

O. J. MOUSSETTE,
CRUSHER,
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1,172,626.

Patented Feb. 22, 1916.

3 SHEETS—SHEET 1.

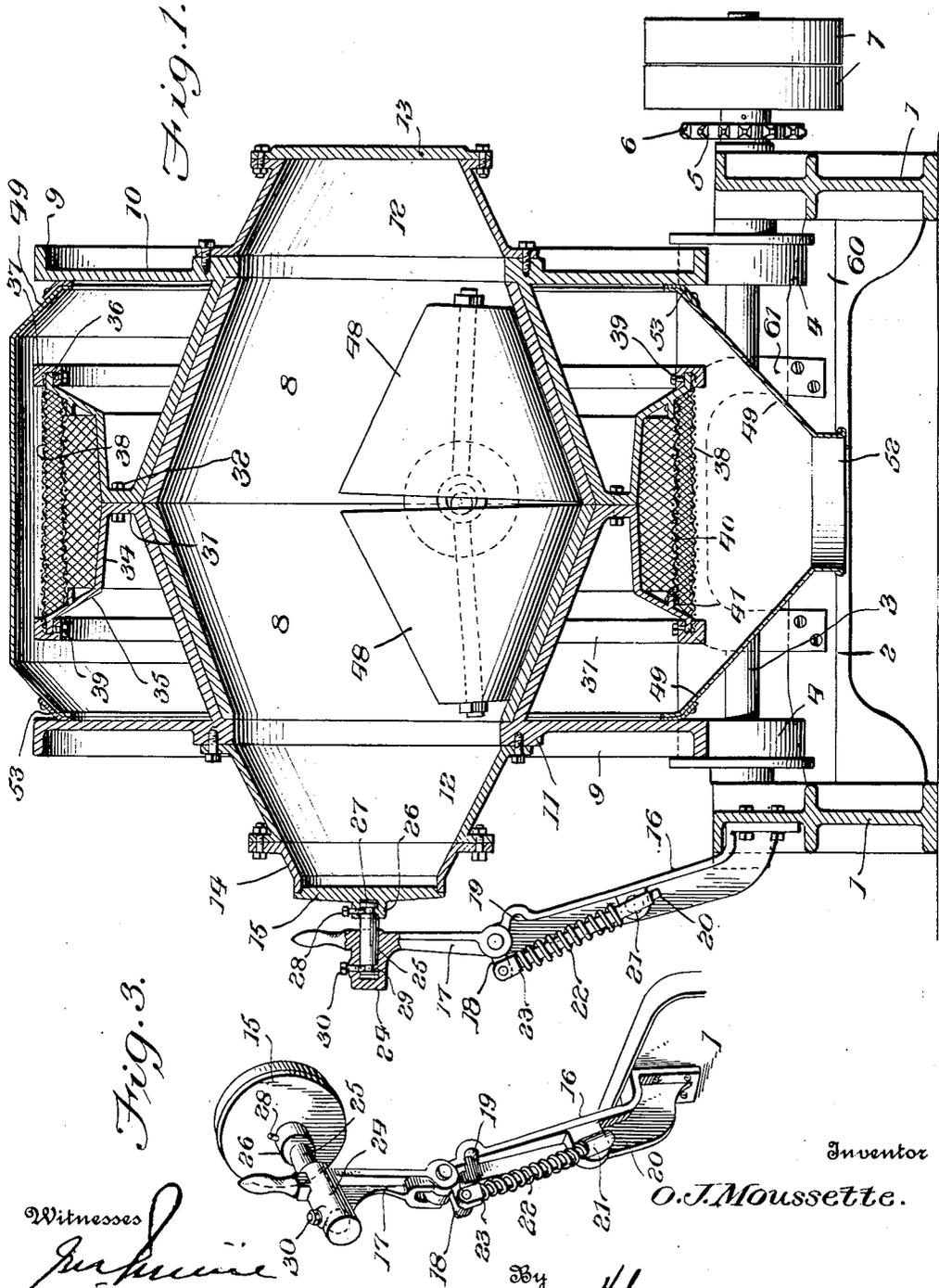


Fig. 1.

Fig. 3.

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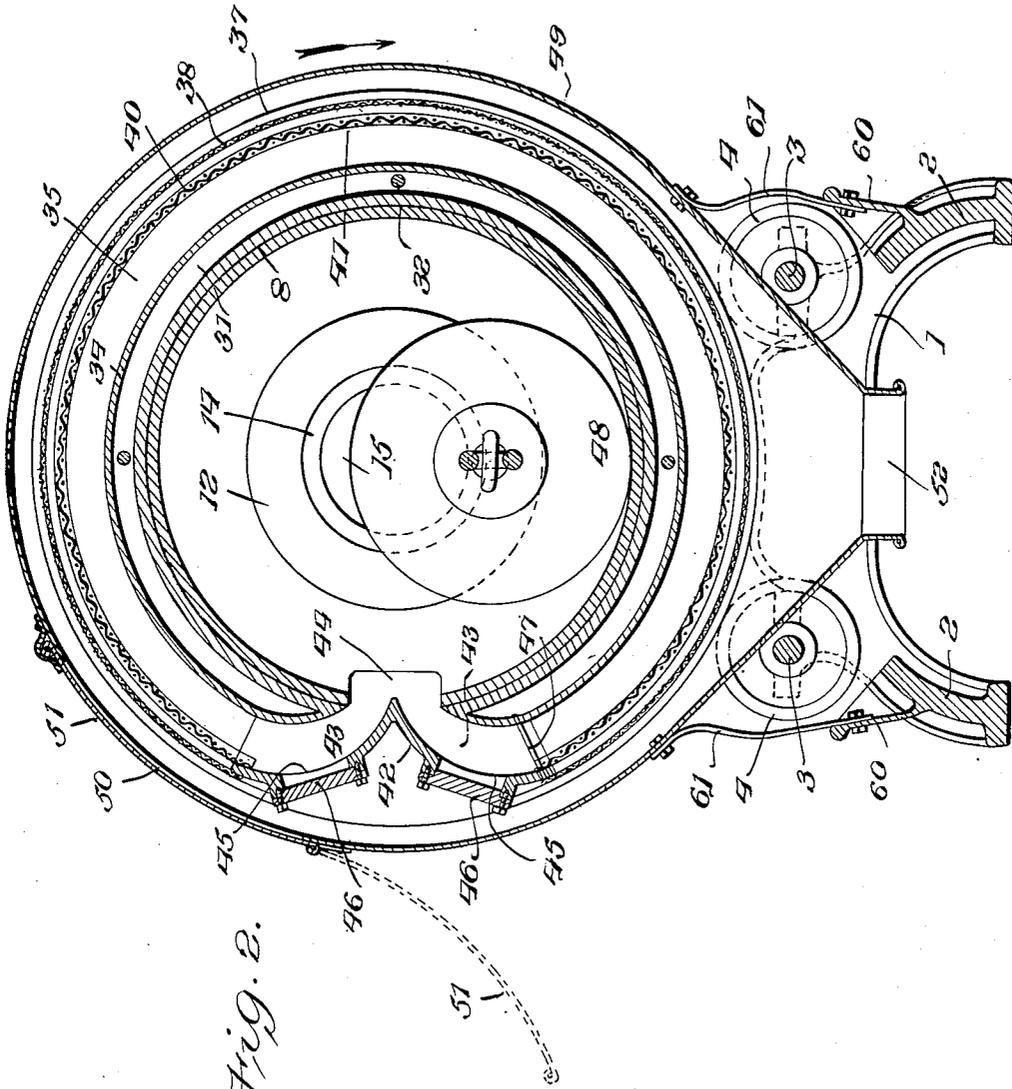


Fig. 2.

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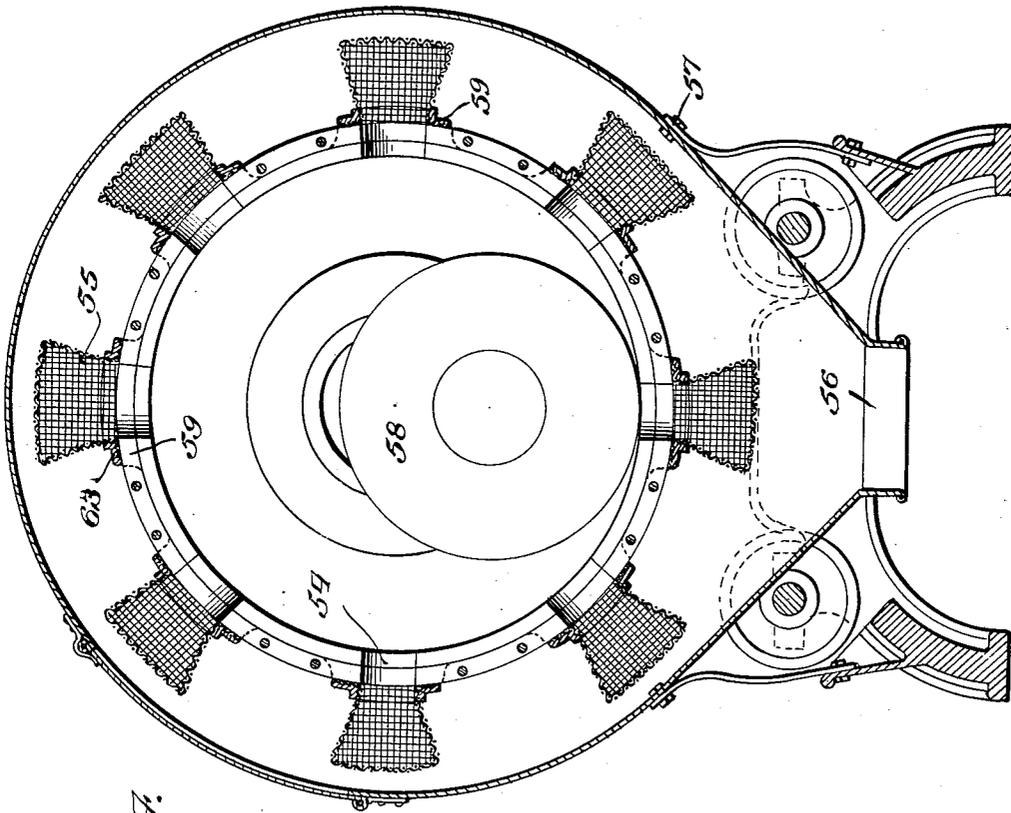


Fig. 4.

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UNITED STATES PATENT OFFICE

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CRUSHER.

1,172,626.

Specification of Letters Patent.

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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, and has special reference to machines for grinding ores or similar material, being especially adapted for reclaiming brass or other metal or valuable products from the refuse of refineries, foundries, smelters and the like.

One object of the invention is to provide a crusher by the use of which the material treated will be screened as it passes from the crushing elements so that the coarser particles will be arrested and only the finer particles permitted to escape to the point of discharge.

Another object of the invention is to provide an apparatus of simple construction whereby the coarser particles will be returned to the interior of the drum and there again treated so as to be reduced to the desired degree of fineness before passing to the receptacle.

Other objects of the invention will appear as the description of the same proceeds.

The invention is illustrated in the accompanying drawings and consists in certain novel features which will be particularly pointed out in the claims following the detailed description.

In the drawings: Figure 1 is a longitudinal vertical section of a crusher embodying my present improvements; Fig. 2 is a vertical transverse section of the same; Fig. 3 is a detail perspective view of the device for locking the closure of the feed opening; and Fig. 4 is a vertical transverse section showing a modification.

In carrying out my present invention, I employ a base or supporting frame which is preferably one integral structure and comprises the end members 1 connected by longitudinal webs 2 at the opposite sides. The end members 1 are provided on their upper edges at their corners with suitable bearings for shafts 3 which carry flanged rollers 4 adjacent the inner faces of the said end members. The shafts are extended through their bearings and beyond one of the end members, and on the said extended portions of the shafts I secure sprocket wheels 5 which are connected by a sprocket chain 6

so that, when power is applied to one of the shafts, both shafts will be positively rotated. One of the shafts is equipped with fast and loose pulleys, indicated at 7, so that power may be applied to the shaft from any convenient or preferred prime motor.

A drum is employed to receive the material to be ground, and the said drum consists of inner tapered steel-lined members 8 having their larger ends abutting and provided at their outer smaller ends with annular integral driving rings 9 which consist of outer continuous peripheries bearing upon the peripheries of the rollers 4 and connected with the drum sections by webs or spokes 10, as will be readily understood. The flanges of the rollers 4 are arranged at the outer sides of the same so that movement of the drum axially or longitudinally will be prevented and the drum consequently retained in proper position upon the rollers. As the rollers are rotated, the frictional engagement between the same and the driving rings 9 will transmit rotary motion to the drum, as will be readily understood.

To the outer faces of the annular shoulders or ribs 11, which serve to connect the webs or spokes 10 with the sections of the drum, I secure by bolts or their equivalents, tapered terminal members 12, the inner circumferential faces of which are flush with the inner faces of the drum sections 8 so as to provide a smooth interior for the drum. One of these terminal sections 12 is closed by a fixed head 13, and to the outer end of the other terminal section I secure a tapered hood 14 which is adapted to be closed by a movable head 15. The end member 1 of the supporting frame below the hood 14 carries a slightly outwardly extending standard 16 upon the upper end of which is pivoted a lever 17 having a small outwardly projecting arm or lug 18 extending radially from its pivotal point. Immediately below the said pivotal point and at the inner side of the same a notch or recess 19 is provided in the standard 16, as clearly shown in Figs. 1 and 3. A pin or rod 20 is pivoted at its upper end to the outer end of the arm or lug 18 and has its lower portion playing in a sleeve or guide 21 which is pivotally mounted upon the standard below the notch or recess 19, and a spring 22 is coiled around the said pin or rod between the pivoted guide and an annular shoulder or other stop 23 near the upper end of the pin or rod.

The lever 17 is constructed near its upper end with a box or bearing 24 in which is swiveled a pin 25 which is also swiveled in a boss 26 formed on the outer face of the head 15 at the center of the same. The said pin 25 is provided with an annular groove 27 near one end which receives a set-screw 28 mounted in the boss 26 so that the head will be swiveled upon the pin, and near the opposite end of the pin I provide an annular groove 29 which is engaged by a set-screw 30 mounted in the bearing 24, as clearly shown in Fig. 1. This arrangement permits the pin to turn freely and also prevents separation of the parts. The construction also facilitates the removal of a worn or broken head and the substitution of a new head therefor.

It will be readily understood that the material to be ground is fed into the drum through the hood 14, and the head 15 is then moved into engagement with the open end of said hood. When the head is in position to close the hood, as shown in Fig. 1, the tension of the spring 22 is exerted upwardly against the lug or arm 18 and resists any tendency of the head and the lever 17 to move away from the drum under pressure of the material within the drum working against the head. When it is desired to place a fresh charge within the drum, the lever is swung outwardly and downwardly about its pivot, thereby carrying the head away from the drum and causing the end of the lug or arm 18 to enter the notch or recess 19. The downward and inward movement of the said arm or lug will, of course, compress the spring 22 between the shoulder 23 and the guide 21 and cause the rod or pin 20 to move close to the flange of the standard 16. When the end of the lug 18 enters the recess or notch 19, the tension of the spring will then be exerted upwardly against the top of the notch through the end of the said lug and will, consequently, hold the lever 17 and the head 18 in open position and, at the same time, will prevent it dropping to a point where it will be inconvenient for the operator to reach the same when it is desired to again close the drum. The force of the spring thus exerted will also tend to prevent accidental dislodgment of the head and the lever.

Upon the outer circumference of the inner drum sections 8, and immediately adjacent the abutting end edges of the same, I provide the annular flanges or ribs 31 through which securing bolts 32 are inserted to rigidly secure the said drum sections together. Integral with the outer edges of said flanges or ribs are annular trough members 34, which extend outwardly at both sides of the ribs or flanges 31 substantially parallel with the axis of the drum and are then carried sharply outward, as shown at 35. The ex-

terminities of the trough members are turned outwardly, as shown at 36, and are fitted in grooves provided in the inner faces of rings or collars 37 which also receive the edges of an annular screen 38 extending around the trough. Clamping screws 39, inserted through the inner circumferential walls of the said rings and bearing against the out-turned edge portions 36 of the trough, serve to clamp the said edge portions and the edges of the screen 38 firmly within the said rings.

The screen 38 is preferably of rather fine mesh and may be woven wire netting or any preferred foraminous construction. Extending between the side portions 35 of the casing or trough and concentric with the screen 38 is a second coarser screen 40 which is secured to annular flanges or ribs 41 provided on the side portions 35, as clearly shown in Fig. 1. By referring to Fig. 2 it will be noted that the screens do not extend entirely around the drum, and between the ends of the same I form on the drum, integral with the trough and the drum, a receiver or trap 42 of such form as to provide passages 43 leading from the trough to an opening 44 formed in the drum by providing registering notches in the meeting edges of the drum sections 8. The outer wall of each passage 43 is curved inwardly toward the said opening 44 and the inner wall of the passage is concentric with said outer wall and terminates at the longitudinal edge of the opening. In the outer wall of each passage is provided an outlet opening 45 which is normally closed by a head 46 secured in place by bolts, as shown. Bars or pins 47 are secured in the casting 42 at one side or end of the same so as to constitute a barrier across the adjacent end of the trough or casing, as shown in Fig. 2.

Within the drum, I provide the crushing rollers 48, which may be of the type shown in Letters-Patent No. 1,087,964, issued to me February 24th, 1914, as illustrated in the present case. It will be understood, however, that other forms of crushing rollers may be employed, if preferred.

A housing 49 is supported by the base of the machine and extends entirely around the drum and the screens between the rings 9 upon the drum, and this housing may be of any desired material. The housing is provided at one side with an opening 50 adapted to be covered by a door 51 so that access may be had to the interior of the housing whenever desired, and the lower portion of the housing is tapered to the discharge opening 52 below which a suitable receptacle may be placed to catch and retain the ground material discharged from the drum. To prevent escape of fine dust, and consequent loss of valuable matter, I secure to the outer surface of the housing, strips 53

of rubber, leather or heavy felt which bear against the driving rings 9, as shown most clearly in Fig. 1 so as to form air tight joints between the housing and the webs of said rings. The side members 2 of the supporting frame are formed with rails 60 to which are bolted the lower ends of brackets or standards 61, the upper ends of said brackets or standards being secured to the housing whereby to support the same.

It is thought the operation of my improved machine will be readily understood. The material to be ground is fed into the drum in any convenient or preferred manner through the hood 14, and the head 15 is then swung up into engagement with the outer end of said hood, as shown in Fig. 1 and hereinbefore explained. Power is applied through the described mechanism to the shafts 3 so as to rotate the drum in the direction indicated by the arrow in Fig. 2. As the drum rotates, the material contained therein will be caused to roll over and over upon itself and this action will also bring it under the rollers 48 and between the said rollers so that it will be broken up. When the opening 44 reaches the lowest point of the drum, the ground material will pass through the same into the passages 43, and as the rotation of the drum continues, the material in the advance passage 43 will drop back into the drum and be again ground. The material caught in the following passage 43, however, will fall therefrom into the trough and be retained between the same and the inner screen 40. The tumbling action of the material over said screen will crush and break up the material to some extent, and the finer particles will pass through the same onto the screen 38 through which the finest particles will pass and escape through the discharge opening 52. The material which is too coarse to pass through the screen 38 will drop upon the screen 40 as it is carried around to the highest point of the drum and will then pass through the said screen into the trough and find its way into the passage 43 and the opening 44 into the drum, where it will be again ground. The barrier 47 will prevent very large pieces of material passing onto the screen and causing unnecessary wear thereon. When the material has been ground so that no more passes to the discharge opening 52, the rotation of the drum may be arrested at such point as will bring the openings 45 immediately below the opening 50 in the housing, and the head 46 then removed so as to permit the removal of any material which may have been caught in the passage 43 and also to facilitate the cleaning of the apparatus.

Should it be desired to effect only coarse grinding, the openings 43 may be increased to any desired extent and, consequently, the

material will pass more rapidly from the drum. The apparatus may thus be easily adapted to grind matter to any desired degree of fineness.

In Fig. 4, I have illustrated an arrangement which is especially adapted for very coarse grinding. In this form of the invention, the drum is provided in its medial transverse plane with a plurality of openings 54, and upon the drum over the said openings I secure foraminous baskets or screens 55 which are approximately of conical formation. These baskets may consist each of a single screen or of a plurality of screens, according to the intended use of the machine. When two or more screens are used, they will be of different degrees of fineness with the finest outside, this arrangement stiffening the basket and also protecting the finer mesh. As the drum revolves, the material will drop into the successive openings 54 and be caught by the screened hoods or baskets 55, the material fine enough to pass through the openings in said screens being discharged at once through the discharge opening 56 at the bottom of the housing 57, while the coarser material will drop from the basket through the openings 54 into the drum as the baskets respectively reach the higher points of the drum and will then be crushed through the action of the rollers 58 and the drum, as will be readily understood. Bosses 59 are formed around the outlet openings and the inner smaller ends of the screens are secured to said bosses by clamping rings 63 bolted upon the bosses and over the laterally bent edges of the screens.

It will be noted that I have provided a very simple and easily operated machine which may be produced at a low cost and will be found highly efficient for the purposes for which it is designed.

Having thus described the invention, what is claimed as new is:—

1. A crusher comprising a rotary drum, an outlet leading laterally from the drum, a screened chamber encircling the drum, and a receiver interposed between the ends of said chamber over the said outlet and having divergent passages forming communications between the outlet and the chamber.

2. A crusher comprising a rotary drum having a lateral outlet, a trough encircling and rigid with the said drum, a screen carried by the outer side of the trough, and a receiver interposed between and connecting the ends of the trough and the ends of the screen and provided with divergent passages extending between the opening in the drum and the trough.

3. A crusher comprising a rotary drum having a lateral outlet, a trough secured rigidly to the drum and encircling the same and communicating at both ends with said

outlet, a series of screens carried by the outer side of the trough and co-extensive therewith, and a barrier across one end of the trough.

5 4. The combination of a base, a drum supported on the base, means on the base for rotating the drum, a standard rising from one end of the base, a lever pivoted to and rising from the upper end of the standard,
10 a closure for the drum carried by the upper end of said lever, means on the standard to automatically limit the opening movement of the lever, and yieldable means mounted on the standard and connected with the lever
15 for holding the lever at the limit of its movement in either direction.

5. The combination of a base, a drum mounted thereon, means on the base for rotating the drum, a standard rising from one
20 end of the base and provided near its upper end with a lateral notch, a lever pivoted upon the standard above said notch, a lateral projection on the lever adapted to enter the said notch, a pin pivoted to and depending
25 from the said projection, a guide for the lower end of said pin pivoted upon the standard, a spring coiled around the said depending pin and between and bearing upon the said lug and the said guide, and a
30 closure for the drum carried by the free end of said lever.

6. A crusher comprising a rotary drum having a lateral outlet, a trough encircling the drum in the plane of said outlet, a screen

covering the outer side of said trough, a receiver connecting the ends of the trough and having diverging passages extending between the lateral outlet in the drum and the trough and being provided with outlet openings in its outer side, and closures for said
40 openings.

7. A crusher comprising a rotary drum having a lateral outlet, a screened chamber encircling the drum, a receiver interposed in
45 said chamber over said outlet and having divergent passages extending between the outlet and the said chamber, and a barrier inserted in one of said passages.

8. A crusher comprising tapered drum sections provided with annular ribs at their
50 larger ends and provided with a lateral outlet in said ends, fastening devices inserted through said ribs to secure the drum sections together, trough members extending divergently from said ribs, a screen secured to
55 and extending between the outer edges of said trough members, and a receiver connecting the ends of said screen and said trough members and provided with passages communicating with the lateral outlet of the
60 drum and the space between the trough members and the screen.

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

OLIVER J. MOUSSETTE. [L. s.]

Witnesses:

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