frequent changes in its design, the numerous written discussions regarding it, and the repair bills of the user.

The two main bearings, on the inside and outside of the eccentric, while traveling at the same speed as in other machines, sustain one-third less weight per square inch, owing to their increased surface. Their alignment is perfect; they are provided with the best babbitt; their lubrication is the ideal oil-bath; and the exclusion of dust is complete. This observance of the simple laws which govern the life of any babbitted bearing makes durability a *mechanical certainty*.

APPLICATION OF POWER

IN any crusher, the leverage should be greatest at the point of heaviest duty. The first breakage of stone, at the top of the head, requires much less power than the simultaneous reduction of many smaller pieces, at the base of the crushing cavity. It is plain that any lever shaft affords least leverage, at the lowest point of the head, where duty is greatest. By means of the Symons eccentric, the crushing pressure is multiplied as much at the bottom of the head as at the top, this direct increase of breaking force affording a better application of power in the lower part of the crushing cavity.

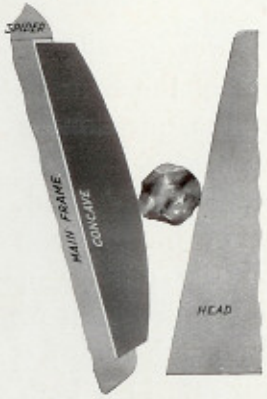


Figure 5
Illustrating Special Curved Concave.

Any seeming advantage of the lever shaft disappears, when the Symons eccentric is compared with that of the "old line" gyratory. Assuming that the leverage afforded by a gyrating shaft is 3 to 1, the eccentric, which moves its lower end, must have three times the "throw" required in the Symons eccentric, which operates directly against the head. In other words, the gain through the reduced "throw" of the Symons eccentric, completely offsets that of the gyrating lever in other machines.

Figure 6
Exterior view of manganese steel head.

SPECIAL EQUIPMENT

STANDARD chilled iron heads, either corrugated or smooth, and straight chilled concaves, are furnished for ordinary crushing work. Heads, of diameter greater or less than standard, are furnished to meet special requirements. By using curved concaves for fine reduction, as illustrated in figure 5, the opposing walls, in the lower part of the crushing cavity, are made more nearly parallel than in the upper part. This decreases the reduction work to be done in the lower part of the machine. When approaching the bottom exit, the pieces of stone drop farther after each stroke; and the danger of clogging is lessened. The work is thus more uniformly distributed over the surface of the head, and the capacity, for fine product, increased.

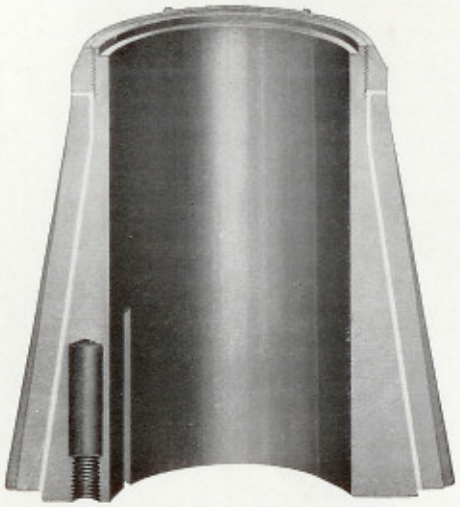


Figure 7
Sectional view of manganese steel head.

Special attention is directed to the construction of the Symons manganese steel head. It consists of three pieces, viz.; the taper head-lining of cast-iron, the threaded ring-nut of cast steel, and the outer shell of manganese steel, with a zinc lining. This zinc lining is poured over a special mandrel, insuring a perfect fit of all renewals thereof. The mantle affords a uniform and ample thickness of manganese steel, without expensive surplus. To renew the head mantle, remove the ring-nut, lift off the shell and drop on a new one. As the mantle is the only part of the head subjected to severe wear, it is the only piece which need be renewed. It is renewed at a cost, but little in excess of the expense of a cast-iron head.

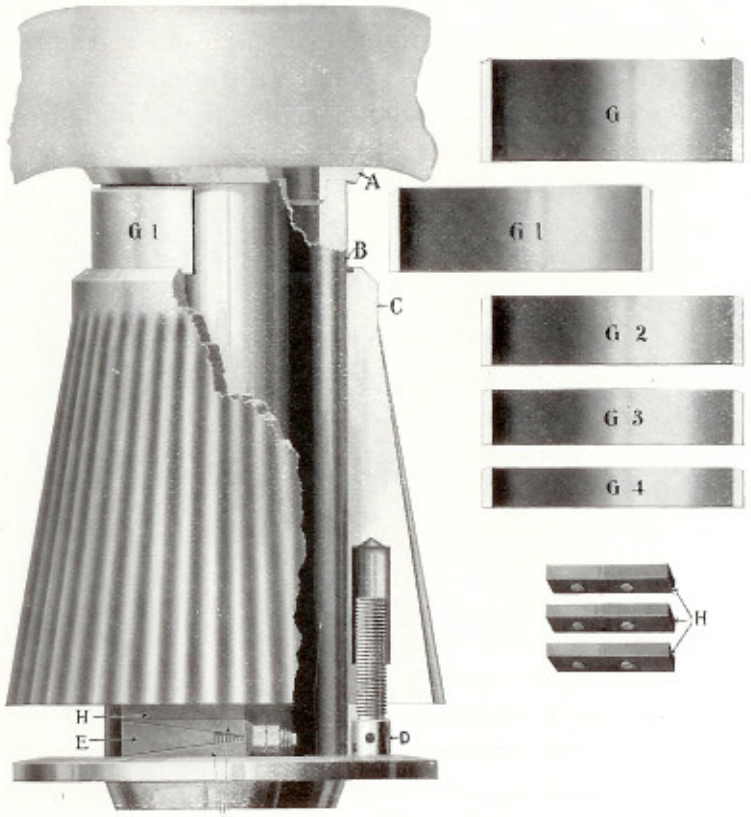


Figure 8. Illustrating method of adjusting head.

A Head-lining collar.
B Head-lining.
C Head.
D Jackscrew.
E and F Wedges.
G 1–4 Distance Rings.
H Wedge Blocks.

ADJUSTMENT.

A VERTICAL feather-key, on the head-lining, fitted to a corresponding key-way in the head, preserves a fixed lateral relation between these parts, at the same time allowing the head to be raised or lowered, along the lining. To alter the position of the head, first loosen the adjusting wedges (*E*) and (*F*). Then lower the head, by turning, as a jack-screw, the short shaft (*D*), threaded into its lower portion. Remove the two-part distance ring (*G*), protecting the upper part of the head-lining; and replace with one of the desired width, from those furnished. Set the head up firmly against this ring, thereby forcing the upper wearing collar of the head lining (*A*) against the under surface of the spider. The nut-locked wedge-blocks (*H*), under the head, preserve its exact adjustment.

DUST EXCLUSION

THE wearing collar (*A*), above referred to, is provided with a knife edge, which shaves the under surface of the spider. It is normally set, against the spider, with sufficient pressure to prevent the outward flow of oil. *Where oil cannot leak out dust cannot work in.* A removable section of the lower circular wall, which supports the head lining, is shaped for excluding dust, in like manner. A housing is thus provided for all running parts, serving the double purpose of excluding dust and confining the automatic oil circulation.

LUBRICATION

PUT good, clean oil into the dust-proof, steel-plate oil tank, and economic operation is insured, by our automatic oiling system. The oil-pump is chain-driven from the pinion shaft. It forces at least five gallons of oil per minute, through the guarded feed-pipe, to the top of the eccentric, where the oil is divided into two equal streams, which flow downward through vertical channels, on the inside and outside of the rotating eccentric. Every bearing in the machine is constantly

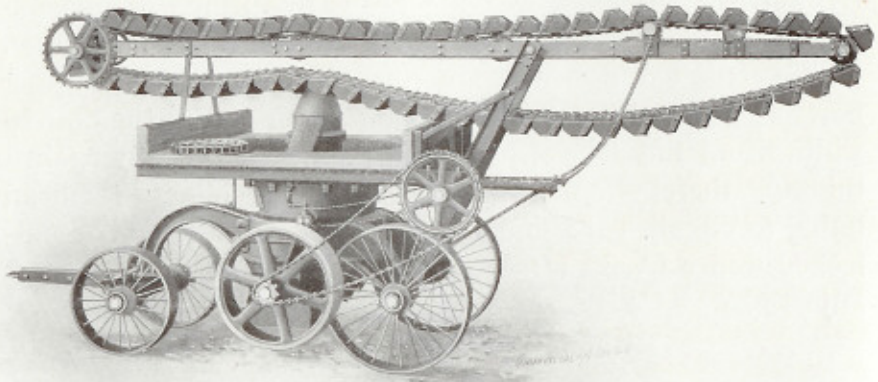


Figure 9. Symons Portable Crusher, with elevator folded.

drenched in this flow of oil. From the oil-basin, in which the gears are housed, the oil returns by gravity to the tank. This continual oil-bath of the eccentric bearings insures their cool running — proof of which may be had, at any time, by noting the temperature of the returning oil.

REBABBITTING THE ECCENTRIC

THE babbitt is cast in staves or sections, extending the length of the eccentric, as shown in Fig. 10. From each stave projects a babbitt key, which fits into a vertical keyway, cut in the eccentric, thus holding the stave securely in place. Associated together, these staves form smooth, continuous bearings. When they become worn, any stave may be separately lifted out and replaced by a new one from stock. This task is a simple and easy one, requiring no babbitting mandrel, no melting or pouring of babbitt. No expert is needed for perfect work. Worn staves may be returned to the factory, where credit will be given at the market price of babbitt.

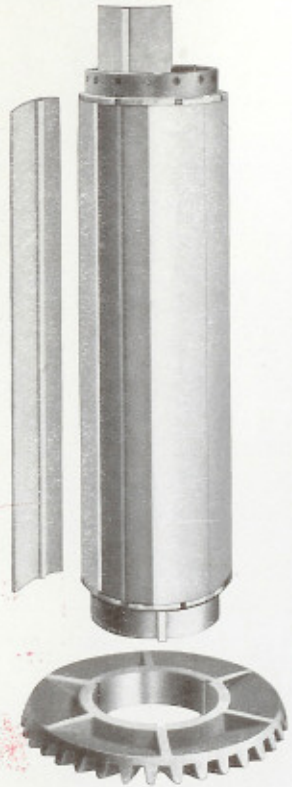


Figure 10
Showing eccentric, detachable gear, and sectional babbitt.

REPAIRS

WHEN any worn part is to be replaced, the design of this crusher is a time-saver.

After removing the upper spider and the small two-part distant ring, the head may be lifted out and replaced without disturbing other parts.

The inner bearing, for the pinion-shaft, is machine-fitted to place, allowing the shaft, bearing and pinion, to be removed from the side of the machine, as illustrated in Fig. 4, on page 10. All parts are easily accessible and relatively easy to handle.

Figure 11. Symons Portable Crusher, with folding elevator in position.

SYMONS PORTABLE GYRATORY CRUSHER

AS a crusher for road builders, the Symons portable gyratory is without a rival. It combines the simple form, great capacity, and well-known durability of the gyratory type, with the economy of weight and low feed level, hitherto peculiar to the jaw crusher.

In any portable plant, the first consideration is capacity. Up-to-date contractors know that, upon the amount of the daily output, largely depends the *cost per cubic yard* of crushed stone. A saving in cost of production, through added capacity, is clear profit. With a mounted No. 5 Symons gyratory, the contractor may *double* the usual daily output of any other portable machine. (See table of capacities, given below.)

Our portable No. 4, having twice the capacity of any other No. 3, weighs less. The feeding platform of the portable No. 4 is almost as low as that of a jaw crusher, while our machine is more easily fed because of the greater area of its receiving opening. The same relative advantages exist in favor of both our numbers 3 and 5 portable outfits.

Our Nos. 3, 4 and 5, mounted on strong steel trucks, with broad tread wheels, can travel any road fit for a traction engine. The superior double-chain folding elevator, shown in the cuts, completes this modern, portable breaker.

CAPACITY, WEIGHT, ETC., OF PORTABLE CRUSHERS

No. of Portable Crusher	3	4	5
Dimensions of receiving openings, ins.	7x32	8x35	10x40
Dimensions of combined openings, ins.	7x64	8x70	10x80
Capacity in tons per hour	10–20	20–40	30–60
Diameter of ring	1–½″	2″	2–½″
Horse Power Required,	15–20	18–25	22–30
Maximum length elevator furnished	24′	28′	28′
Height from ground to top of hopper	4′ 10″	5′ 6″	5′ 10″
Distance from center to center of axles	7′ 0″	7′ 9″	7′ 9″
Width over all	8′ 6″	9′ 6″	9′ 6″
Weight of mounted crusher, in lbs.	12000	16000	18000
Weight of 16 ft. folding elevator, in lbs.	850	1075	1075
Weight, per added foot of elevator, in lbs.	48	62	62

For further information, see table on page 21.

DESIGN OF PLANTS

THE time and knowledge, of our engineers, are at the service of the buyer, in the selection and arrangement of his crushing equipment. Blue prints of complete plants will be prepared for customers, when desired.

On the last pages of this catalog, we show several sketches of Symons crushing plants, which may be of value to the intending purchaser, in determining the lay-out best adapted to his peculiar circumstances.

We maintain a corps of experts, whose services are available to persons desiring assistance or superintendence, in the building of their plants.

Attention is called to the information sheet, at the back of this catalog. Every crushing plant presents an independent engineering problem, which can only be dealt with intelligently, when local conditions are studied and understood. Prospective buyers will greatly assist us in dealing with their requirements, by filling out this sheet and returning same to us. A sample of the material, to be crushed, is also of great value in estimating the output, obtainable with any equipment, while it also enables us to more accurately gauge the purchaser's needs.

SIZES, POWER REQUIRED, PRODUCT, ETC.

THE increased output of the Symons Crusher is discussed at length on page 9. The advantages of this machine, in bearing area, lubrication, leverage and *consequent economy of power*, have also been explained and are, we trust, fully understood.

Figure 12 shows the lines of cleavage, followed in the supposed reduction of a large block of stone, to cubes of one inch size. It should be observed that, in this process, to produce one-inch cubes, a two-inch cube must be broken into *eight* pieces. The actual stone-breaking work, required of a crusher, is thus quickly doubled, by adjusting it for finer reduction, in which case power must be liberally added. Capacity is also affected, when the width of the bottom opening is reduced. Clearly, any estimate of power or capacity must be based on a specified size of product, while the character of the stone is also a factor. The figures in the following table will be found conservative for average conditions:

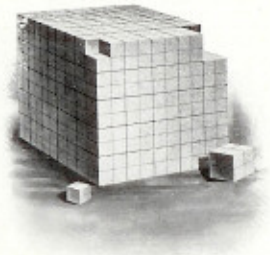


Figure 12
Illustrating additional cleavage required in fine reduction work.

CAPACITY, WEIGHTS, ETC., OF SYMONS CRUSHERS

Number of Crusher	3	4	5	6	7½
Dimensions of each receiving opening	7x32	8x35	10x40	12x47	14x54
Dimensions of combined receiving openings	7x64	8x70	10x80	12x94	14x108
Capacity, in tons per hour	10–20	25–40	30–60	50–90	110–165
Size of product, ins.	1–½	2	2–½	3	3–½
Weight of crusher, lbs	10000	13000	17000	31000	45000
Driving pulley, diameter, ins.	32	36	42	48	56
Driving pulley, face, ins.	10	12	12	16	18
Driving pulley, bore, ins.	2 15/16	3 7/16	3 7/16		3 15/16
Driving pulley, speed in R.P.M.	375	354	354	320	284
Horse power required	15–20	18–25	22–30	35–50	50–75

For information on mounted outfits, see table on page 19.

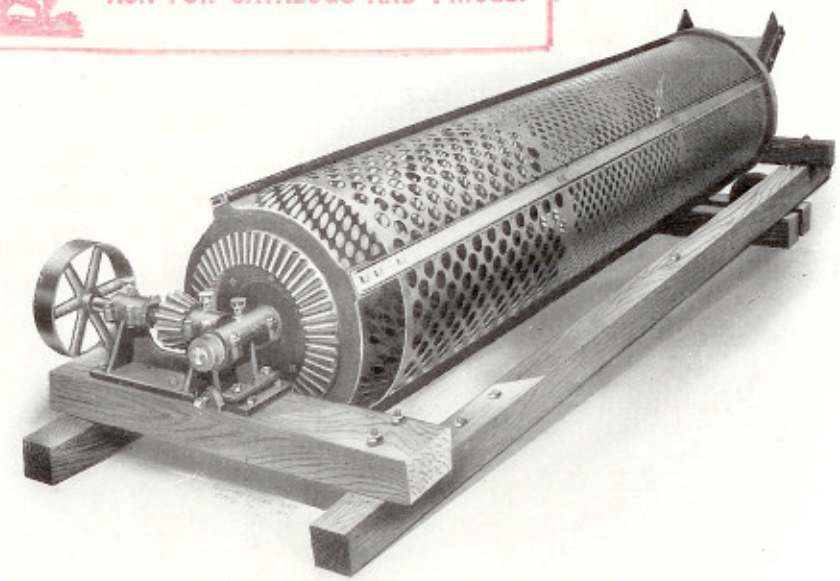


Figure 13. Revolving screen.

REVOLVING SCREENS

STRENGTH, simplicity and perfect alignment are features carefully considered in the construction of our rotary screen. The bearings are wide, thoroughly lubricated and well protected from dust. The chilled rolls are of ample size to insure easy running. The head ring is also chilled, and is made removable. The screen sections are bolted to the parallel channels, adding the great strength, of their cylindrical form, to the channel frame. This arrangement allows of the ready removal and replacement of any section. The support for the central bearing, at the lower end of the screen, is adjustably fitted into the main casting, which affords bearings to the pinion shaft. This special provision allows the adjustment of the gear teeth to the proper mesh, while it insures a perfect alignment of the bearings. Our screens are made in all standard sizes and length, as indicated in the table shown herewith.

DIMENSIONS, ETC., OF REVOLVING SCREENS

Size	Speed of Frame R. P. M.	Speed of Counter Shaft R.P.M.	Weight	Horse Power Required
24″x 6′	22½	78	1500 lbs.	3 to 4
24″x 8′			1600 "	
24″x10′			1700 "	
24″x12′			1850 "	
32″x 8′	22	79	2550 "	4 to 5
32″x10′			2750 "	
32″x12′			3000 "	
32″x14′			3150 "	
40″x 8′	18	65	3750 "	8 to 10
40″x10′			3950 "	
40″x12′			4200 "	
40″x14′			4550 "	
40″x16′			4750 "	
40″x18′			5050 "	
48″x10′	16	45	6200 "	9 to 12
48″x12′			6500 "	
48″x14′			6750 "	
48″x16′			7150 "	
48″x18′			7500 "	
48″x20′			7800 "	

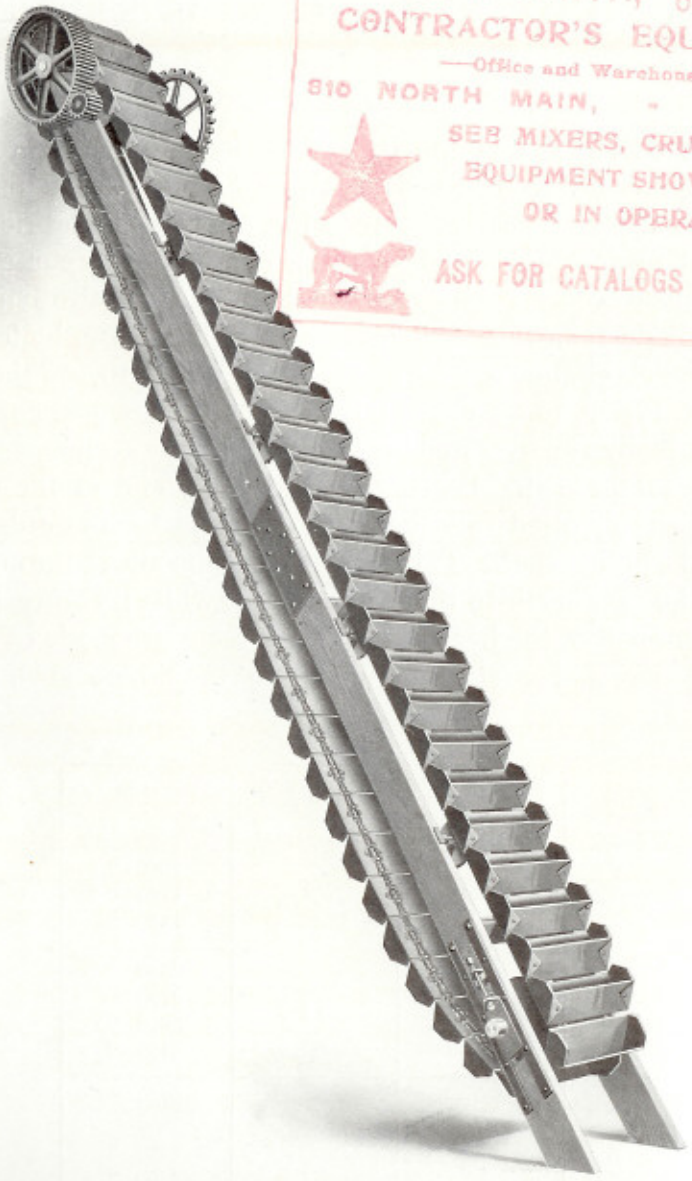


Figure 14. Chain elevator.

ELEVATORS

OUR elevators, illustrated herewith, are worthy of special attention. Appreciating the importance of this part of the crushing plant, and the severe duty to which it is subjected, we have given careful study to every detail of our elevators, and have embodied therein the best of workmanship and material throughout. In general, we have followed the strong simple design, with which quarrymen are familiar.

The buckets are made of the best steel, shaped for clean, effective work. They are firmly secured to the traveling carrier, which is furnished either of the best heavy rubber belting or of strong double sprocket chains, as may be preferred by the customer.

For stationary plants, wherein elevators are usually housed, we furnish belt carriers unless otherwise ordered. We avoid cheap belts, exercising special care in their selection.

For portable crushers exposed to the weather, chain carriers are given preference. Our sprocket chain carrier is driven by traction wheels, and hence cannot possibly climb or break under unusual strain.

Both belt and chain carriers travel on iron rolls of large size, provided with wide bearings and having convenient means for lubrication. Wood frames, well braced to give strength and rigidity, are furnished with stationary plants, unless otherwise ordered. Our folding elevators are mounted on steel frames. Ample takeups are provided at the bottom of the frame. Elevators are designed by us, upon application, to meet special requirements. For table of elevator sizes, weights, etc., see page 27.

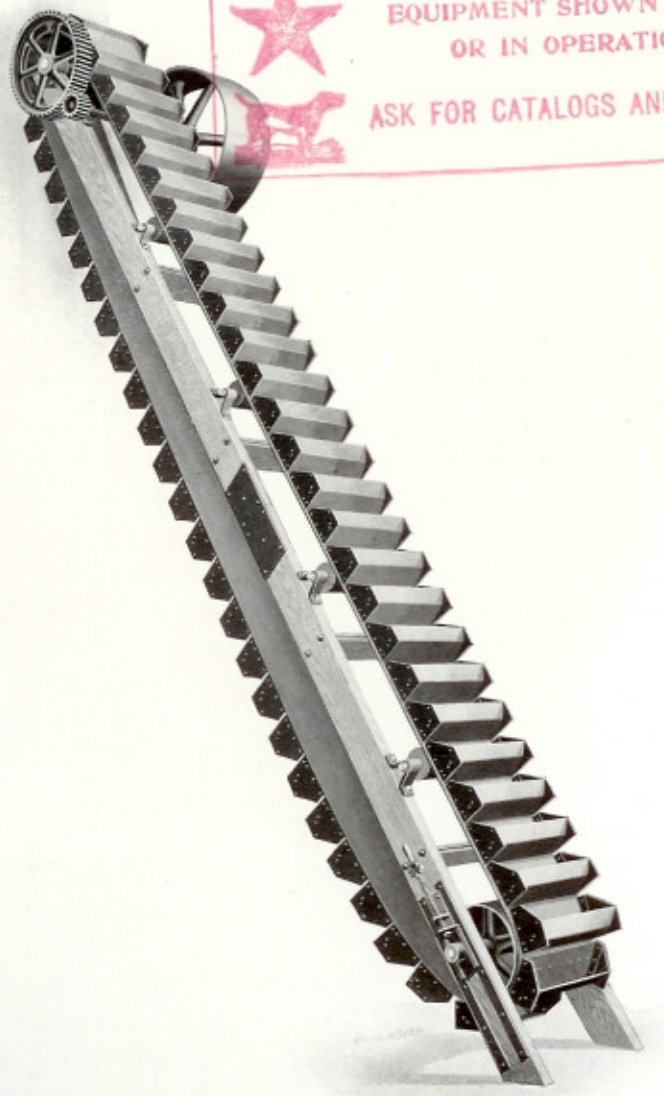


Figure 15. Belt elevator.

CHAIN ELEVATORS

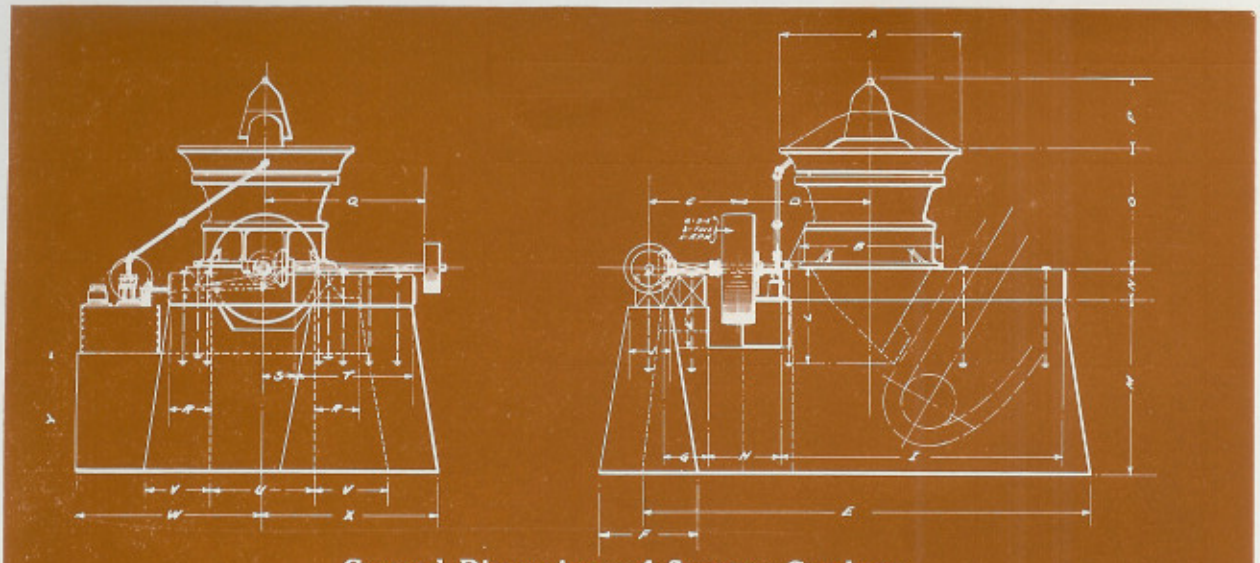
Number of Elevator	2	3	4	5
Size of bucket	4x9x12	4x9x12	5x9x18	5x9x18
Gauge of steel	16	16	14	14
Driving sprocket	88–26T	88–26T	88–26T	88–26T
Speed of driving pulley R. P. M.	33	33	33	33
Speed of upper sprocket R. P. M.	33	33	172	172

BELT ELEVATORS

Number of Elevator	2	3	4	5
Size of Bucket	5x9x9	5x9x11	6x10x13	6x10x15
Gauge of steel	16	14	14	14
Width of belt	10	12	14	16
Size of Driving Pulley — 30′ to 50′ elev.	30x5	36x6	36x6	36x6
Size of Driving Pulley — 50′ to 80′ "	30x6	36x7	36x7	36x7
Size of Driving Pulley — 80′ to 100′ "	30x7	36x8	36x8	36x8
Size of head pulley	20x12	22x14	22x16	22x17
Speed of head pulley R. P. M.	31	30	30	30
Speed of driving pulley R. P. M.	160	156	156	156
Speed of bucket, feet per minute	160	172	172	172
H.P. required by 30 to 50′ elev.	3	5	6	8
H.P. required by 50 to 80′ elev	4½	7½	9	12
H.P. required by 80 to 100′ elev.	6	10	12	16
Capacity per hour, tons	30	50	60	80
Weight of 30′ elevator, lbs.	2500	3000	3500	4000

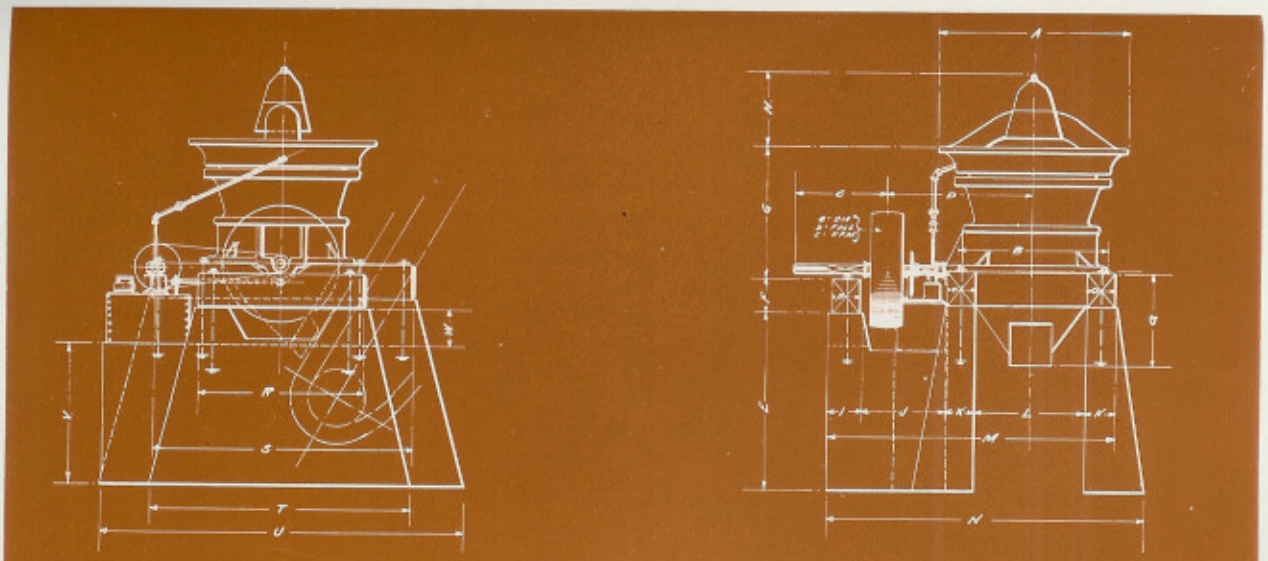
BELT ELEVATORS—(Continued)

Number of Elevator	6	7½	8	9
Size of bucket	8x12x17	8x12x24	11x16x30	11x16x36
Gauge of steel	10	10	10	8
Width of Belt	18	25	32	38
Size of Driving Pulley — 30′ to 50′ elev.	38x6	38x6	54x8	54x8½
Size of Driving Pulley — 50′ to 80′ elev.	38x10	38x10	60x14	60x14½
Size of Driving Pulley — 80′ to 100′ elev.	38x12	38x12	72x8	72x18½
Size of head pulley	36x22	36x28	54x34	54x40
Speed of head pulley R. P. M.	23	23	18	18
Speed of driving pulley R. P. M.	128	128	100	100
Speed of bucket, feet per minute	216	216	254	254
H.P. required by 30 to 50′ elev	11	16	29	40
H.P. required by 50 to 80′ elev	16	24	43	60
H.P required by 80 to 100′ elev	22	32	58	80
Capacity per hour, tons	110	165	290	400
Weight of 30′ elevator, lbs.	6000	7000	12000	15000



General Dimensions of Symons Crushers

No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	a	b	c
3	4′ 6⅝″	4′ 0″	3′ 0″	3′ 10″	13′ 0″	2′ 6″	1′ 4″	2′ 3″	8′ 0″	1′ 2″	1′ 3″	2′ 6½″	5′ 8″	12″	8′ 0⅛″	1′ 6⅝″	5′ 0″	1′ 5″	12″	8′ 6″	2′ 10″	2′ 0″	6′ 8″	5′ 6″	8′ 9″	32	10	375
4	4′ 11″	4′ 4″	3′ 0″	4′ 1″	13′ 6″	3′ 0″	1′ 6″	2′ 3″	8′ 9″	1′ 4″	1′ 8″	2′ 9½″	5′ 6″	12″	8′ 4″	1′ 10⅝″	5′ 1″	1′ 5″	12″	8′ 9″	3′ 4″	2′ 4″	5′ 11″	5′ 6″	8′ 9″	36	12	354
5	5′ 8″	4′ 4″	3′ 9″	4′ 1″	13′ 6″	3′ 0″	1′ 6″	2′ 3″	8′ 9″	1′ 4″	1′ 3″	2′ 9½″	5′ 6″	12″	8′ 9″	2′ 2⅛″	5′ 1″	1′ 5″	12″	8′ 9″	3′ 4″	2′ 4″	5′ 11″	5′ 6″	8′ 9″	42	12	354
6	6′ 10″	5′ 8″	3′ 0″	4′ 10″	14′ 6″	3′ 0″	1′ 6″	2′ 6″	9′ 0″	1′ 4″	1′ 6″	3′ 8″	7′ 0″	12″	4′ 7″	2′ 8″	5′ 4″	1′ 6″	14″	4′ 0″	4′ 2″	2′ 4″	6′ 4″	6′ 0″	5′ 6″	48	16	320
7½	8′ 0⅝″	6′ 9″	3′ 0″	5′ 5½″	15′ 6″	3′ 0″	1′ 6″	2′ 9″	9′ 9″	1′ 4″	1′ 6″	4′ 4″	8′ 8″	12″	5′ 4⅞″	2′ 11⅛″	5′ 6″	1′ 6″	14″	4′ 0″	5′ 1″	2′ 6″	6′ 6″	6′ 0″	6′ 6″	56	18	284



General Dimensions of Symons Crushers

No.	A	b	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W			a	b	c
3	4′ 6⅝″	4′ 0″	2′ 8″	3′ 10″	5′ 6″	12″	8′ 0⅛″	1′ 6⅝″	12″	2′ 4″	1′ 2″	2′ 10″	8′ 6″	9′ 3″	10″	8″	2′ 6½″	4′ 0″	7′ 0″	5′ 6″	8′ 6″	4′ 0″	1′ 8″			32	10	375
4	4′ 11″	4′ 4″	2′ 11″	4′ 1″	5′ 9″	12″	8′ 4″	1′ 10⅝″	1′ 2″	2′ 7″	1′ 2″	3′ 4″	9′ 5″	10′ 0″	10″	10″	2′ 9½″	5′ 0″	8′ 0″	6′ 6″	11′ 0″	4′ 8″	1′ 8″			36	12	354
5	5′ 8″	4′ 4″	2′ 11″	4′ 1″	5′ 9″	12″	8′ 0″	2′ 2⅛″	1′ 2″	2′ 7″	1′ 2″	3′ 4″	9′ 5″	10′ 0″	10″	10″	2′ 9½″	5′ 0″	8′ 0″	6′ 6″	11′ 0″	4′ 8″	1′ 8″			42	12	354
6	6′ 10″	5′ 8″	1′ 11″	4′ 10″	7′ 0″	12″	4′ 7″	2′ 8″	1′ 2″	2′ 9″	1′ 2″	4′ 2″	10′ 6″	11′ 0″	12″	10″	3′ 8″	6′ 0″	9′ 0″	7′ 0″	12′ 6″	5′ 6″	1′ 6″			48	16	320
7½	8′ 0⅝″	6′ 9″	1′ 11″	5′ 5½″	8′ 6″	12″	5′ 4⅞″	2′ 11⅛″	1′ 2″	3′ 0″	1′ 2″	5′ 1″	11′ 7″	12′ 0″	12″	10″	4′ 4″	6′ 0″	10′ 0″	7′ 6″	14′ 0″	6′ 9″	1′ 10″			56	18	284

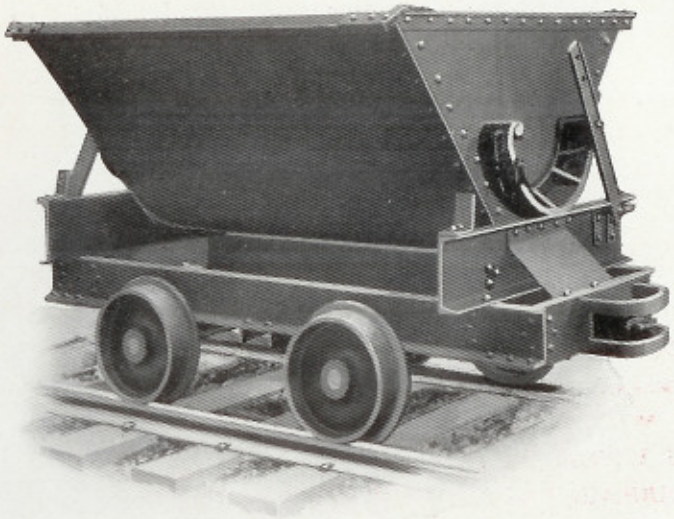


Figure 16. Rocker-dump, steel quarry car.

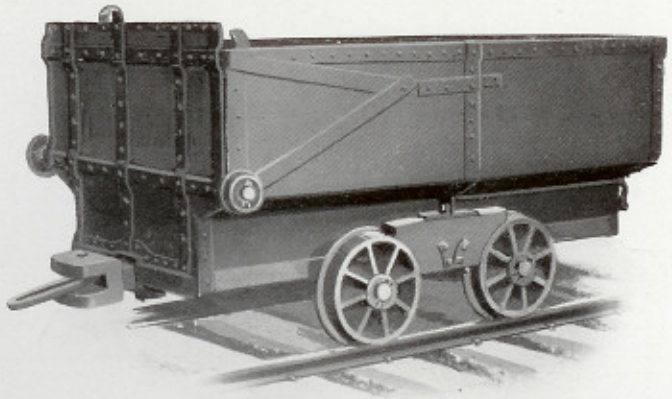


Figure 17. End-dump, steel quarry car.

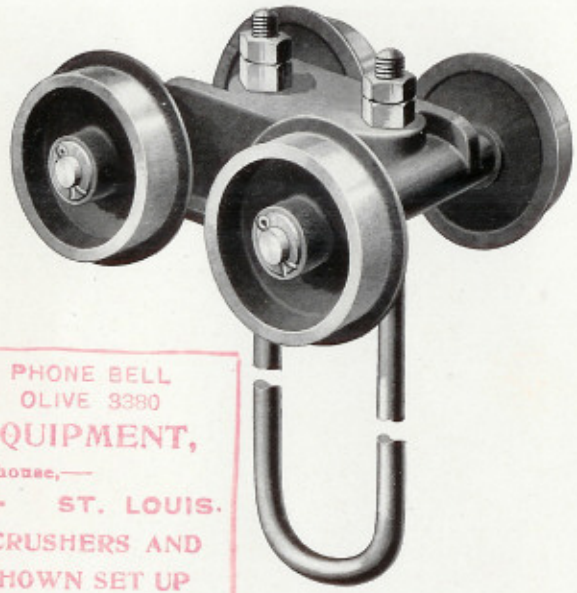


Figure 18. Overhead Trolley.

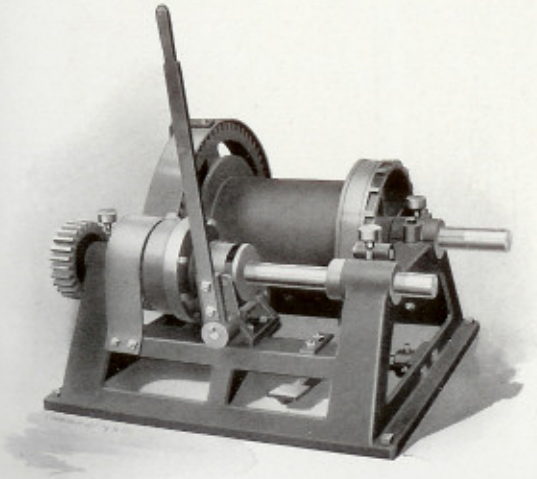


Figure 19. Single-acting friction hoist.

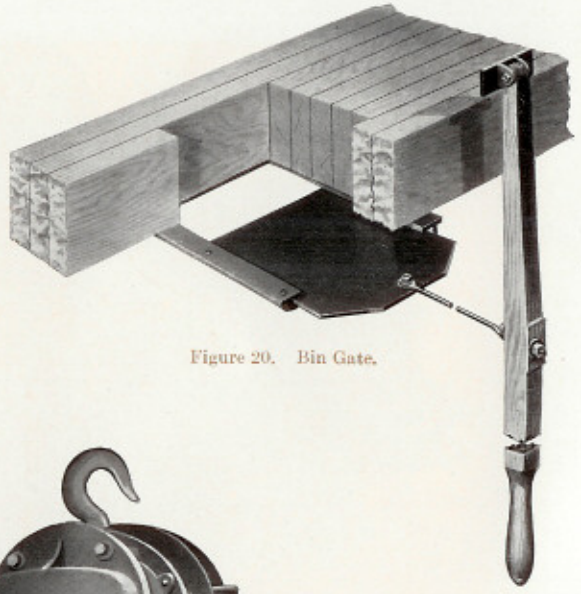


Figure 20. Bin Gate.

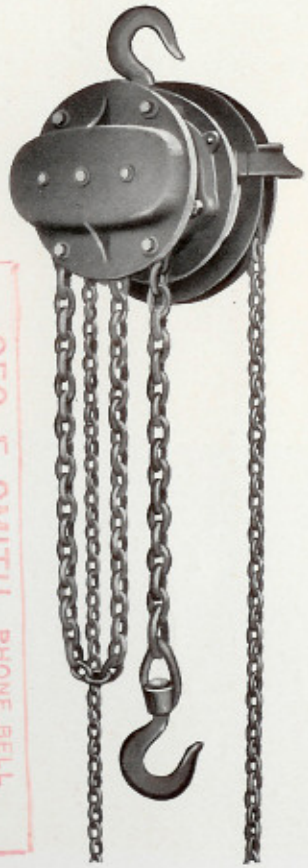


Figure 21. Chain Tackle.

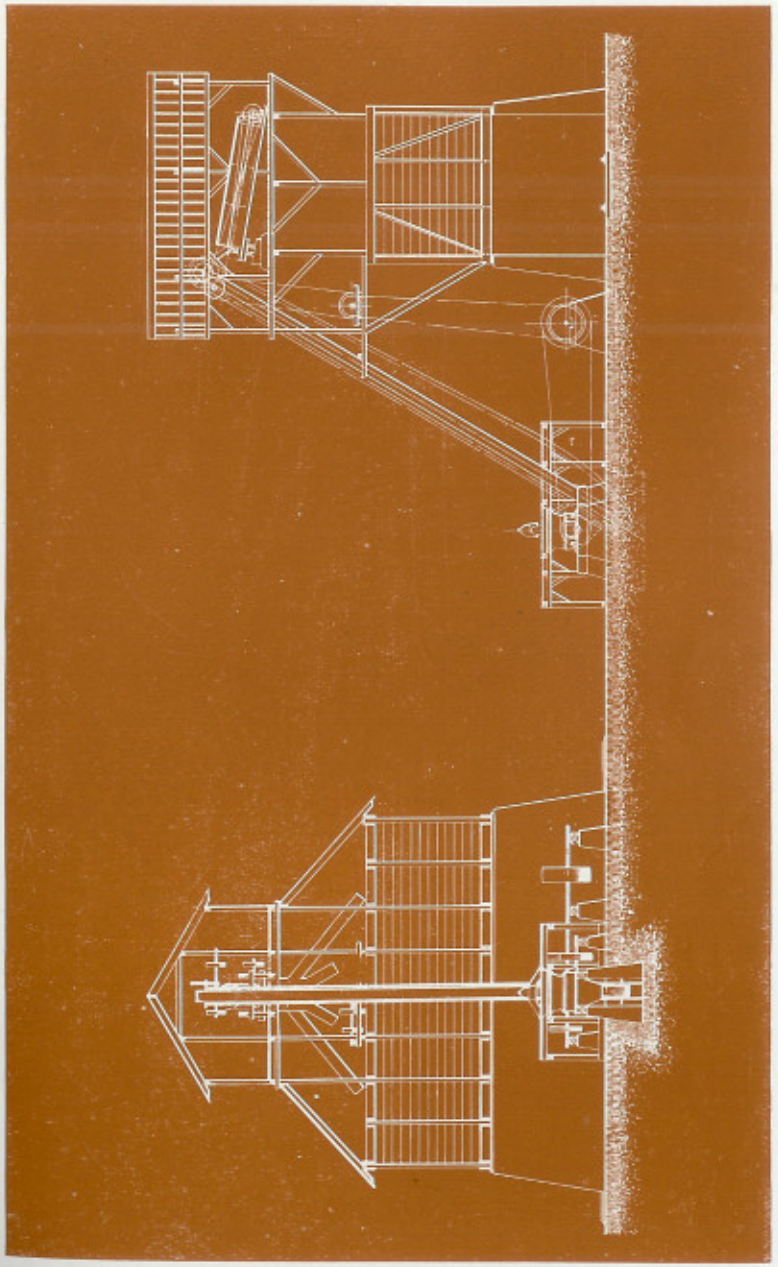


Figure 22. Suggestive sketch for No. 3, 4 or 5 Symons crushing plant, with elevator, revolving screen and small bin.

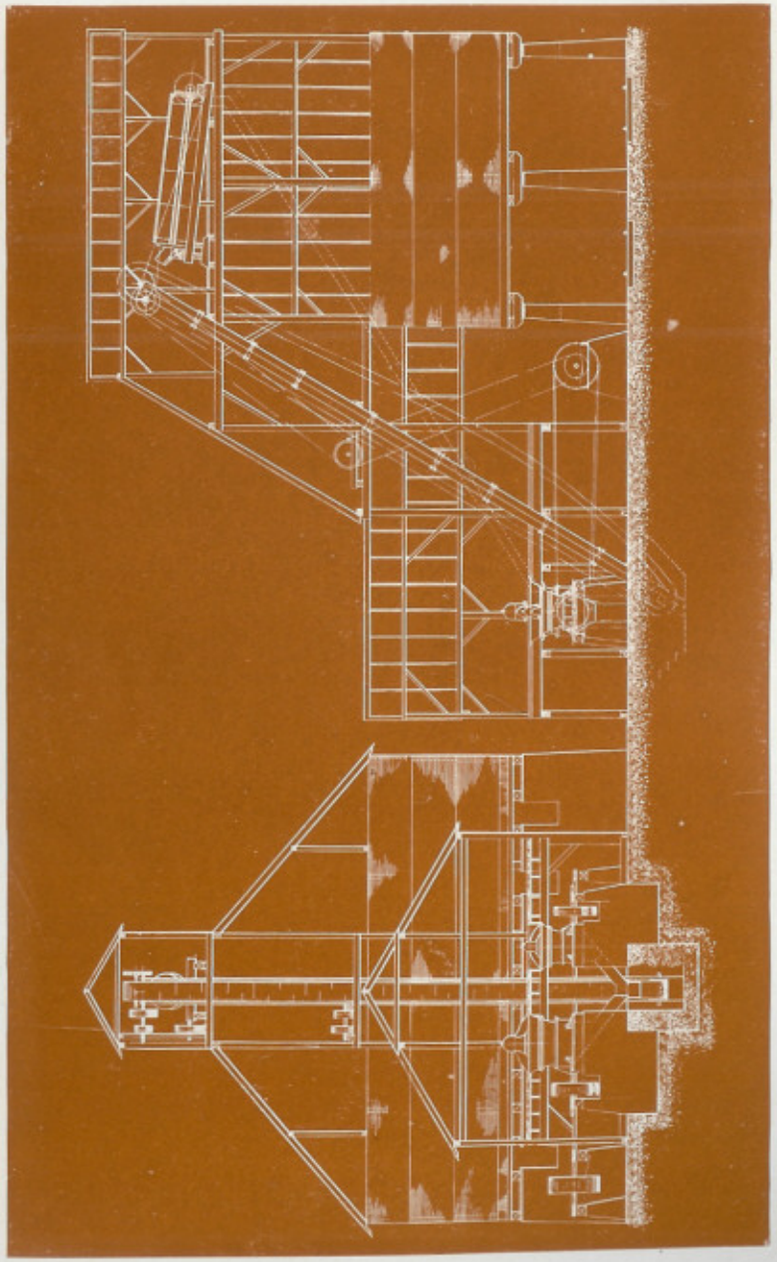


Figure 23. Typical crushing plant, consisting of Symons Crushers, Nos. 7½ and 4, with single elevator, revolving screen and return chute to No. 4.

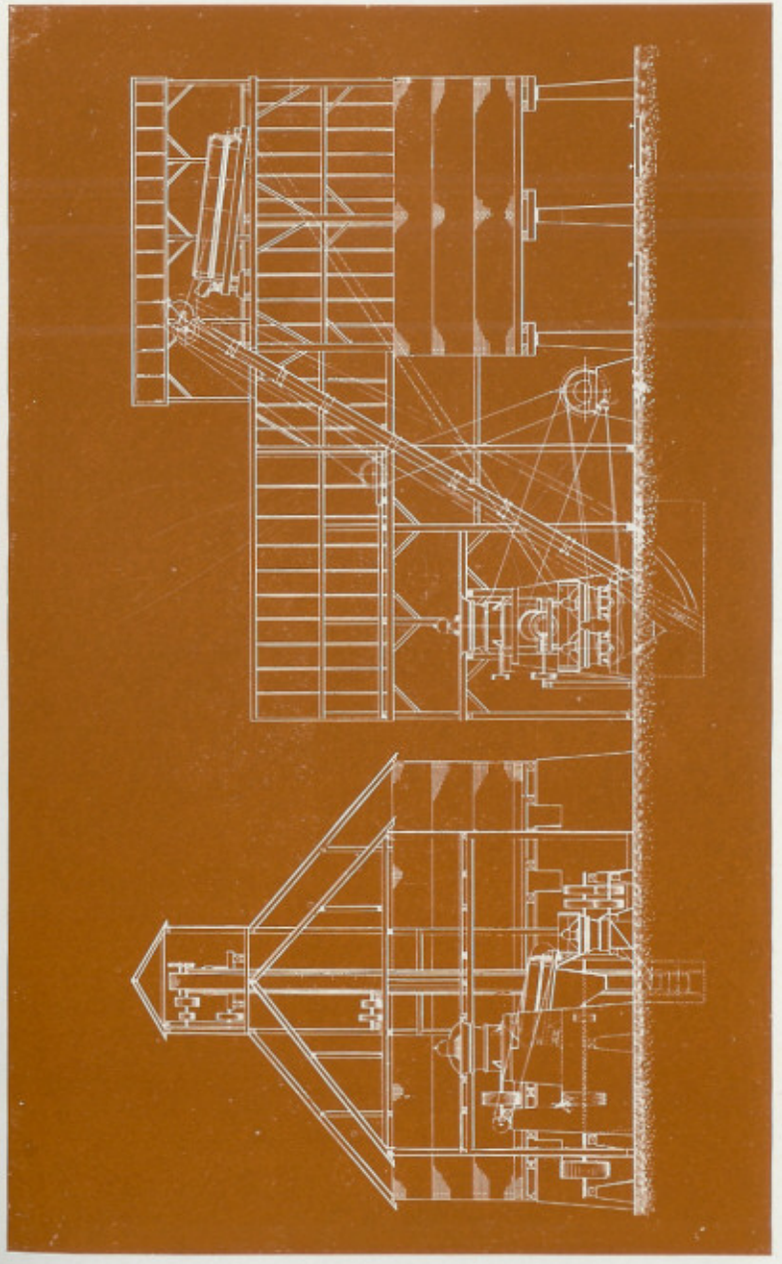


Figure 24. Crushing plant, consisting of one No. 7½ and two No. 4 Symons Crushers, with single elevator.

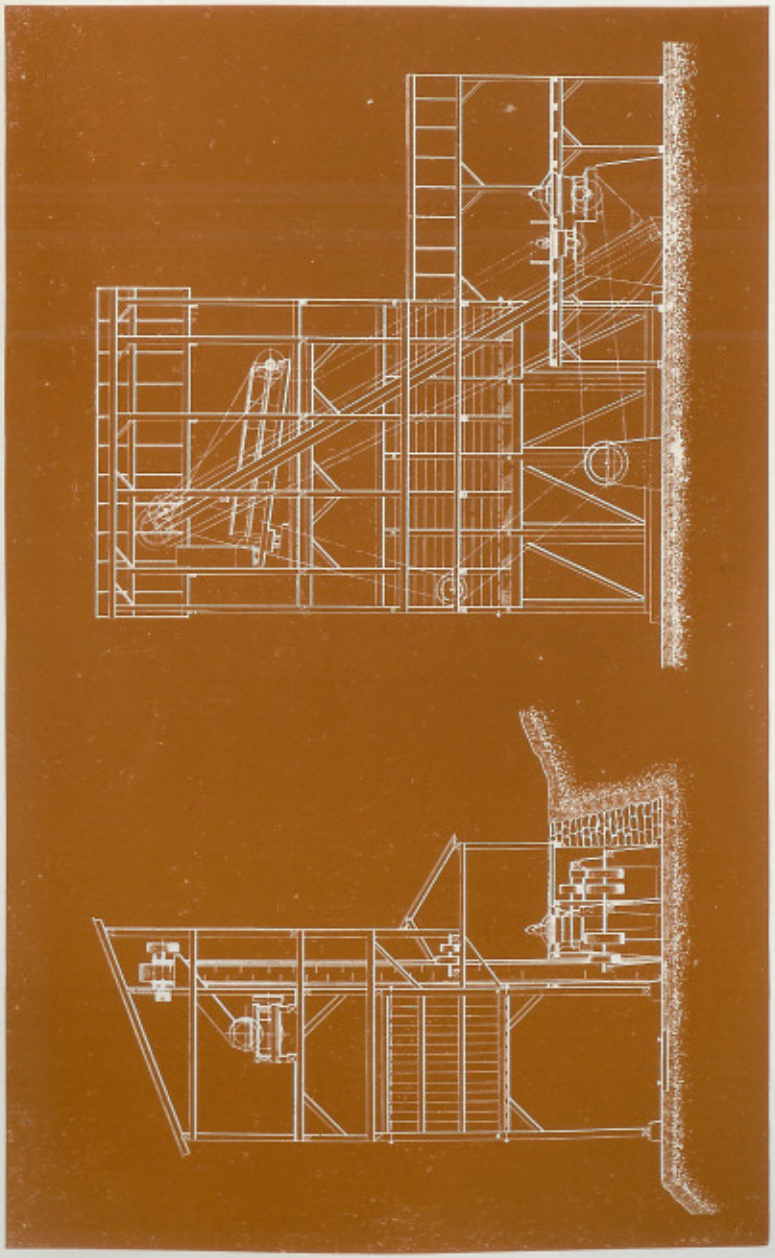


Figure 25. Plant, on narrow footing, consisting of one No. 5 and one No. 3 Symons Crusher, on same level, both discharging into single elevator.

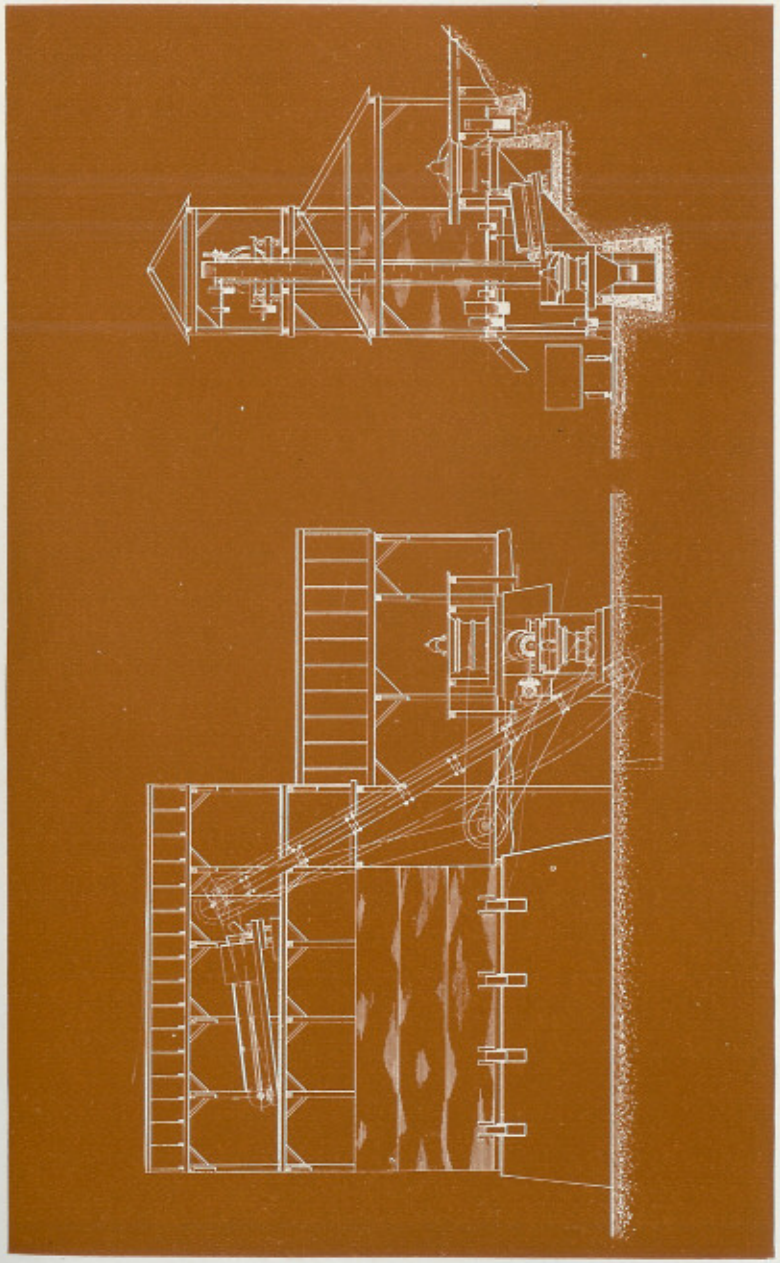


Figure 20. Side-hill plant, consisting of No. 7½ Symons Crusher, with No. 5 for handling rejections.

Percentage of Stone that will pass through Screens of the following Perforations

Size of Opening in Crusher

	5	4¾	4½	4¼	4	3¾	3½	3¼	3	2¾	2½	2¼	2	1¾	1½	1¼	1	¾	½
5	85	90	95	100	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
4¾	80	85	90	95	100	....	....	....	....	....	....	....	....	....	....	....	....	....	....
4½	76	80	85	91	96	100	....	....	....	....	....	....	....	....	....	....	....	....	....
4¼	71	76	80	85	90	97	100	....	....	....	....	....	....	....	....	....	....	....	....
4	67	71	75	80	85	90	97	100	....	....	....	....	....	....	....	....	....	....	....
3¾	62	66	70	75	79	85	91	98	....	....	....	....	....	....	....	....	....	....	....
3½	57	61	65	70	74	79	85	91	100	....	....	....	....	....	....	....	....	....	....
3¼	54	57	60	64	68	73	78	85	93	100	....	....	....	....	....	....	....	....	....
3	49	52	55	59	63	67	72	78	85	92	100	....	....	....	....	....	....	....	....
2¾	45	48	50	54	57	62	67	77	78	85	93	100	....	....	....	....	....	....	....
2½	40	44	45	49	52	55	59	64	70	76	85	94	100	....	....	....	....	....	....
2¼	36	38	40	43	46	49	52	57	63	68	75	85	95	100	....	....	....	....	....
2	31	33	35	38	40	44	47	50	55	60	67	75	85	98	....	....	....	....	....
1¾	27	28	30	32	35	37	40	45	48	52	58	64	74	85	100	....	....	....	....
1½	22	24	25	27	29	31	34	37	40	44	50	55	63	73	85	100	....	....	....
1¼	18	19	20	22	23	25	27	30	33	36	40	45	52	60	70	85	100	....	....
1	13	14	15	16	17	19	21	23	25	27	30	35	41	46	55	67	85	100	....
¾	8	9	10	11	12	13	14	16	18	19	21	25	29	34	40	50	62	85	100
½	4	4	5	6	6	6	8	9	10	11	13	15	18	21	25	30	40	55	85
¼	....	....	....	1	1	1	2	3	3	4	5	6	7	8	10	14	19	25	40
⅛	....	....	....	....	....	....	....	....	....	....	1	2	2	2	3	5	7	10	16

Please fill in answers to the following questions, detach sheet and mail with your inquiry:—

1. What is the character of the material to be crushed?

2. Does the material break in flat pieces?

3. What amount of material, in tons or cubic yards, is to be crushed per hour?

4. Through what size of ring is it desired to pass approximately the entire crushed product?

5. How many and what sizes of product do you wish to produce?

6. Is it desired to return the oversize or rejections to the initial crusher to be re-crushed; or to a separate crusher for this purpose?

7. Will storage bins be required; and, if so, what capacity for each size of material?

8. Do you wish us to include power plant in our estimate, and what kind would you prefer?

9. Is your location flat or on hillside? If hillside, give us profile, as nearly as possible, with sketch

10. What system of handling uncrushed rock do you prefer?
   - (*a*) Incline and automatic dump cars.
   - (*b*) Level proposition with end dump cars and tipple.
   - (*c*) Level proposition with side dump cars.
   - (*d*) Overhead cable with skips or buckets.
   - (*e*) Incline chute.
   - (*f*) Incline track with brake.
   - (*g*) Bottom dumps cars on tramway.
   - (*h*) Horse and cart.

If possible, send us sample of material to be crushed.

The T. L. Smith Co.
305 OLD COLONY BUILDING
CHICAGO, ILL.