June 7, 1932. A. L. MUNRO 1,861,578

GRAVEL WASHER

Filed June 10, 1929 2 Sheets-Sheet 1

Fig. 2.

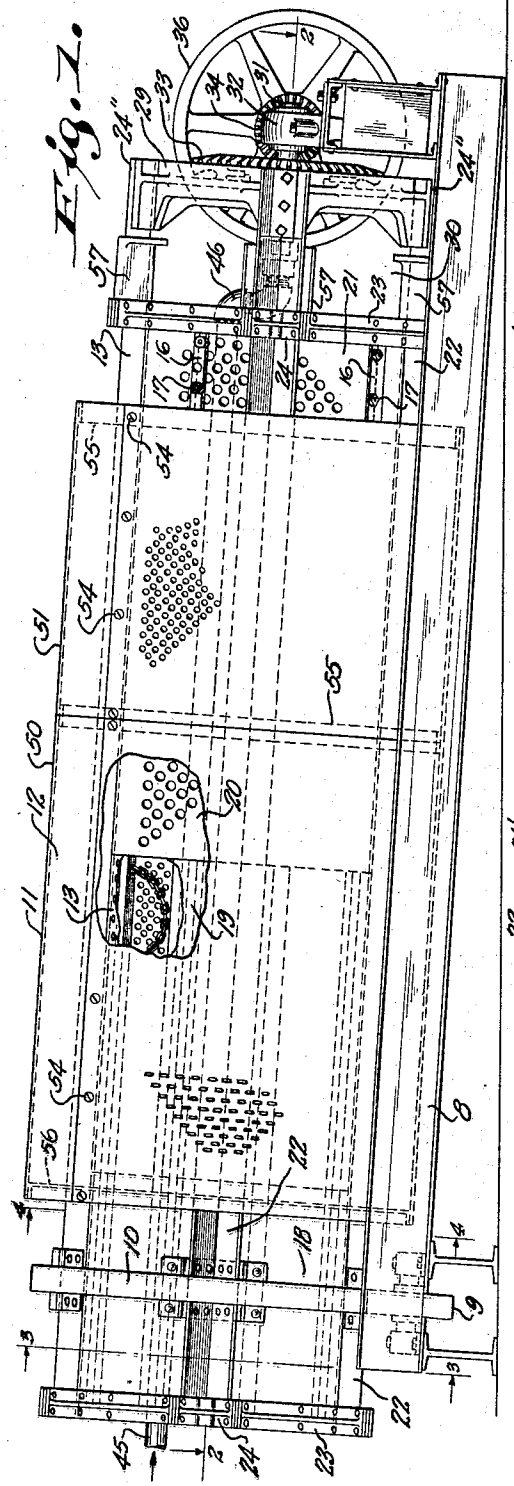


Fig. 4.

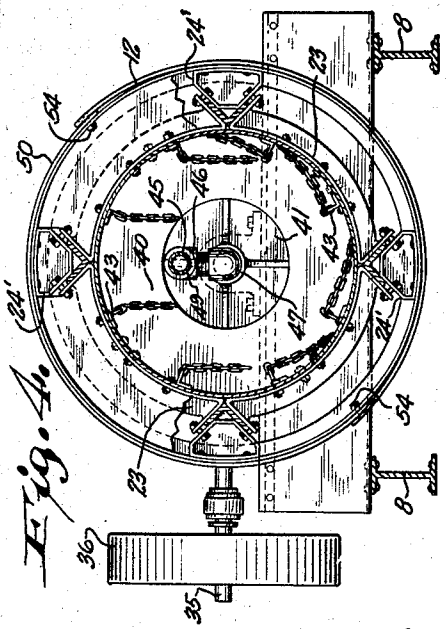
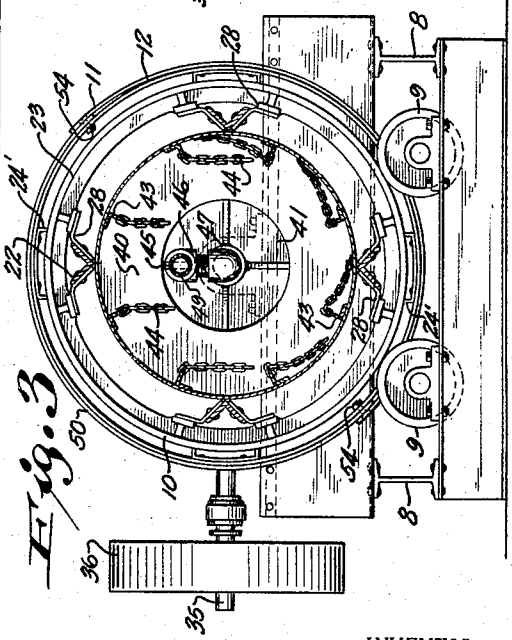


Fig. 3



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GRAVEL WASHER

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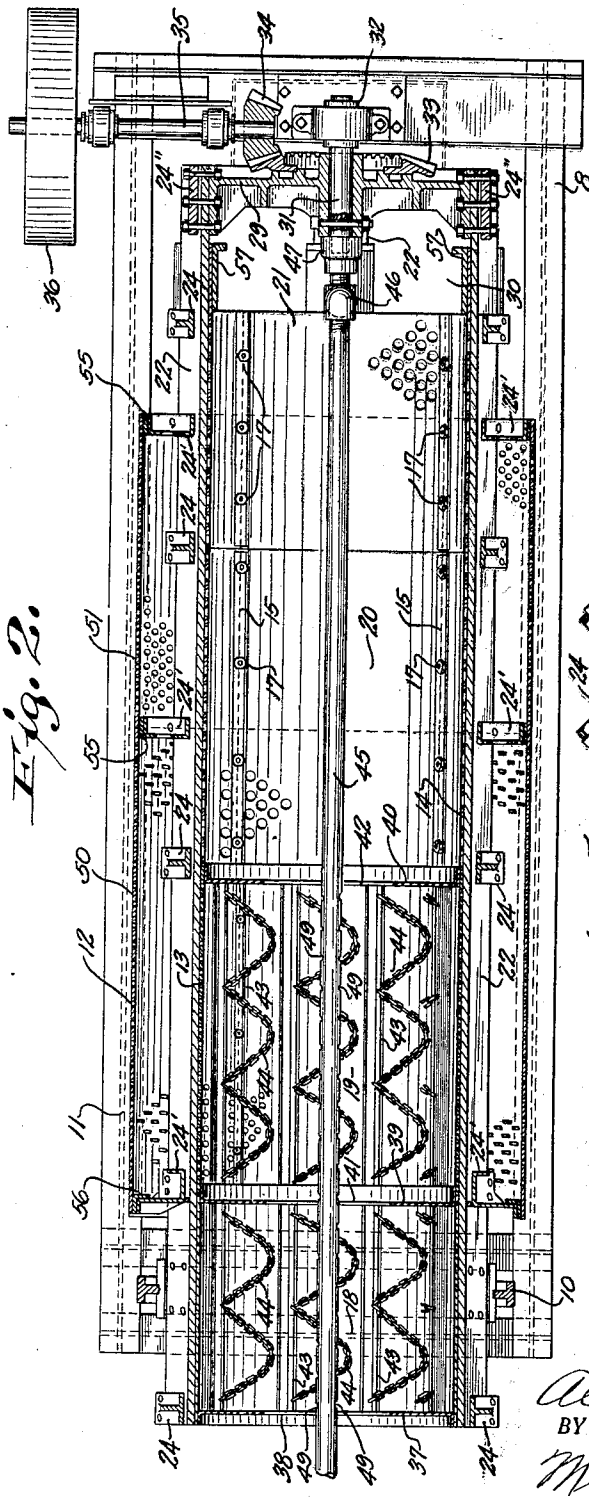


Fig. 2.

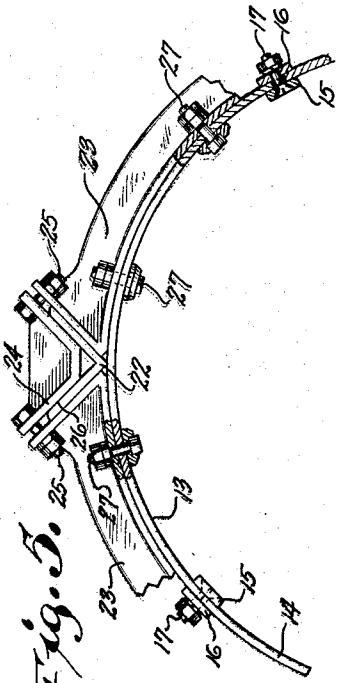


Fig. 5.

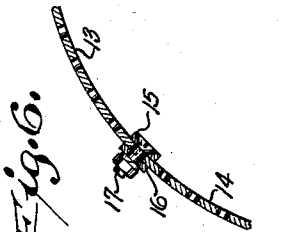


Fig. 6.

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UNITED STATES PATENT OFFICE

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GRAVEL WASHER

Application filed June 10, 1929. Serial No. 369,735.

This invention relates to improvements in gravel washers of the rotary type.

Gravel washers as now made have screen drums formed of continuous pieces of metal with the result that in case of repairs it is necessary to take down the whole machine in order to replace or repair a part.

It is one of the objects of the present invention to overcome the before mentioned objectionable feature and provide a gravel washer in which the rotary screen member is divided both longitudinally and circumferentially into sections to permit easy removal thereof.

A further object of the invention is to provide a gravel washer having longitudinally extending reinforcing members which while extending the full length of the washer drum may be easily removed to replace some of the screen sections.

A further object of the invention is to provide a gravel washer having means within the drum for preventing clay or other extraneous matter from sticking to the drum.

A further object of the invention is to provide a gravel washer with means for spraying water in certain portions of the drum to wash the gravel.

A further object of the invention is to provide a gravel washer having chain loops suspended within the drum for preventing clay or other extraneous matter from sticking to the inner wall of the drum.

A further object of the invention is to provide a gravel washer of the double drum form which is of simple construction, is strong and durable, and is well adapted for the purpose described.

With the above and other objects in view the invention consists of the improved gravel washer and its parts and combinations as set forth in the claims and all equivalents thereof.

In the accompanying drawings, in which the same reference characters indicate the same parts in all of the views:

Fig. 1 is a side view of the improved gravel washer, parts broken away to show interior construction;

Fig. 2 is a horizontal sectional view thereof taken on line 2—2 of Fig. 1;

Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 1;

Fig. 4 is a similar view taken on line 4—4 of Fig. 1;

Fig. 5 is a fragmentary detail view of a portion of the drum; and

Fig. 6 is a fragmentary detail view of two screen sections.

Referring to the drawings the numeral 8 indicates a rectangular frame which is inclined downwardly towards its discharge end. The higher portion of the frame is provided with two spaced rollers 9 journaled thereon upon which is supported a ring 10 forming part of the screen drums 11. The screen drum comprises an outer short screen drum 12 and an inner and longer screen drum 13 arranged in concentric relation of the outer drum 12. The inner drum is formed of sections of curved screen plates 14 joined together edgewise by inner strips 15, outer strips 16 and bolts and nuts 17. The bolts extend through and are welded to the inner strip and extend through the outer strips and through half holes in the abutting edges of the plates to clamp the edges between the strips and form circumferential screen member sections 18 and said member sections are joined together endwise to form a drum of the desired length. While the member sections may have perforations of any size desired it is preferred for some kinds of work to use imperforate plates in the first section 18, provide plates in the second section 19 with small perforations, and the plates of the sections 20 and 21 with larger perforations. The circumferential line of plates in endwise relation are connected together and reinforced by longitudinally extending members 22 of V-shape in cross section. Preferably four of the longitudinal members are used and they are equidistantly spaced around the drum and are clamped thereto by four part segmental bands 23 interposed between the longitudinal members and V-shaped clamping members 24 which extend into the channels of the longitudinal members and are bolted to the angular flanges of the said

members by bolts 25. The angular faces 26 of the segmental members and the clamping members correspond to the angle of the longitudinal members. The segmental members are also bolted to the circumferential plates by bolts 27 which pass through the plates and through the flanges 23′ forming part of the segmental members 23.

The screen supporting ring 10 is indirectly connected to the plates of the screen drum by brackets 28 which form part of the ring and are bolted or riveted to the longitudinal members 22 to form a rigid connection therewith.

The opposite or discharge end of the drum is provided with a closed head 29 which is spaced a short distance from the end of the perforated drum 21 to provide a discharge opening 30 for the machine. The head is connected to the drum by means of the longitudinal members 22 which extend beyond the end of the inner drum and are rigidly connected to the head by V-shaped clamping members 24″ similar to the clamping members 24. The head is provided with a short projecting shaft 31 which extends through and is journaled in a bearing 32 forming part of the frame 8.

A bevel gear 33 mounted on the head 29 is in mesh with a bevel pinion 34 mounted on a drive shaft 35 extending at right angles to the drum shaft and journaled on the main frame. A belt wheel 36 mounted on the outer portion of the shaft 35′ is adapted for belted connection with a source of power.

The charging end portion of the drum is provided with a partial head 37 having a central charging opening 38 and the forward end portion of the drum is also provided with spaced deep partitions 39 and 40 which are similar in shape to the head 37 and are also provided with central openings 41 and 42. The partition 39 partly separates the imperforated section 19 from the perforated section 19, and the partition 40 partly separates the perforated section 19 from the perforated sections 20 and 21.

The inner peripheral portions of the sections 18 and 19 have longitudinally extending angle strips 43 mounted thereon and from which loops of chain 44 depend which serve as beaters to break up lumps of clay and gravel which may be present during the washing of the gravel. Any number of these chain loops may be used and may extend along any portion of the length of the drums.

A water pipe 45 extends into the drum a short distance above its axial line and at its inner end is provided with a double elbow 46 and a bearing 47. The bearing 47 extends around the inwardly projecting end of the shaft 31 to form a support for the inner end of the tube or pipe 45 while permitting the shaft 31 to rotate. A portion of the tube between the head 37 and the partition 40 is provided on one or more of its sides with perforations 49 for discharging jets of water directly upon the material being washed and also upon the chain loops and the angle strips 43 which serve as blades or shelves to carry the material upwardly during the washing operation.

The outer screen drum 12 is for convenience formed in two longitudinal sections 50 and 51, and the said sections are preferably divided circumferentially into two sections 52 and 53 which overlap each other and are joined together by bolts and nuts 54. Said sections are secured to the inner drum by clamping members 24′ of somewhat similar shape to the clamping members 24 and are bolted to the segmental bands in the same manner. The abutting end edges of the outer drum sections and the outer ends thereof are reinforced by inner bands 55 and 56 which are bolted thereto.

Brackets 57 projecting rearwardly from the rear segmental band 23 and secured to the longitudinal member 22 serve to reinforce the said members 22 and protect the members against wear.

The perforations of the outer drum section 50 are somewhat smaller than the other section 51 and the gravel not passing through the perforations will be discharged from the rear open end of the outer drum.

The chain loops 44 are of such length as to hang freely from their supports and their weight is sufficient to exert hammer like blows upon the material as they are swung by the rotation of the drum.

While the gravel washer has been shown in the form of a double concentric drum, it is to be understood that the outer drum may be eliminated without departing from the spirit and scope of the invention.

In operation the gravel to be washed is fed into the inlet opening 38 and the drum is rotated and water is supplied to the perforated pipe 45 to spray into the compartments or sections 18 and 19. The rotation of the drum and the angle strips 43 will keep the gravel in constant agitation while the chain loops will tend to break up and grind the clay, which may be mixed with the gravel, and the clay and sand is washed away from the gravel. As the drums are inclined downwardly towards the discharge end of the machine the material will, during the said rotation, gradually work downwardly towards the said discharge and the cleaned gravel will be discharged from the end thereof. Particular attention is directed to the depth of the ring partitions 39 and 40 which while not seriously impeding the flow of the small aggregate, will retard the movement of the large rock, so that said rock will aid in the crushing and grinding of the clay and sand from the gravel. The gravel in entering the first section 18 will be soaked, mixed and sprayed and the ex-

traneous matter will be detached from the gravel, water soaked, softened and reduced by attrition. The material will then pass into the next section 19 which is perforated and the finer particles and sand will be flushed out through the perforations. This flushing will reduce the remaining bulk within the drum and the chains will have a better chance to break up any clay balls which may form. The screen members of the compartment 19 will permit the discharge of the sand, water and the small pebbles while the outer screen 50 will permit the discharge of sand and water, and the small pebbles will travel to the next outer screen 51 before they are discharged. The material within the inner compartment 19 will pass over the partition 40 and into the compartment 20 where all but the larger pieces of material will pass through the perforations of said compartment. The pieces which pass through will drop into the outer drum and the smaller particles will pass through the perforations of the section 51 and the other pebbles will be discharged from the lower end of said section 51. The large pieces which do not pass through the perforations of the section 20 will be discharged from the lower end thereof. As the perforations of the different sections vary in size and the inner drum is longer than the outer, the material screened will be discharged and drop in piles of different sized pieces beneath the machine.

From the foregoing description it will be seen that the machine is well adapted for the purpose described and also that parts which may become worn may be easily replaced.

What I claim as my invention is:

1. In combination, a frame, an inclined drum rotatably supported upon said frame, the upper charging portion of said drum being imperforate and a lower portion thereof being perforated, a partition within said drum between said imperforate and perforated portions for retarding the flow of material from one of said portions to the other, loosely suspended relatively short chain loops secured to the interior of said drum and movable thereby to agitate the passing material and to impinge against both the imperforate and perforated drum portions on opposite sides of said partition, and a second perforated drum surrounding the perforated portion of said inclined drum.

2. In combination, a frame, an inclined drum rotatably supported upon said frame, the upper charging portion of said drum being imperforate and a lower portion thereof being perforated, a partition within said drum between said imperforate and perforated portions for retarding the flow of material from one of said portions to the other, angle bars secured to the interior of said drum on opposite sides of said partitions and extending longitudinally of said drum, loosely suspended relatively short chain loops secured to each of said bars and swingable by said drum to agitate the passing material and to impinge against both the imperforate and perforated drum portions on opposite sides of said partition, and a second perforated drum surrounding the perforated portion of said inclined drum.

3. In combination, a frame, an inclined drum rotatably supported upon said frame, the upper charging portion of said drum being imperforate and a lower portion thereof being perforated, a partition within said drum between said imperforate and perforated portions for retarding the flow of material from one of said portions to the other, and loosely suspended relatively short chain loops secured to the interior of said drum and movable thereby to agitate the passing material and to impinge against both the imperforate and perforated drum portions on opposite sides of said partition.

4. In combination, a frame, an inclined drum rotatably supported upon said frame, the upper charging portion of said drum being imperforate and a lower portion thereof being perforated, a partition within said drum between said imperforate and perforated portions for retarding the flow of material from one of said portions to the other, angle bars secured to the interior of said drum on opposite sides of said partitions and extending longitudinally of said drum, and loosely suspended relatively short chain loops secured to each of said bars and swingable by said drum to agitate the passing material and to impinge against both the imperforate and perforated drum portions on opposite side of said partition.

In testimony whereof, I affix my signature.

ALEXANDER L. MUNRO.