Jan. 2, 1923.

1,440,594.

H. F. GORSUCH.

AUTOMATIC FEEDER FOR ELEVATORS.

FILED JUNE 14, 1922.

3 SHEETS—SHEET 1.

Fig. 2.

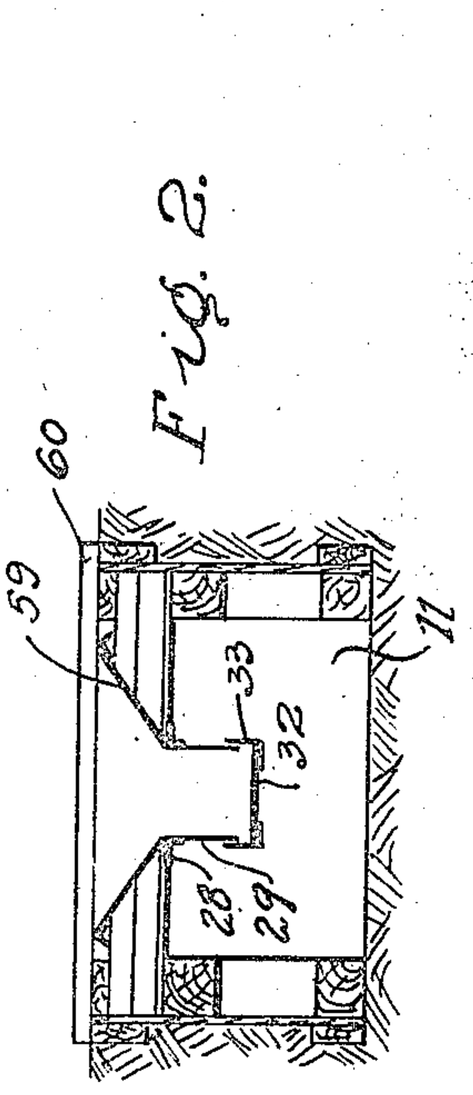

Fig. 1.

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3 SHEETS—SHEET 2

Fig. 3.

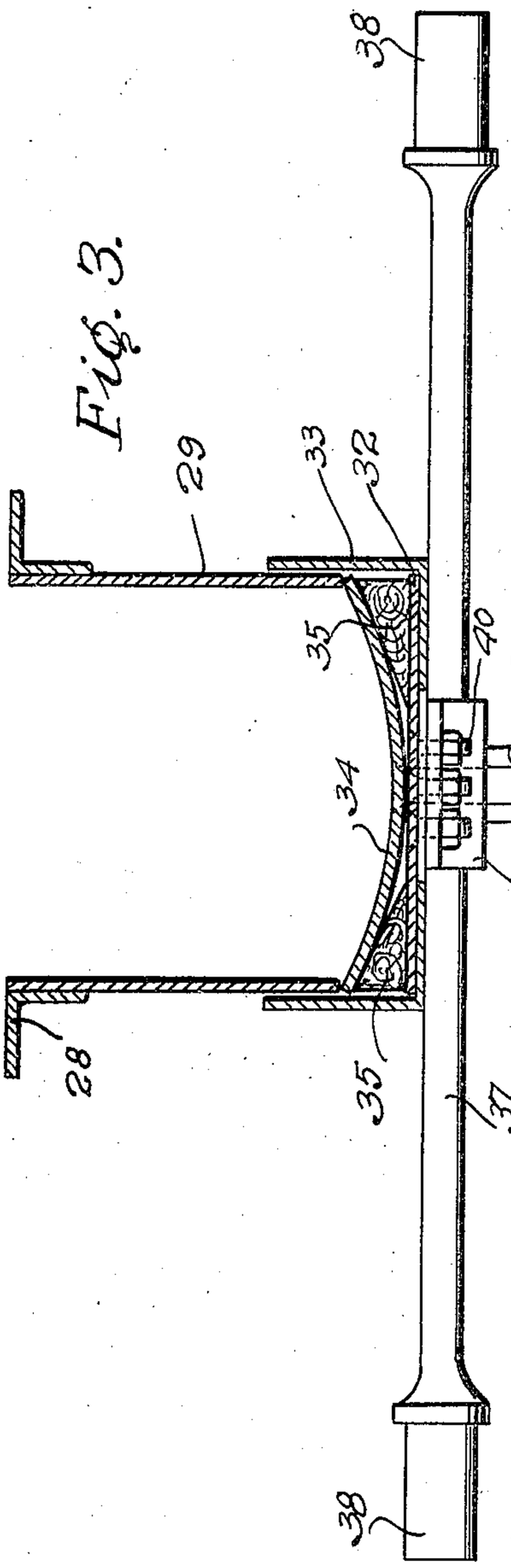
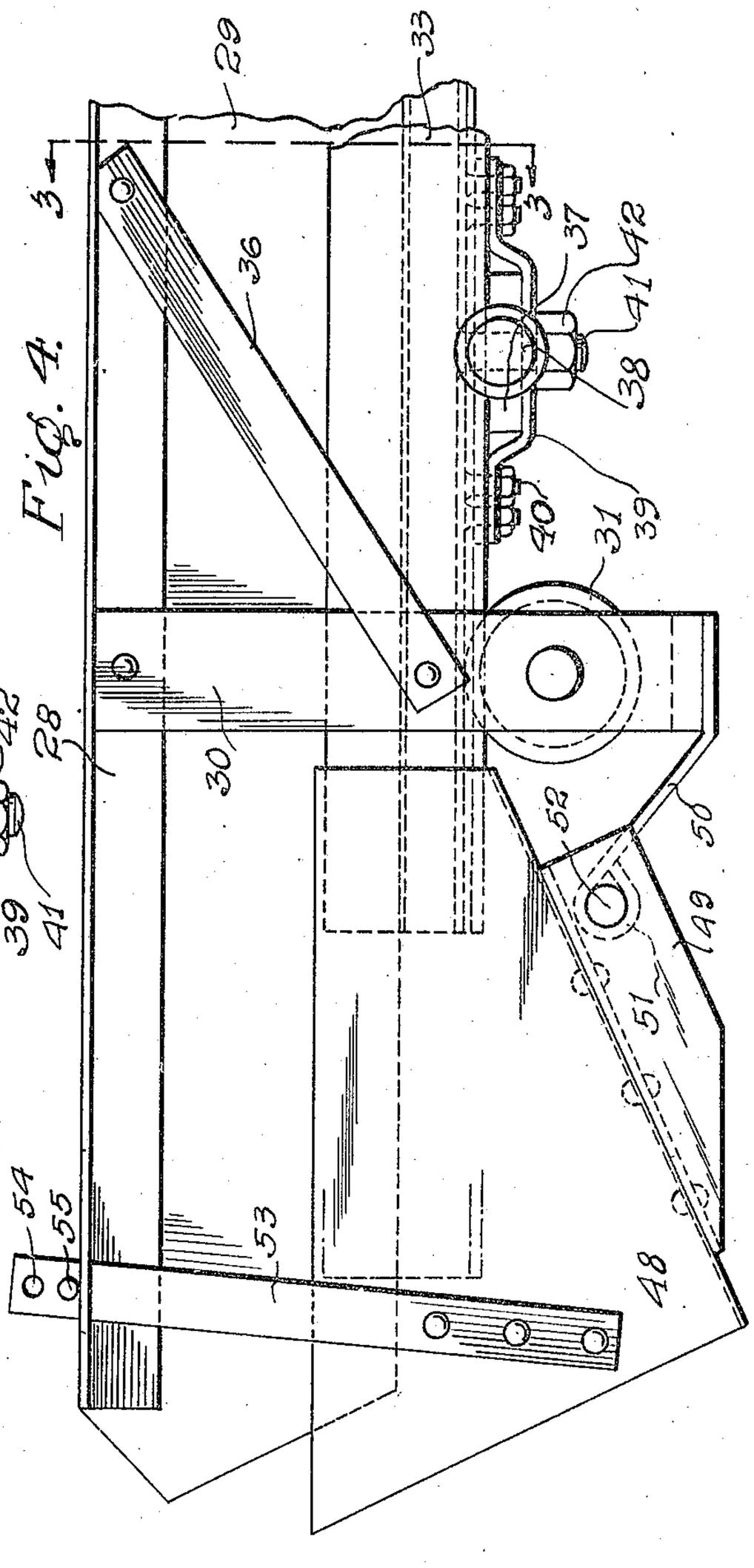


Fig. 4.



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AUTOMATIC FEEDER FOR ELEVATORS.

FILED JUNE 14, 1922. 3 SHEETS—SHEET 3.

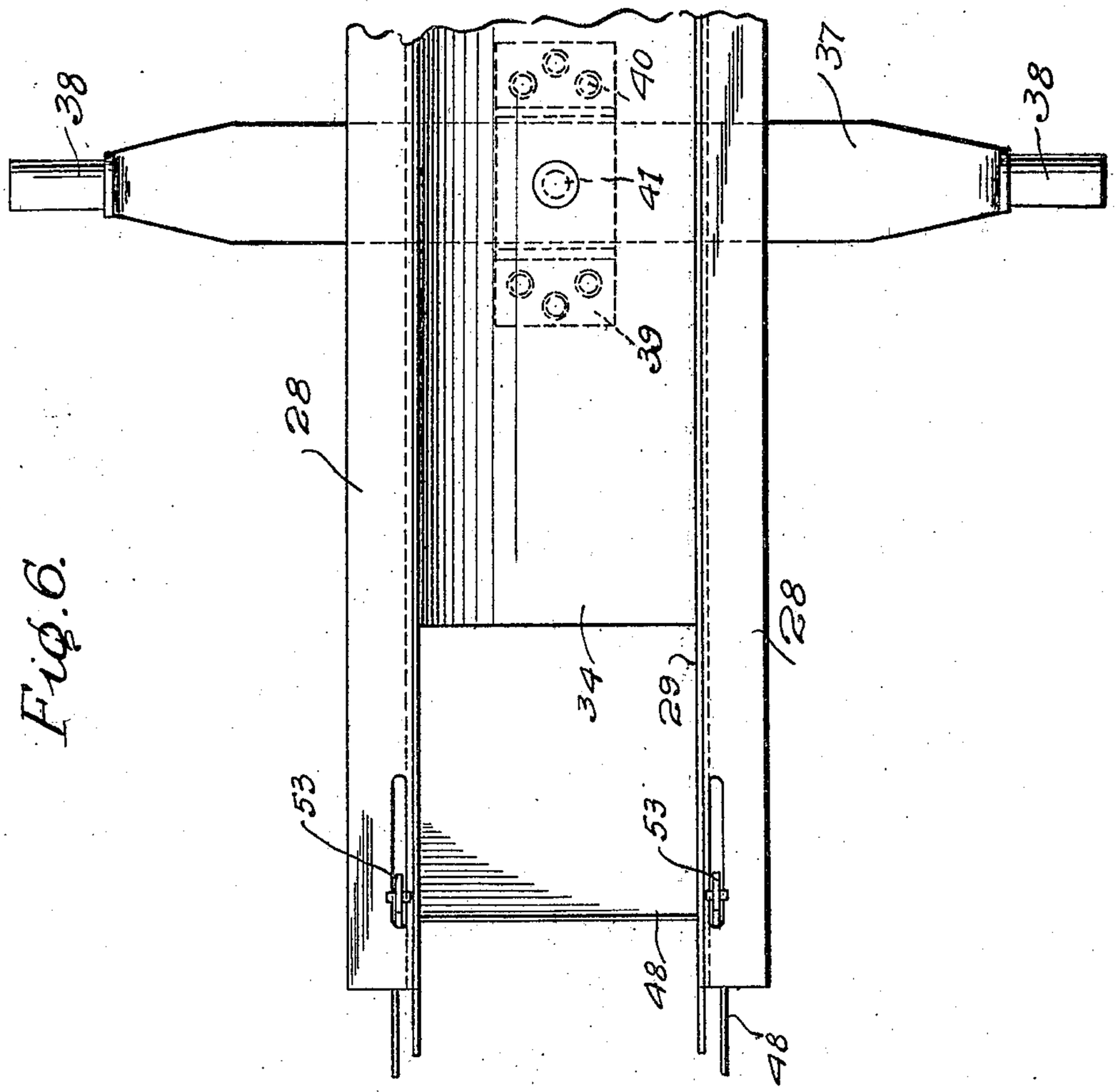

Fig. 6.

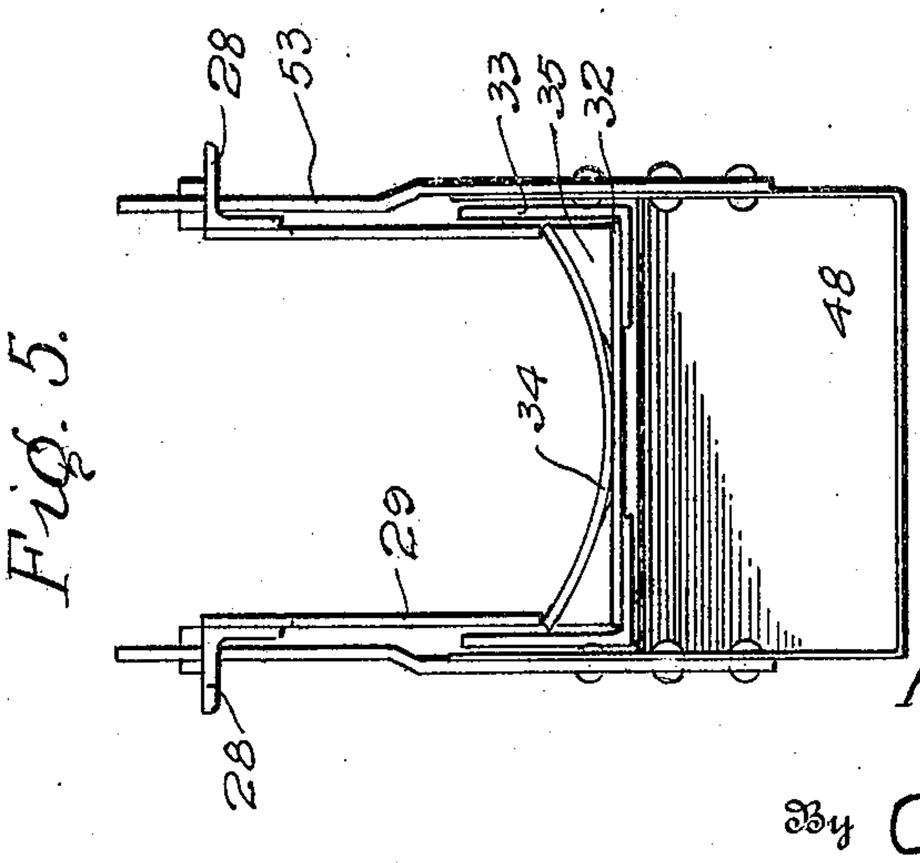

Fig. 5.

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Patented Jan. 2, 1923. 1,440,594

UNITED STATES PATENT OFFICE.

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AUTOMATIC FEEDER FOR ELEVATORS.

Application filed June 14, 1922. Serial No. 568,252.

To all whom it may concern:

Be it known that I, HOWARD F. GORSUCH, a citizen of the United States, residing at Galion, in the county of Crawford and State of Ohio, have invented certain new and useful Improvements in Automatic Feeders for Elevators, of which the following is a specification.

This invention relates to means for feeding material to elevators, and particularly to means for feeding material to an endless elevator having receiving buckets, this mechanism being particularly designed for use with standard screening devices.

In a certain type of standard screening mechanism, the material to be screened is received in a pit into which the lower end of an upwardly extending elevator frame extends, this elevator frame carrying an endless elevator provided with buckets, the material being lifted from the pit by said buckets, carried upward on the frame, and then discharged into a series of screening drums whereby the material is put in condition for use.

In mechanism of this kind, it is desirable to provide for an even feed of material to the buckets of the elevator so as to prevent the buckets from becoming clogged or filled to overflowing at one time, while at another time the buckets will be running with very little in them.

An object of this invention, therefore, is to provide means whereby gravel, broken stone, coal or like material may be gradually fed to the endless elevator.

A still further object in this connection is to provide means whereby the graduated feed may be controlled to a considerable extent.

Another object is to provide in a mechanism of this kind a reciprocating conveyor into which the material is discharged and which, by its reciprocations, causes the material to travel forward and be discharged into a spout and from thence to the elevator buckets, and provide means for causing the reciprocation of said conveyor.

A still further object is to provide means for supporting the conveyor frame within the pit by the use of standard rails which may also serve as the rails of a track so as to permit dumping cars to be run into position over the pit and discharged onto the reciprocating feeding element or conveyor.

A further object is to provide a construction of this character including a trough having fixed side walls into which a hopper discharges, this trough having its bottom mounted for reciprocating movement and constituting the conveyor heretofore referred to so that the material in the trough will be gradually fed forward onto the conveyor buckets.

Other objects have to do with the details of construction and arrangement of parts whereby these functions heretofore referred to are secured.

In the drawings, I have illustrated only so much of the elevator system as is necessary for an understanding of my invention, and in these drawings:—

Figure 1 is a sectional view through a material elevating mechanism of well known construction and showing my material distributing mechanism applied thereto;

Figure 2 is a diagrammatic section on the line 2—2 of Figure 1;

Figure 3 is an enlarged section on the line 3—3 of Figure 4;

Figure 4 is an enlarged side elevation of the forward end of the distributing mechanism;

Figure 5 is a front end elevation of the distributing mechanism;

Figure 6 is a fragmentary top plan view of the construction shown in Figure 4;

Referring to the drawings, 10 designates a pit or equivalent structure having a relatively narrow extension 11 which extends beneath the railroad rails 12. The pit on each side of the railroad rails may be covered in by planks 13. Extending downward into the main portion of the pit is an elevator frame, which is designated generally 14, and this particular construction requires no description, inasmuch as it forms no part of my invention.

This elevator frame carries at its lower end the sprocket wheels, rollers, or equivalent elements, designated 15, over which passes an endless element 16 having thereon the buckets 17. It is immaterial how this elevator 16 is driven, as this forms no part of my invention, but ordinarily, it may be stated, the elevator is driven from a head shaft mounted at the upper end of the frame and carrying a sprocket wheel and driven by a sprocket chain from a shaft 18 mounted upon the frame, having a sprocket wheel 19

driven from the engine, and also carrying a sprocket wheel 20. Mounted upon the frame 14 is a shaft 21 carrying a sprocket wheel 22, from which a sprocket chain 23 passes to the sprocket wheel 20 whereby the shaft 21 is driven. This shaft 21 is illustrated as mounted in sliding bearings 24 carried in guides 25 attached to the frame 14, the sliding bearing being shifted in this guide by means of the screw-threaded member 26 or in any other suitable manner. Mounted upon the shaft 21 is the crank 27. Except for the shaft 21 and the members 22 to 27, all the parts which I have heretofore described are standard equipment for this type of elevator and further description is, therefore, believed to be unnecessary.

Disposed within the pit 11 and extending into the portion 10 thereof are side walls which are formed of the supporting angle irons 28 and depending plates 29 which are riveted or otherwise connected to the angle irons. These two side walls are spaced from each other under ordinary circumstances a distance of $9\frac{1}{2}''$, though it will be obvious that these may be spaced a greater distance if desired. Depending from the angle irons 28, riveted or otherwise attached thereto and therefore supported from the side walls, are hangers 30 which support cast iron rollers 31, there being three sets of these hangers illustrated and three rollers. Resting upon the rollers and loosely embracing the depending plates 29 is a conveyor trough. This trough is composed of a flat bottom member 32 and angle irons 33 having upwardly extending flanges constituting side walls to the trough, the horizontal flanges of the angle irons extending beneath the plate 32, and disposed above this plate 32 is a transversely curved, concave bottom 34 which at its middle rests upon the plate 32 but at its sides is supported by filler blocks 35. The margins of this plate extend beneath the depending plates 29, while the vertical flanges of the angle irons 33 extend upward on each side of the depending plates 29 so as to embrace the same. This conveyor trough formed of the parts 32, 33, 34 and 35 is reciprocatable with reference to the depending plates 29 and rests upon the rollers 31 and is supported thereby for reciprocation. Preferably the hangers 30 are connected by straps 36 to the angle irons 28 but any other suitable strengthening means for the hangers 30 may be used.

The reciprocating trough is connected at one end, more or less adjacent its forward end, to an equalizer bar 37. The middle portion of this equalizer bar is rectangular in cross section where it extends beneath the reciprocating trough, but the extremities of the equalizer bar are reduced and circular in diameter to form trunnions 38. This equalizer bar is connected to the trough by a U-shaped yoke 39 attached by bolts 40 to the bottom plate 32, and this yoke is attached to the equalizer bar by a king bolt 41 passing through the equalizer bar and through the yoke and carrying a nut 42. The heads of the bolts 40 and of the bolt 41 are countersunk, as illustrated, so that the inner surface of the concave bottom 34 is smooth. The ends of the equalizer bar are connected to the crank 27 by means of connecting rods 43. It will be obvious now that a rotation of the shaft 21 will cause a reciprocation of the trough-shaped conveyor.

The conveyor frame is supported from the railroad rails 12 by means of angle irons or angular clamps 44, one margin of each of said angle irons resting upon the base of the corresponding rail 12 and clamping them. Downwardly extending plates 45 are riveted to the angle irons 28 and to the depending plates 29. Bolts 46 pass through the angle irons 44 and extend downward at an angle of 45°. These bolts constitute eyebolts and through the eyes of these bolts pass pins, rivets or bolts 47.

Disposed below the forward end of the reciprocating conveyor is a spout, designated 48. This spout has upwardly extending, lateral side walls and a downwardly inclined bottom discharging into the pit 10 and specifically adjacent the path of travel of the elevator bucket 17, and the spout is preferably pivotally mounted so that its forward end may be adjusted up or down and thus the inclination of the spout changed. To this end the spout is provided with two downwardly extending flanges 49 formed by angle irons attached to the bottom of the spout and the spout is pivotally supported by an extension 50 extending forward from the lower end of the forward hanger 30, this extension at its extremity being formed to provide a bead 51 through which a pin 52 passes, this pin also passing through the flanges 49. Thus the spout is operatively supported from the side walls. The spout is held in its adjusted position by upwardly extending supporting straps 53 riveted to the side walls of the spout and extending upward through slots in the horizontal flanges of the angle irons 28. The upper end of each strap 53 has a plurality of perforations 54 through which a pin 55 may be passed to hold this spout adjusted.

The connecting rod 43 is adjustable upon the crank 27 so that the crank may be in effect lengthened or shortened to thus change the stroke of the reciprocating trough constituting the conveyor and the material is caused to move forward into the conveyor upon each backward stroke of the trough or conveyor by means of a downwardly and forwardly extending wall 56 (see Figure 1) which is disposed between

the depending plates 29 and held in place in any suitable manner, the lower edge of this wall 56 approximating the bottom 34 but not touching the same and this wall being held from any longitudinal movement. Thus upon the backward movement of the trough-shaped conveyor, the material in the conveyor will strike against this wall 56 and thus the material will be forced forward relative to the bottom and discharged out into the spout. The reciprocation of the conveyor will also cause a certain amount of material to be discharged into the spout and thus into the buckets of the elevator. The amount of material which may be discharged may be varied by changing the stroke of the crank 27. In ordinary practice this crank will be adjustable to provide either an 8″ or 10″ stroke. Any suitable means may be used for varying the stroke of this crank. The depending plates 29 are further braced from movement by braces 57 which are riveted to the forward plates 45 and to braces 58 on the frame 14. Preferably a hopper 59 (see Fig. 2) will be mounted to discharge into the space between the depending plates 29, the hopper walls forming part of the side walls or being operatively connected thereto and preferably extending across the hopper will be a plurality of bars 60 spaced from each other to form a grate or screen.

The operation of this mechanism will be obvious from what has gone before. The operation of the elevator will cause the operation of the crank 27 and this will cause the reciprocation of the trough-shaped conveyor and the gradual and uniform discharge of material into the buckets of the endless conveyor, thus preventing any flooding of the elevator buckets with material and permitting the bucket to carry up a uniform amount. The reciprocation or shaking of the trough-shaped conveyor will cause the material to spread out evenly from the conveyor and, of course, will be evenly discharged therefrom.

It is to be noted particularly that the construction of the trough-shaped conveyor is such that it will resist wear incident to the constant shifting of material over the face of the conveyor and that when the false bottom or inner bottom 34, which is formed of quarter-inch thick plate, becomes too much worn and useless, it may be readily removed and a new plate put in place, and furthermore that the angle irons 33 and the plate 32 are of relatively heavy material and are very rigidly connected to the equalizing bar so as to resist the strains which are incident to the constant reciprocation of the conveyor with its load.

The equalizer bar 37 is pivotally connected at its middle to the trough bottom 34 so that when the erector sets this plant up the screening plant and feeder do not have to come on an exact line in order to get the side arms to fit and there will be no more stress on one side than on the other when the device is working. The spout 48 directs the material to the buckets on the elevator, and one of the purposes of hinging this spout is so that when a large stone falls down one of the buckets and catches the under side of the spout, the hinge will allow the spout to shift and give sufficiently to permit the stone to pass and not bend the bucket out of shape.

In the construction shown in Figure 1, I have shown this mechanism as applied to an ordinary gravel screening plant where the gravel is drawn to the hopper by horses and small slip scrapers. The bars 60 under these circumstances act as a guard to prevent too large stones from getting in and clogging up the feeder or elevator. The railroad rails 12 are simply short rails put down in the pit for clamping the feeder to. It will be obvious, of course, that this mechanism might be readily utilized for receiving gravel and the like from cars.

The mechanism is relatively simple, has been found to be thoroughly effective in actual practice and will not readily get out of order. Of course, it will be understood that means is provided whereby the sprocket wheel 20 may be operatively connected to or disconnected from the shaft 18, this means being an ordinary clutch so that it is not necessary to operate the feeding mechanism while the elevator is being operated.

I claim:—

1. A feeding mechanism of the character described including parallel, downwardly extending side walls held from movement, a reciprocatable trough-shaped conveyor having side walls extending up exterior to the first named side walls, means for supporting the conveyor for reciprocating movement, and means for reciprocating the conveyor.

2. A feeding mechanism of the character described including parallel, downwardly extending side walls held from movement, a reciprocatable trough-shaped conveyor having side walls extending up exterior to the first named side walls, hangers depending from the first named side walls, and rollers carried by said hangers and upon which the bottom of the conveyor rests.

3. A feeding mechanism of the character described including parallel, vertical side walls, a reciprocating trough-shaped conveyor mounted below the side walls for reciprocation relative thereto, means for reciprocating the conveyor including an equalizer bar attached to the trough-shaped conveyor and extending laterally on each side beyond it, a crank shaft having cranks, and connecting rods connecting the cranks to said equalizer bar.

4. A feeding mechanism of the character described including rigid side walls spaced from each other, a trough-shaped conveyor disposed below the lower edges of the side walls and having side walls embracing the first named side walls, rollers operatively supported from the first named side walls and supporting the conveyor for reciprocating movement, power operated means for reciprocating the conveyor, and a spout operatively supported upon the said side walls at one end thereof and into which the forward end of the reciprocating conveyor discharges.

5. A feeding mechanism of the character described including rigid side walls spaced from each other, a trough-shaped conveyor disposed below the lower edges of the side walls and having side walls embracing the first named side walls, rollers operatively supported from the first named side walls and supporting the conveyor for reciprocating movement, power operated means for reciprocating the conveyor, and a spout operatively supported from said side walls at one end thereof and into which the forward end of the reciprocating conveyor discharges, said spout being angularly adjustable.

6. A conveying mechanism of the character described comprising parallel side walls, a trough-shaped conveyor mounted below said side walls and including a transverse concave bottom plate having its margins extending beneath the side walls and including angle irons formed to provide side walls embracing the first named side walls, supporting means for the conveyor, and means for reciprocating the conveyor.

7. A feeding mechanism of the character described including side walls, a trough-shaped conveyor mounted below the side walls and including a bottom plate, angle irons attached thereto and extending upward exterior to the side walls, an inner bottom, transversely concave having its margins extending beneath the side walls, filling pieces between the first named bottom and the inner bottom and power operated means for reciprocating the conveyor.

8. A feeding mechanism of the character described including side walls, a trough-shaped conveyor mounted below the side walls and including a bottom plate, angle irons attached thereto and extending upward exterior to the side walls, an inner bottom transversely concave having its margins extending beneath the side walls, filling pieces between the first named bottom and the inner bottom, power operated means for reciprocating the conveyor including an equalizer bar extending beneath the conveyor, a yoke bolted to the first named plate and embracing the equalizer bar, and a bolt passing through the inner bottom plate and through the yoke and equalizer bar, the head of said bolt being countersunk in the inner bottom.

9. A feeding mechanism of the character described including parallel, vertical side walls, a reciprocating conveyor coacting with the side walls for reciprocation relative thereto, means for reciprocating the conveyor including an equalizer bar operatively pivoted at its middle to the middle of the conveyor and extending laterally on each side, connecting rods swingingly connected to the ends of the equalizer bar, and power operated means for reciprocating the connecting rods.

10. The combination with a main conveyor, of an auxiliary conveyor discharging thereinto and including a reciprocatable conveying member, a power driven crank shaft mounted upon the frame of the main conveyor and extending approximately at right angles to the longitudinal axis of the auxiliary conveyor, an equalizer bar operatively pivoted to the bottom of the conveying member and projecting laterally therefrom, and connecting rods engaging the ends of the equalizer bar and said crank shaft.

11. In a structure of the character described, a pit, an elevator extending into the pit at one end, rails extending transversely across the pit, a frame disposed below the rails and including side members, angle irons resting upon the webs of the rails, eye-bolts attached to the side members and extending up through said angle irons whereby said frame including the side members is supported from the rails, and a reciprocatable trough extending between the side members and supported thereby.

12. In a structure of the character described, a pit, an elevator extending into the pit at one end, railroad rails extending transversely across the pit, a conveyor discharging into the elevator and disposed within the pit and comprising side members and a trough-shaped member associated with the side members and forming the bottom of the conveyor, means for supporting the trough-shaped member for reciprocation relative to the side members, and means for supporting said side members comprising eye-bolts extending in divergent relation upward from the side members, and angle irons for each rail, through one flange of which the corresponding eye-bolts pass and the other flange resting upon the base of said rails.

In testimony whereof I affix my signature.

HOWARD F. GORSUCH.