

O. J. MOUSSETTE.
CRUSHER.
APPLICATION FILED OCT. 10, 1912.

1,087,968.

Patented Feb. 24, 1914.

3 SHEETS—SHEET 1.

Fig. 1.

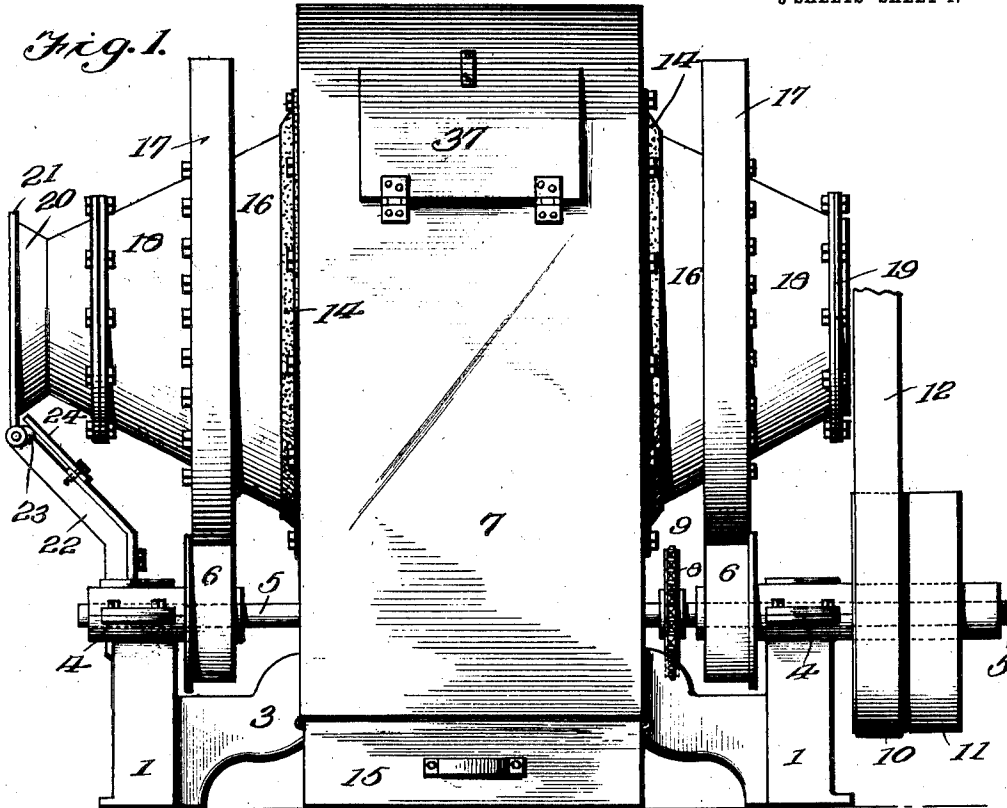
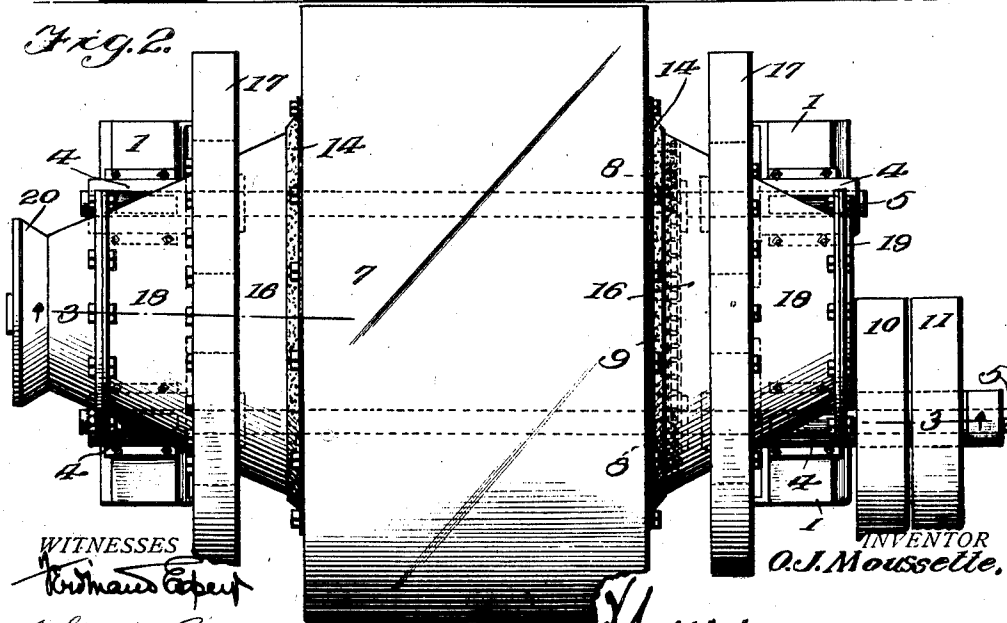


Fig. 2.



WITNESSES

Wm. A. Egan
Wm. A. Egan

INVENTOR
O. J. Moussette.

J. H. Moussette, Attorney.

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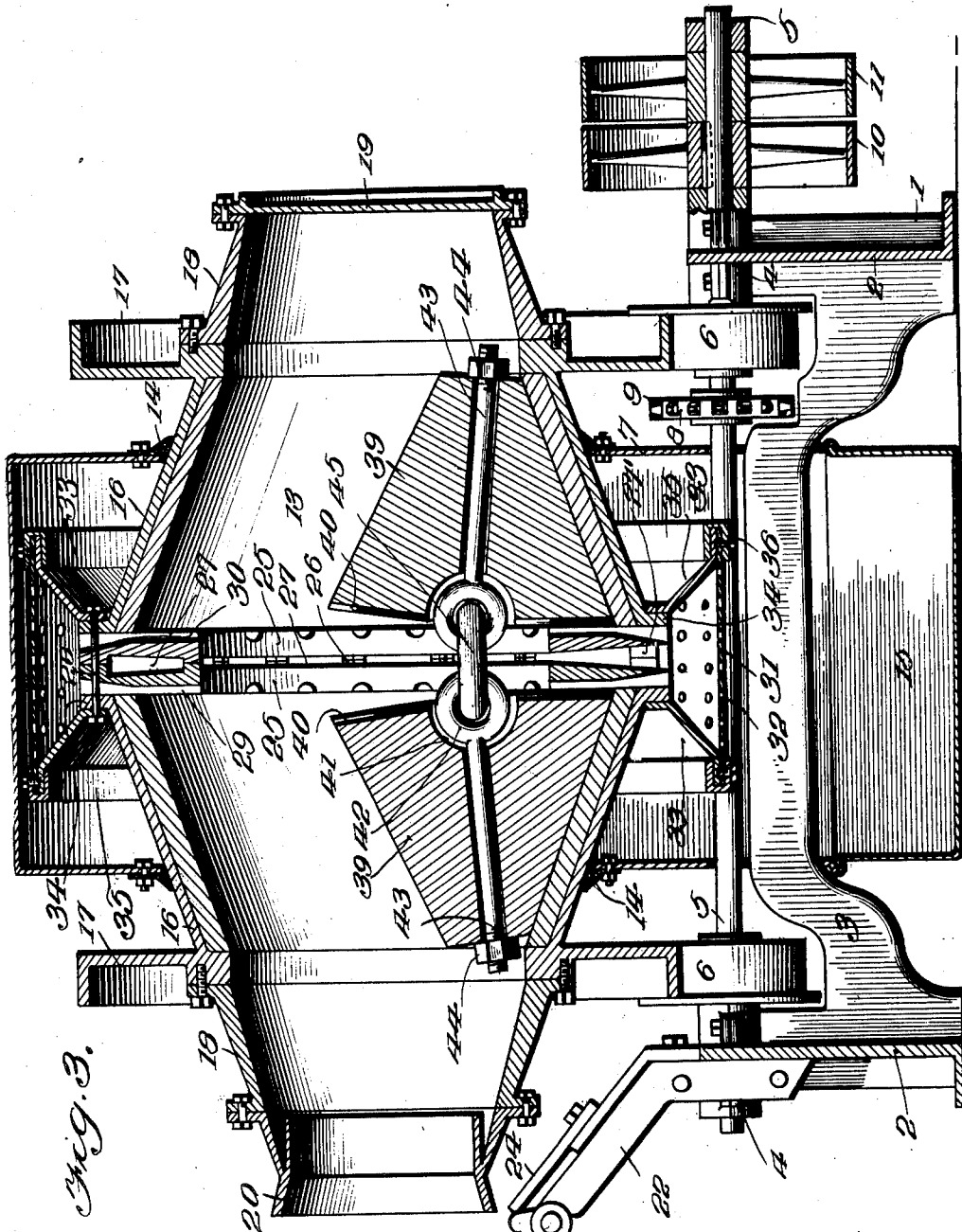


Fig. 3.

WITNESSES
Friedman & Co.
H. R. Cornwall.

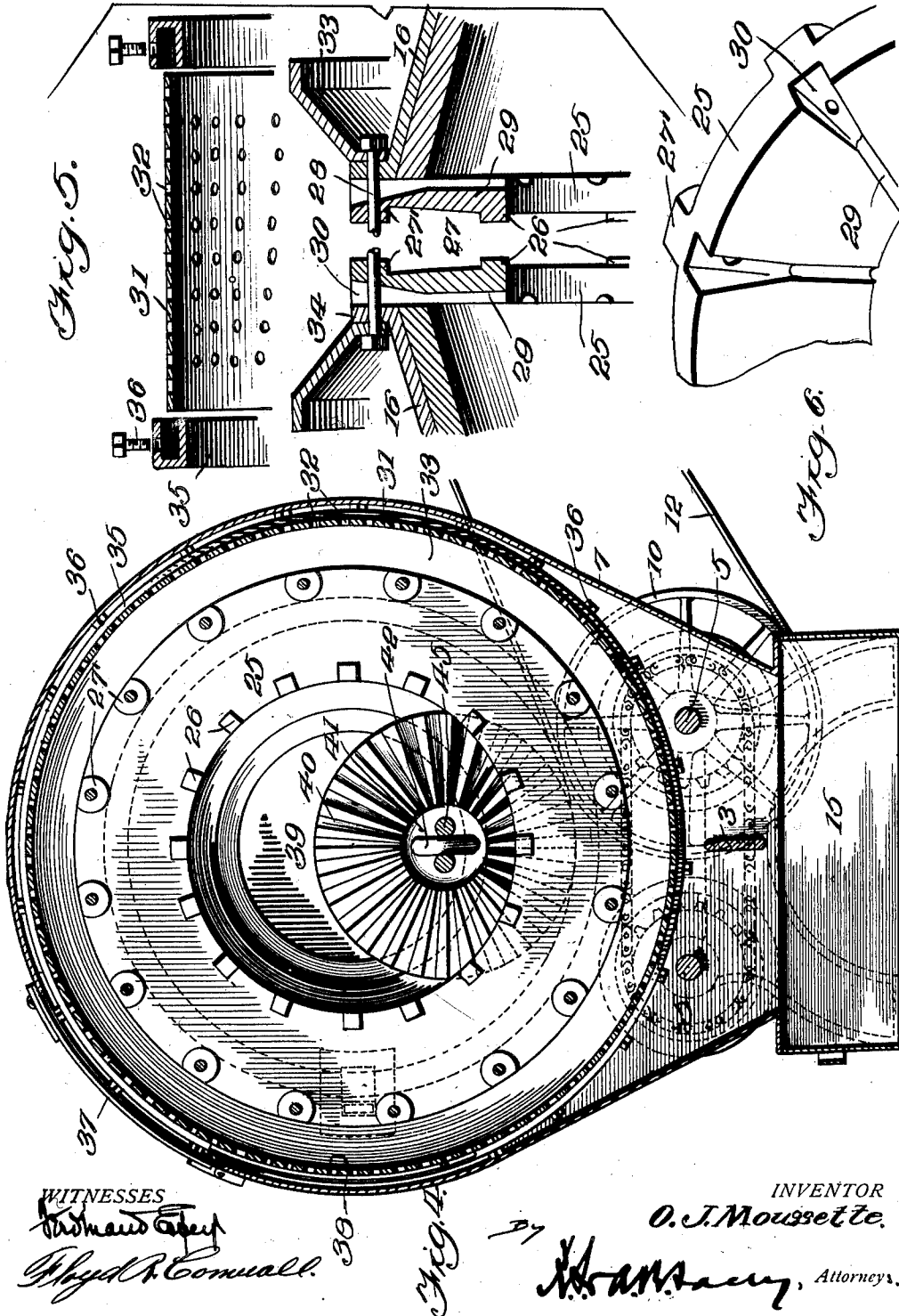
INVENTOR
O. J. Moussette.
By *[Signature]* Attorney.

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3 SHEETS—SHEET 3.



WITNESSES
Edmund A. [Signature]
Phyllis R. Cornwall.

INVENTOR
O. J. Moussette.
[Signature], Attorneys.

UNITED STATES PATENT OFFICE.

OLIVER J. MOUSSETTE, OF BROOKLYN, NEW YORK.

CRUSHER.

1,087,968.

Specification of Letters Patent.

Patented Feb. 24, 1914.

Application filed October 10, 1912. Serial No. 725,018.

To all whom it may concern:

Be it known that I, OLIVER J. MOUSSETTE, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Crushers, of which the following is a specification.

This invention relates to crushers or pulverizers, and has for its object the provision of a comparatively simple and thoroughly efficient machine which may be used for grinding ores or similar material and will be especially adapted for reclaiming brass or other metal from the refuse of refineries, foundries, smelters, and the like.

The invention has for one object the provision of a crusher so constructed that the finely ground material may be fed from between the crushing members as it is pulverized and deposited in a suitable receptacle.

The invention also seeks to provide a crusher so constructed that the material being treated will be continuously acted upon by the crushing members and the collection of the unground material between the active crushing members in such quantity as to arrest the action of the machine will be prevented.

The invention also seeks to provide a crusher of the rotary drum type which may be easily operated, and also seeks to improve, generally, the construction and operation of crushing machines to the end that the efficiency and durability of the same may be increased.

The several stated objects of my invention, and other incidental objects which will appear as the description of the invention proceeds, are attained in an apparatus of the type illustrated in the accompanying drawings, and the invention resides in certain novel features which will be hereinafter fully disclosed and particularly pointed out in the claims following the detailed description.

In the drawings: Figure 1 is an elevation of a crusher embodying my present improvements; Figs. 2 is a plan view of the same; Fig. 3 is a vertical longitudinal section; Fig. 4 is a transverse vertical section; Fig. 5 is an enlarged sectional view through the outlet controlling rings and the screen showing the

parts separated and in their proper relative positions; Fig. 6 is a detail perspective view of a portion of one of the outlet controlling rings.

In carrying out my invention, I employ a supporting frame or base 1 which is preferably constructed of a single integral casting comprising corner posts, a transverse web 2 connecting the posts at the ends of the frame, and a longitudinal brace or connecting bar or web 3 extending between the said webs. Upon the upper ends of the posts are provided journal boxes 4 which receive and support the parallel shafts 5 extending longitudinally of the frame at the opposite sides thereof. Upon these shafts, adjacent the ends of the frame, are flanged rollers or wheels 6 through which motion is imparted to the drum. Between the rollers or wheels 6, at one end of the supporting frame and the adjacent side of the housing 7, sprocket wheels 8 are fitted rigidly upon the said shafts, and these sprocket wheels are connected by a sprocket chain 9 so that they will rotate simultaneously and in the same direction. One of the shafts is extended beyond the side of the frame and is equipped with suitable fast and loose pulleys 10 and 11 so that motion may be imparted to the shafts from any convenient form of prime motor connected to the pulleys by a driving belt or band 12. This particular form of driving mechanism is especially advantageous as it reduces the dead weight of the machine and consequently minimizes friction, and, as there are no unnecessary parts, the cost of installation and maintenance is minimized. It will also be noted that the described arrangement brings the sprocket chain and the wheels upon which it is trained below the drum so that the employment of a casing or housing for the driving gearing is rendered unnecessary.

The housing 7 fits around the central longitudinal brace 3 of the supporting frame and projects upwardly therefrom to extend around the drum 13. Rings 14 of leather or heavy cloth are secured to the sides of the housing and fit closely to the drum to prevent escape of dust. These rings may be secured in any desired manner, preferably by clamping rings and bolts, as shown in Fig. 3.

A receptacle 15 is placed below the brace 3 and is fitted closely to the lower end of the housing so that the leakage of the finely ground matter between the housing and the receptacle cannot occur. The drum is supported upon and driven by the rollers 6 and consists of the inner tapered or substantially conical sections 16 having the driving rings 17 formed at their outer smaller ends to bear directly upon the rollers 6 so that, when the said rollers rotate, the rotary motion will be imparted directly to the driving rings and the drum thereby rotated about its own axis. As the shafts are connected by the sprocket chain and wheels above described, both shafts will be positively rotated and, consequently, the rollers on both shafts will be actuated and slipping of the drum upon some of the rollers, with the consequent frictional wearing away of the contacting surfaces, is avoided.

Secured rigidly to the outer ends of the drum sections 16 are terminal members 18 which are of similar tapered or conical formation and one of which is provided with a fixed head or closure 19, as shown. The terminal member 18 at the opposite end of the drum has rigidly secured thereto a tubular member 20 which is preferably in the form of a spout, as shown in Fig. 3, so that material may be readily fed into the drum through the said spout or feed member, as will be readily understood. This feed or inlet member or spout is closed by a cover or lid 21 which is pivoted to the upper end of a supporting arm or standard 22 rising from the base frame 1. Upon the pivot of the said lid or cover is formed a radial projection or cam 23 which bears against a spring presser plate 24 secured upon the said supporting arm 22. The projection or cam 23 is so disposed that when the cover 21 is swung upwardly against the end of the inlet member 20 the force of the spring plate 24 will be directed downwardly against the said lug or cam and, consequently, the cover will be held firmly against the inlet of the drum so as to close the same and prevent the escape of material therethrough. If the lid or cover be swung downwardly against the pressure of the said plate 24, the plate will yield to the upward outward movement of the lug and will then bear upon the under side of the said lug or cam so that the premature closing of the lid or cover will be prevented. It will thus be seen that I have provided an exceedingly simple device by which the lid or cover may be held in either of its positions so that premature closing of the same will be prevented and leakage past the same when the drum is in use will also be prevented and the use of packing and expensive locking devices is rendered unnecessary. Moreover, the cover can be quickly swung to either of its positions for

the reason that, while the spring presser plate will hold the lid or cover in the position in which it may be set, the plate will yield readily to manual force exerted upon the lid to shift the same.

The inner ends of the main section 16 of the drum do not abut, but are spaced from each other to accommodate a pair of rings or disks 25 which aid in the crushing of the material and also control the discharge of the crushed material. These rings or disks are provided on their opposed inner faces with spacing lugs 26 which, by being placed in contact, hold the disks or lugs slightly separated and thereby provide an intermediate passage 27 through which the ground material may escape. The lugs, furthermore, constitute additional breaking members which will be brought against the particles passing into the space between the disks by the rotation of the drum with such force as to further disintegrate the same. The inner faces of the disks are inclined or beveled so that the space 27 flares toward the outer edges of the disks and, consequently, the particles passing beyond the lugs 26 at the inner edges of the disks may readily pass from between the same. At the outer edges of the disks are provided additional spacing lugs 27', and these lugs 27' not only aid in holding the disks in their spaced relation, but also reinforce the disks by providing enlargements through which the securing bolts 28 may be passed to secure the disks in position. In the outer faces of the disks or rings are formed a plurality of radial grooves 29, the outer ends of which are flared, as indicated at 30, and these grooves constitute outlets for the material, as will be readily understood. A screen 31 is arranged concentrically around the drum, and this screen is preferably constructed of a sheet metal plate having small perforations or openings 32 therein, as shown, but may be formed of ordinary netting or of other foraminous material. The screen is held in spaced relation to the drum and the outer peripheries of the disks or rings 25 by a series of brackets 33 having their inner ends fitted upon the bolts 28 and secured by the said bolts against the annular radial flanges 34 formed on the main sections of the drum, the outer ends of the said brackets 33 being extended axially with respect to the drum and fitted in the grooved collars 35 which also fit over the edges of the screen. Set-screws 36 are mounted in the outer sides of these collars and engage the screen so as to pass through the edges of the same and bear upon the ends of the brackets whereby the screen and the brackets will be securely clamped within the collars and the screen thereby supported upon the drum. It will also be noted that the bolts 28 secure the brackets to the drum and the innermost sections of the

drum, as well as the rings interposed between the said sections, together.

The screen extends close to the upper portion of the housing 7 which is imperforate and is preferably cylindrical in form, while the lower portion of the housing is shaped to provide converging walls serving as guards to deflect the material escaping through the screen into the receptacle 15 placed below the housing. The housing is provided with a man-hole 37, and a portion of the screen, indicated at 38, is made to serve as a door by being cut out of the main portion of the cylindrical body of the screen and hinged thereto so that if it be necessary to clean or repair the screen or the drum, the drum and screen may be rotated so that the door 38 will be made to register with the man-hole 37 and access then may be had to the interior of the drum, as will be readily understood.

Crushing rollers 39 are mounted loosely within the drum and these crushing rollers may be of the usual conical form. The rollers rest loosely within the drum upon the bottom portion thereof and have a somewhat greater taper than the main sections of the drum so that the inner opposed ends of the rollers will flare upwardly with respect to each other. These larger ends of the rollers are preferably corrugated or otherwise roughened, as indicated at 40, so that as the rollers rotate the material caught between the same will be thoroughly broken up and reduced. The said inner ends of the rollers are constructed with central concave recesses 41 which receive the eyes 42 on the inner ends of eye-bolts 43 passing through the central bores of the rollers and of a diameter to substantially fill the said bore, but, at the same time, permit free rotation of the rollers. Nuts 44 mounted on the outer ends of the bolts serve to retain the bolts in position within the rollers, and a link 45 is fitted through the eyes 42 of the bolts and extends between the same so that the rollers will be effectually coupled and held in their proper relative positions with their inner ends spaced apart to receive the material.

It is thought the operation of my improved crusher will be readily understood from the foregoing description, taken in connection with the accompanying drawings. The material to be reduced is fed through the inlet or spout 20 and the lid 21 is then swung upwardly against the end of the said spout so as to close the same, as previously stated. The power of the prime motor is then transmitted to the shafts 5 by shifting the driving belt onto the fast pulley, and the said shafts will then consequently be rotated. The rotation of the said shafts being imparted directly to the rollers or supporting wheels 6, the drum

will immediately be set in motion through the frictional engagement between the said rollers and the driving rings 17 on the drum. The material fed into the drum will tend to accumulate in the lowest point of the same and will, consequently, be caught between the two crushing rollers, between the rollers and the sides of the breaker rings or disks, and also between the bottom of the drum and the rollers so that the weight of the rollers will be exerted to thoroughly crush the material. Any large particles which might escape over the rollers will be caught between the opposed inner ends of the same and thoroughly broken up by the corrugated or roughened faces thereof. The disks or rings 25 being secured rigidly to and between the ends of the main sections of the drum, will catch any particles too large to pass through the grooves in the outer faces of the disks and through the space between the disks and will carry the same around so that they will be again deposited upon the body of material in the drum, the result being that only small particles will be permitted to escape to the screen and any particles which are too large to pass through the screen will be subjected to a rolling disintegrating action through the rotation of the lugs 27 at the outer edges of the disks and will also return to the interior of the drum to be again treated. The finely ground material escaping between the rollers and the bottom of the drum will enter the radial grooves on the outer faces of the disks and will escape through the same readily and rapidly to the screen. It will also be noted that the screen is rigidly connected with the drum and consequently rotates with it so that the particles of matter too large to pass through the screen will be carried around and dumped upon the upper portions of the rings or disks 25 where they will enter the space between the disks and settle upon the lugs 26, tending to pass between the said lugs and consequently being brought into position to be broken up by the lugs and the rollers.

My improved crushing machine is composed of very few parts and will be found highly efficient in use and its many advantages are believed to be evident from the foregoing description without further detail mention of the same.

What I claim is:

1. In a crusher, the combination of a rotary drum having a continuous circumferential outlet between its ends, annular breakers secured rigidly in said outlet, a screen rigid with and spaced from the drum and extending over said outlet, and means for rotating the drum.

2. In a crusher, the combination of a rotary drum having an annular outlet between its ends, breakers secured in said outlet, a

screen rigid with the drum and extending over said outlet, and a housing fitting around the drum and inclosing said screen.

3. In a crusher, the combination of a rotary drum having an annular outlet, disks secured in the said outlet and provided with spaced projections on their inner opposed faces, a screen extending over the outlet and a housing inclosing the drum and the screen.

4. In a crusher, the combination of a rotary drum having an annular outlet, disks secured in the said outlet and having spaced projections on their inner opposed faces, and means for rotating the drum.

5. In a crusher, the combination of a drum having an annular outlet, breaker disks secured in said outlet and having grooves on their outer faces, and means for rotating the drum.

6. In a crusher, the combination of a drum having an annular outlet, breaker disks secured in the said outlet and having spaced lugs on their inner opposed faces and outwardly extending grooves in their outer faces, and means for rotating the drum.

7. In a crusher, the combination of a rotary drum having an annular outlet between its ends, breaker disks secured in the said outlet, brackets extending outwardly from the drum adjacent the outlet, and an annular screen carried by the said brackets.

8. In a crusher, the combination of a rotary drum having an annular outlet between its ends, breakers secured in said annular outlet, brackets extending from the drum adjacent the outlet, a screen fitted to the outer ends of said brackets, and securing collars engaging the edges of said screen and the outer ends of the brackets.

9. In a crusher, the combination of a rotary drum comprising tapered members having their larger ends opposed and spaced apart, breaker members secured between the

said spaced ends of the tapered members and constructed to provide outlets for the drum, crushing rollers arranged loosely within the drum, and means for holding the said crushing rollers in spaced relation and at opposite sides of the breakers.

10. In a crusher, the combination of a rotary drum comprising tapered members having their larger ends opposed and spaced apart, breaker disks secured between the said opposed ends of the tapered members and constructed to provide outlets for the drum, tapered crushing rollers arranged loosely within the drum, eye-bolts extending axially through the respective rollers, and a link engaging the eyes of said bolts whereby to hold the rollers in a constant spaced relation and at opposite sides of the breaker disks.

11. In a crusher, the combination of a rotary drum, transverse breaker members rigid with the periphery of the drum, and crusher rollers loose within the drum coöperating with said breaker members.

12. In a crusher, the combination of a rotary drum, breaker rings rigid with the periphery of said drum between the ends thereof and arranged at an angle to the axis of the same, and crusher rollers loose within the drum adjacent the sides of the breaker rings to coöperate therewith.

13. In a crusher, the combination of a rotary drum having a peripheral outlet, breaker rings secured rigidly in said outlet and projecting radially into the drum, and crushing rollers loose within the drum at the sides of the breaker rings.

In testimony whereof I affix my signature in presence of two witnesses.

OLIVER J. MOUSSETTE. [L. s.]

Witnesses:

PAUL WILLIAMS,
W. N. EICHBERG.