

No. 855,744.

PATENTED JUNE 4, 1907.

P. ARGALL.
ORE DISTRIBUTER.
APPLICATION FILED MAY 18, 1906.

4 SHEETS—SHEET 1.

Fig. 1

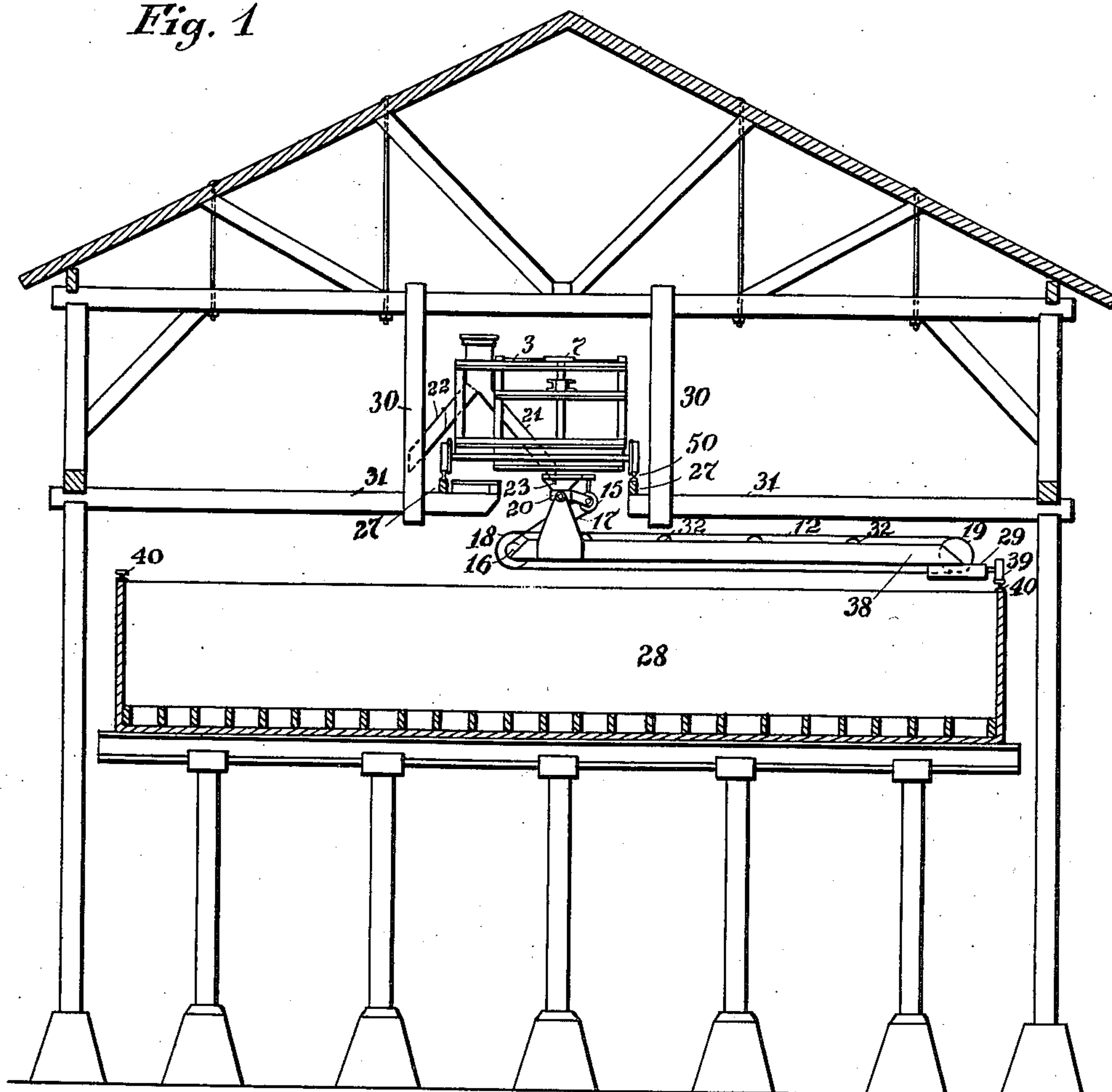
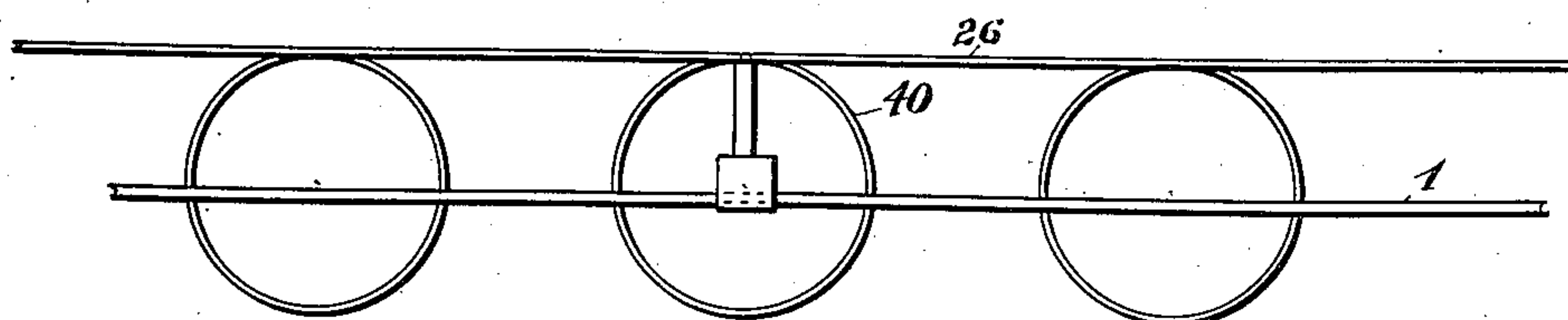


Fig. 4



Witnesses
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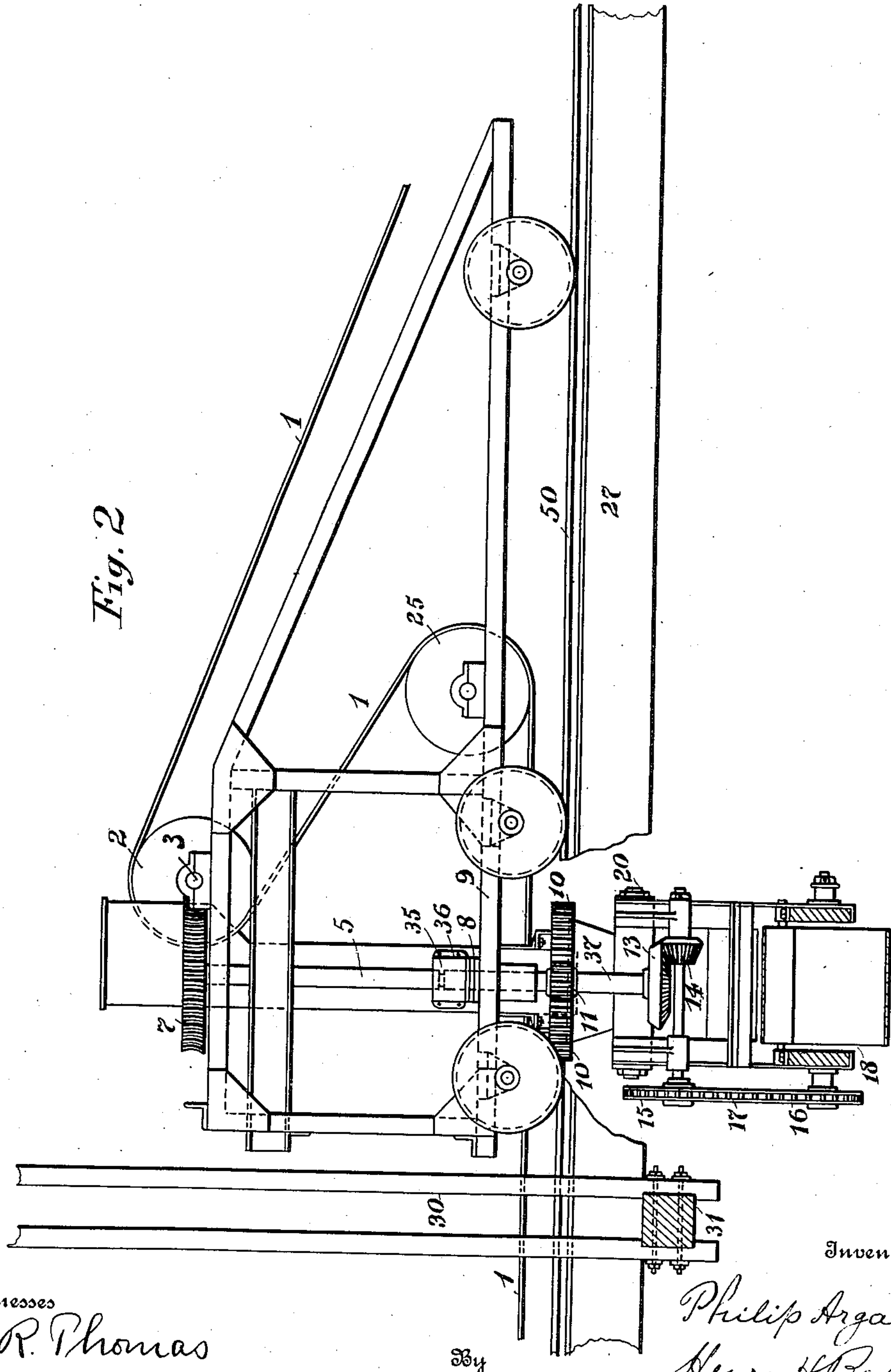
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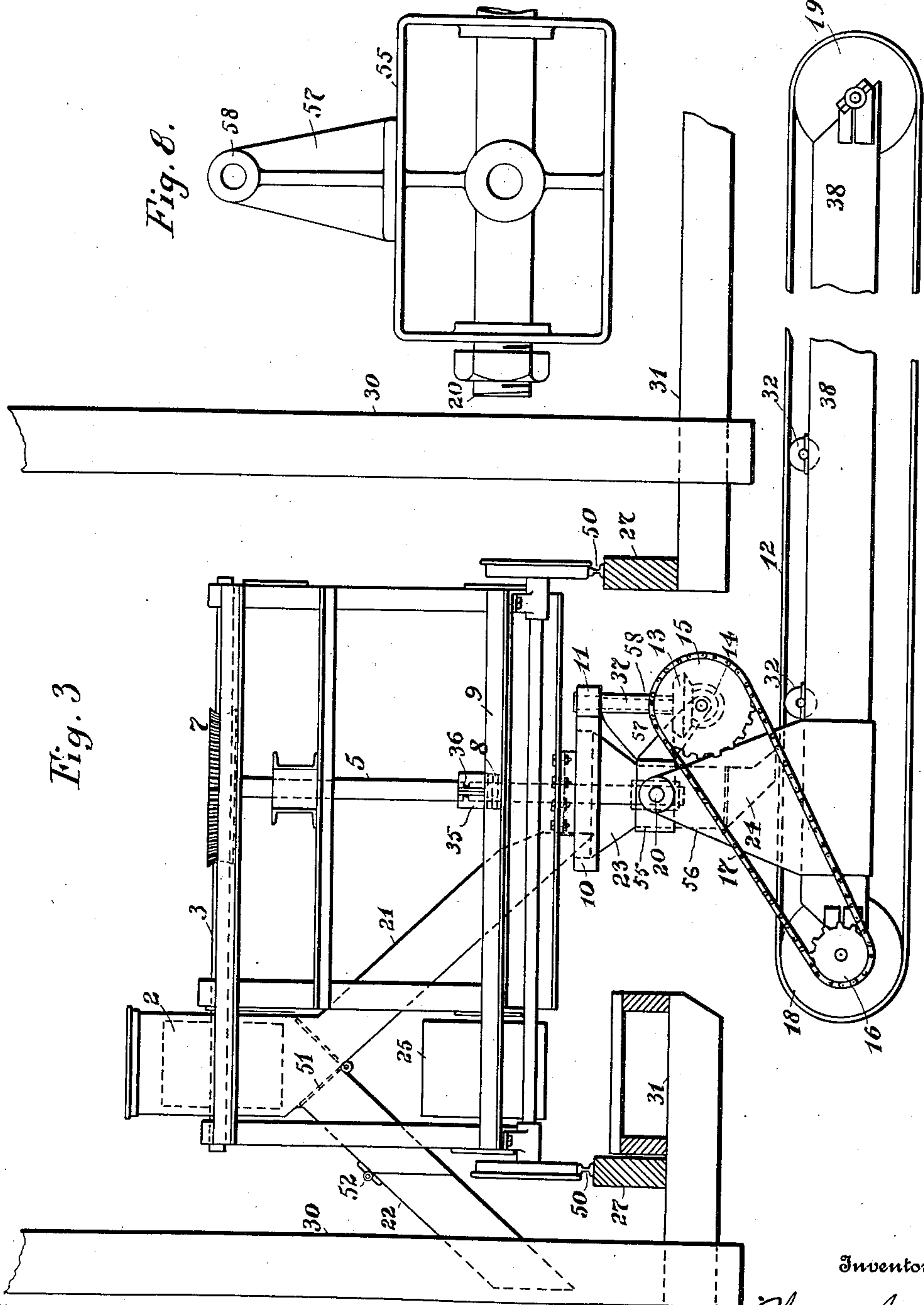
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4 SHEETS—SHEET 3.



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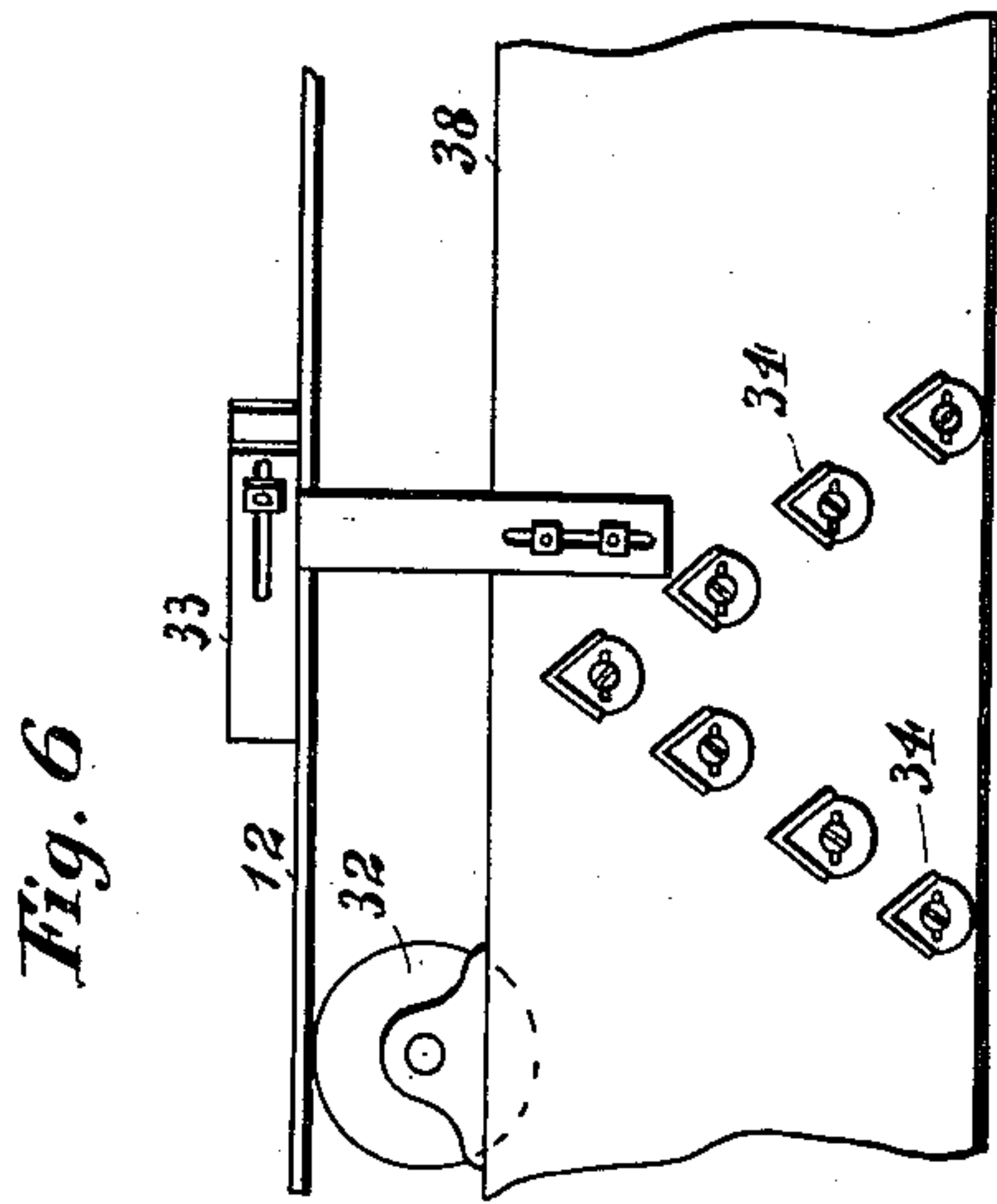
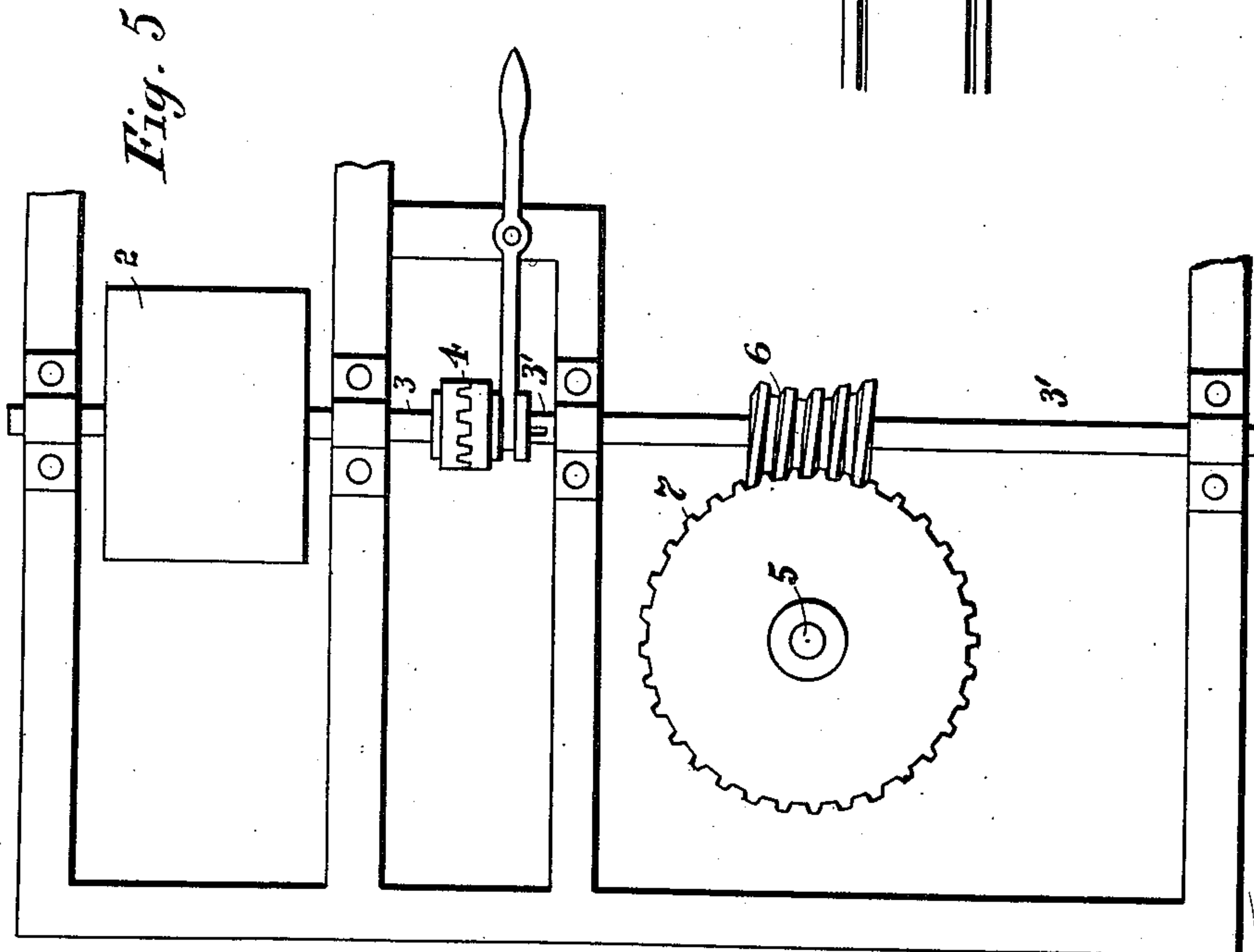
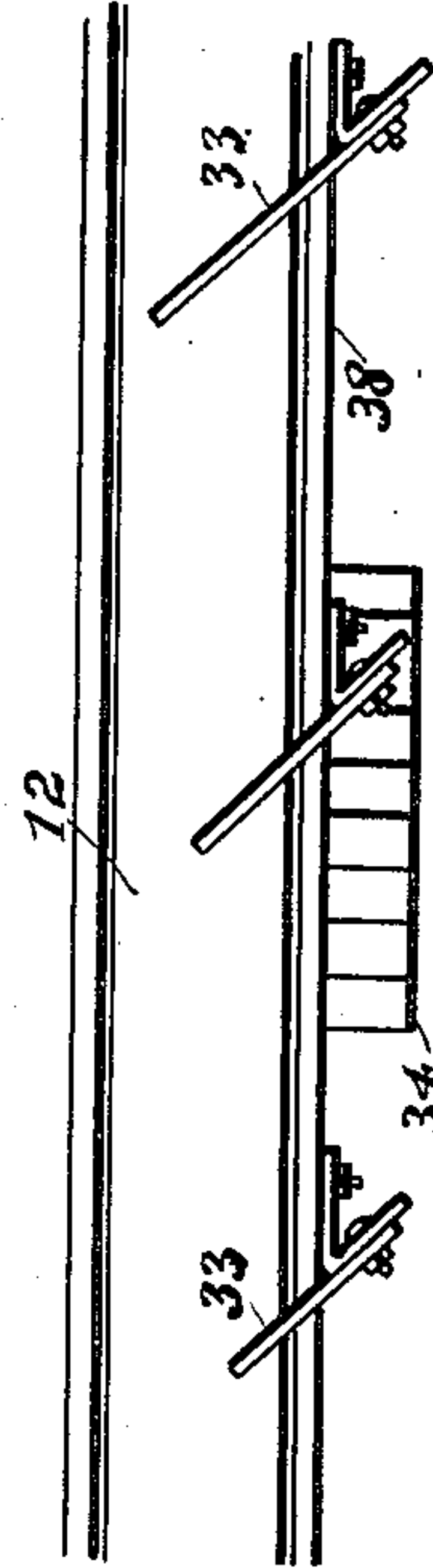


Fig. 7



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UNITED STATES PATENT OFFICE.

PHILIP ARGALL, OF DENVER, COLORADO.

ORE-DISTRIBUTER.

No. 855,744.

Specification of Letters Patent.

Patented June 4, 1907.

Application filed May 18, 1906. Serial No. 317,485.

To all whom it may concern:

Be it known that I, PHILIP ARGALL, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Ore-Distributers, of which the following is a specification.

My invention relates to the conveying of ore or other pulverulent material and its distribution in regular and even layers in tanks or vats for treatment, and more particularly to the conveying and distribution of metalliferous sands or ores in the lixiviation departments of cyanid plants, where the tanks are usually circular and arranged in one or more straight lines, so that they can be filled from cars passing successively over them, or from a belt conveyer arranged along the center line of the tanks and dumping the ore at intervals into them, whence ordinarily it is shoveled from the center toward the sides and leveled by hand labor. These sands have also been distributed by fans, somewhat similar to those used in distributing grain, such being mounted on a traveling bridge spanning the tanks, whence the sand is showered over the tanks, the fans being driven at high speed. The objection to such means, apart from its high initial and operating cost is that it tends to both size and concentrate the ore, the heavier particles passing toward the periphery and the lighter and finer particles falling near the center of the tanks. This sizing and partial concentration of the ore is quite objectionable in the treatment of high grade ores, and moreover suitable electric power to operate such a distributor is not often available.

These deficiencies in the art have led to the present improvements, the object of which is to provide a simple and efficient apparatus, operated mechanically, which shall convey and automatically distribute, over a series of tanks, bins or vats, in regular and even layers, well mixed and homogeneous, the pulverulent ores or metalliferous sands with which it is required to fill them. To this end I arrange a single belt conveyer over the series of tanks, parallel with and adjacent to the central line thereof, usually suspended from the roof timbers, but the ways and track for the conveyer and trippers may be supported from the tank foundations, or in any other suitable manner. Belt conveyers and self propelling trippers to dump the ore off the belt at any given point within the range

of the trippers are in common use, and so far I lay no claim to novelty, but my invention consists primarily in the addition to the tripper of automatic means for evenly conveying and distributing from the tripper when located over the center of a given tank the pulverulent material from the center to the circumference in even non-concentrated layers, said means being preferably actuated by the same power which propels the trippers. Its leading elements are a vertical rotatory shaft operated at slow speed preferably from the belt wheel of the trippers, at the bottom of which shaft a short horizontal belt conveyer, which I call the radial distributor, of a radius to suit the size of the tank, rotates with the shaft and at the same time moves from the center outward by its conveying portion to move the ores radially outward to all parts, suitable means being provided to cause the radial distributor to dump its load in definite proportions as it travels outward, in such relative quantities as to insure an even distribution of the ore throughout the whole area of the tank from center to periphery.

In the drawings forming a part of this specification: Figure 1 shows the movable tripper on its ways supported from the roof timbers, the vertical shaft of the radial distributor mechanism being central over one of the tanks in the line of the series, and the belt distributor extending horizontally from the center to the circumference of the tank. Fig. 2 shows a side view of the movable tripper on its ways, the main conveyer belt by which it is driven, the vertical shaft (the sustaining sleeve being omitted for clearness), and the mechanism of the radial distributor in end view. Fig. 3 shows the mechanism of the radial distributor in enlarged view, the head wheel with the gear connections by which the radial distributor is operated from the main conveyer belt, the chute for conveying the dumped ore to the radial distributor, and the details of the mechanism of said radial distributor. Fig. 4 shows in plan a line of circular tanks with the main conveyer belt located over the same, near the central line, the position of a radial distributor central over one of the tanks, and the outer straight rail for supporting the outer end of the radial distributor in shifting from one tank to another. Fig. 5 shows a plan view of the head wheel, the mechanism which conveys motion from it to the radial distributor, and the means for engaging and disengaging

said mechanism. Fig. 6 shows in side view adjustable deflectors which serve to remove the load of ore from the radial distributor belt in measured quantity, with the angular diffusing plates which spread the ore evenly in its fall. Fig. 7 shows the said deflectors in plan view over the radial distributor belt. Fig. 8 is a plan view of the rectangular spider frame secured to foot of rotatory vertical shaft 5, showing the means for supporting the short upright revolving shaft, and for sustaining the pivoted member which carries the radial distributor belt.

1 is the main conveyer belt, driven from a source not herein shown, passing in a sinuous curve around head wheel 2 and bottom wheel 25 of the movable tripper, which latter derives its motion to and fro on its ways in the usual manner from said belt, through gears not shown because forming no part of the present invention.

3 is the shaft of head wheel 2, divided into two sections 3 and 3' by clutch 4, by means of which the two sections are connected and disconnected at will. 5 is the vertical rotatory shaft of the radial distributor, driven preferably from said head wheel by suitable gear connections, with means to engage and disengage said connections. There must also be a provision to lock said gears in a fixed position when the head wheel is disconnected, as when the tripper carriage is to be moved from tank to tank. The form of gearing which I have chosen for illustration, and which I prefer on account of its simplicity, is the worm 6 on shaft 3', meshing with worm wheel 7 on vertical shaft 5, which forms an efficient lock against movement when disconnected, thus precluding the necessity for separate locking means, which however I may employ when other forms of gearing are resorted to.

8 is a thrust collar which supports the weight of the rotatory vertical shaft 5 and connected mechanism on the bottom member 9 of the tripper, said shaft being channeled at 35 to engage corresponding bearings in separable collar 36, which affords a seat for the rotatory shaft on thrust collar 8.

10 is a fixed gear wheel bolted to the bottom of the tripper carriage to mesh with a pinion 11 on short upright shaft 37, which is carried around by the vertical shaft 5 in its revolutions, and is at the same time rotated, imparting motion to distributor belt 12 through bevel gears 13, 14, sprocket wheels 15, 16, drive chain 17, and driving wheel 18. The upright shaft 37 with its attachments is supported as follows: 55 is a rectangular spider frame firmly secured to the foot of the vertical shaft 5 and rotates with it. To the top of this spider frame is secured the hopper 23, and to its bottom is secured the hopper 24, both hoppers rotating with the frame and with the vertical shaft. A bracket arm 57 extends outward from this frame carrying a

sleeve 58 in which the short upright shaft 37 is revolvably supported, with its gear attachments. The member 56 is also pivotally secured to frame 55 by bolts 20, and carries the inner extremity of the radial distributor or conveyer, the conveyer belt of which is mounted on frame 38, which carries at its extremity the tail pulley 19, preferably mounted in take-up boxes to permit adjustment of the belt tension. There is an extension 29 on the frame 38 (shown in Fig. 1), carrying a wheel or wheels 39 traveling on circular rail 40 and straight rail 26 to support the outer end of the radial distributor, and aid it to pass from one tank to another in shifting the position of said distributor. Also to support the outer end of the distributor by its wheeled carriage on the railed edge 40 of the tank, on which it travels as it revolves. Said straight rail is located at the outer edge of the circular tanks in line for the purpose of sustaining the wheeled carriage 39 as it travels from one tank to another. The member 56 pivoted on frame 55 and rotating with vertical shaft 5 sustains the main weight of the radial distributor and actuating mechanism and transfers it to the tripper carriage and supporting rails 50 by means of thrust collar 8 and separable collar 36. This joint permits the outer end of the distributor to seek a free bearing on the circular rail 40 by its wheeled carriage, and thus properly divide the weight between the vertical shaft and the outer rail or rails in spite of any irregularity.

21, 22 is a branched chute for delivery of the ore from the main belt to hopper 23 of the radial distributor. Of said chute the branch 21 is the one ordinarily in use, the branch 22 being only for use in an emergency while the radial distributor is being adjusted. A gate 51 is provided to cut off the branch not in use, and the branch 22 is hinged as at 52 to avoid contact with the framework when in transit. Beams 30 and 31 suspend from the roof timbers and sustain the weight of the way beams 27 and track rails 50 for the traveling tripper. Said ways and rails are located longitudinally over the line of tanks, so as to bring the vertical shaft of the distributor over the center of each tank in succession.

32 are rollers on member 38 to support distributor belt 12. 33 are adjustable deflectors provisionally affixed to member 38 to extend over said belt 12 at suitable intervals, in such manner as to deflect over the side of the belt at various points a proportional quantity of ore to insure uniform distribution throughout the tank.

34 are adjustable diffusing plates located on sides of frame 38 to spread the falling ore and contribute to its equal distribution.

28 is one of the tanks of the series, shown in section.

The operation is as follows: The self pro-

pelling tripper having been brought over the center of one tank of the series, pulverulent material is fed on to the moving main conveyor belt, and carried over the head wheel of the tripper in the usual manner, but instead of falling in a heap in the center of the tank as heretofore, to be distributed by more or less skilled hand labor, this invention provides for its reception by novel mechanism which insures its equal distribution from the center outward to the periphery of the tank by automatic means. The tripper being placed in fixed position centrally over the tank, as above stated, and the distributor mechanism being thrown into gear, the stream of pulverulent ore enters a hopper (23) whence it drops through the arms of the spider frame 55 and passes to a deflecting hopper (24) which shoots it onto the distributor belt in the direction of its travel, which is from the center of the tank outward. On its way suitable means remove from the belt at various points definite proportions of the material to evenly distribute it throughout the area of the tank as the distributor belt slowly rotates, the two simultaneous movements, circular and radial, thus covering every point of the tank surface with its due proportion of material without the requirement of any thought or skill, in a manner vastly superior to the results of hand labor. When one tank is properly filled the ore supply is shut off from the main belt, the distributor mechanism is thrown out of gear, and the tripper is moved by the usual means to the center of the next tank of the series. Before moving, care is taken in each case to set and lock the radial distributor belt frame at right angles to the line of travel, the outer end of said frame being supported by wheel carriage 39 on the straight rail 26, whereby its transit is facilitated. Having taken its new position the ore supply is turned on, the radial distributor mechanism is thrown into gear, and the filling recommences.

Various means may be employed to remove the material in graduated quantities from the distributor belt, which readily suggest themselves, but for purposes of illustration I have shown the adjustable deflectors 33 and the angular diffusing plates 34 as a simple and easily applied means, to which however I do not confine myself. The essential invention lies in the automatic means for radial and equable distribution of pulverulent material in a circular tank of a series, in coöperation with the mechanism which delivers the said material to the tripper and moves the tripper from place to place.

I claim, and desire to secure by Letters Patent:

1. In an ore distributor, means for carrying pulverulent material to a required point, a conveyer mounted to receive said material

as discharged, and to rotate angularly in a horizontal plane about said point of discharge, means to rotate said conveyer in said plane, means to cause a longitudinal travel of said conveyer simultaneously with said rotation, whereby the material is moved radially from the center, and means connected with said conveyer for removing material therefrom during its outward travel, substantially as specified.

2. In an ore distributor, a main conveyer for carrying pulverulent material, an endless belt conveyer mounted to receive the discharge from said main conveyer and to rotate angularly in a horizontal plane, means to rotate said belt conveyer in said plane, means to cause a longitudinal travel of said belt conveyer while rotating, and means connected therewith for removing material therefrom during the outward travel of said material, substantially as specified.

3. In an ore distributor, a main conveyer belt, a head wheel over which said belt discharges, a conveyer mounted to receive the discharge from said main conveyer belt and to rotate angularly in a horizontal plane about said point of discharge, means to rotate said conveyer in said plane, means to cause a longitudinal travel of said conveyer radially while rotating, and means connected therewith for removing material therefrom in proportional quantities during its outward travel, substantially as specified.

4. In an ore distributor, a main conveyer belt, a movable tripper carriage, a head wheel for said belt, on said carriage, a vertical rotatory shaft borne on said carriage, with gear connections to said head wheel, a horizontal distributor belt borne by said vertical shaft, at its foot, rotating with the same, mechanism to give progressive radial movement to said distributor belt while rotating with the shaft, and means for removing at intervals portions of the material carried on said distributor belt, substantially as specified.

5. In an ore distributor, a main conveyer belt for the conveyance of pulverulent ore, a tripper carriage mounted movably on track ways, a head wheel on said carriage receiving motion from said conveyer belt, a vertical rotatory shaft on said carriage mechanically connected with said head wheel, a horizontal distributor belt borne by said vertical shaft at its foot, and rotating with it, means for giving progressive radial movement to said distributor belt while rotating with said shaft, means for delivering pulverulent material from said conveyer belt to the distributor belt at a point near to the center of rotation, and means for deflecting portions of said material off from said distributor belt at various points, substantially as specified.

6. In an ore distributor, a tripper carriage mounted movably on trackways, a head

wheel on said carriage, a vertical rotatory shaft connected by gearing to said head wheel, borne on said carriage, a horizontal distributor belt carried by said rotatory shaft, means for giving radial movement to said distributor belt as it rotates with the shaft, a main conveyer belt running on said head wheel, for delivering ore to the tripper, a chute for receiving the dumped ore, a hopper near the vertical shaft for delivering the dumped ore to the distributor belt, and means for removing the ore from the distributor belt in portions as it travels radially outward, substantially as specified.

7. In an ore distributor, a main conveyer belt, a tripper carriage mounted movably on trackways, a head wheel on said carriage driven by said conveyer belt, a vertical rotatory shaft on said carriage mechanically connected with said head wheel, clutch mechanism between said head wheel and said vertical shaft for engaging and disengaging the connections between the same, means for locking the vertical rotatory shaft and connections in a fixed position when out of gear with the head wheel, a horizontal radial distributor belt carried by the vertical shaft at its foot, rotating with said shaft, and means for operating said distributor belt as a radial carrier while rotating with said vertical shaft, substantially as specified.

8. In an ore distributor, a main conveyer belt, a tripper carriage mounted movably on trackways, a head wheel on said carriage driven by said belt, a vertical rotatory shaft on said carriage, intervening mechanism between said head wheel and said vertical shaft through which the latter is operated, a radial distributor belt carried on said vertical shaft and rotating with it, means for operating said distributor belt radially while rotating, and anti-friction means for supporting the outer end of the radial distributor belt in its travel, substantially as specified.

9. In an ore distributor, a main conveyer belt, a tripper carriage mounted movably on trackways, a head wheel on said carriage over which said belt runs and discharges, a vertical rotatory shaft on said carriage connected operatively with said head wheel, a horizontal distributor belt at the foot of said vertical shaft, rotating with it, means for operating said distributor belt radially while rotating, and adjustable deflectors located near

said distributor belt at intervals to remove prescribed portions of the material carried by said belt, substantially as specified.

10. In an ore distributor, a tripper carriage, a horizontal distributor belt mounted thereon, with means for rotating said belt in a horizontal plane, means for operating said distributor belt radially while rotating, deflectors located near said radially moving distributor belt at intervals to remove prescribed portions of the material carried on said belt, and diffusing plates located to intercept the falling material and spread it equably over the surface beneath, substantially as specified.

11. In an ore distributor, in combination with a series of circular tanks in line, a main conveyer belt located over said line, a trackway for a tripper carriage over said line of tanks, a tripper carriage mounted movably on said trackways, a head wheel on said tripper carriage driven by said main belt, a radially movable distributor belt mounted on said carriage to rotate in a horizontal plane, mechanism for rotating the same, connected with said head wheel, means for operating the distributor belt radially while rotating, and means for deflecting prescribed portions of ore carried on said distributor belt, substantially as specified.

12. In an ore distributor, a movable tripper carriage, a vertical rotatory shaft thereon, a fixed gear wheel concentric with said vertical rotatory shaft, a short upright shaft connected with said vertical rotatory shaft so as to be carried around by it as it revolves, a pinion on said short upright shaft meshing with said fixed gear wheel, whereby said short shaft is rotated while revolving, a horizontal distributor belt at the foot of said vertical shaft, revolving around and with it, and intermediate gearing between said short upright shaft and said distributor belt whereby the latter receives radial motion from the former while carried around in a circular sweep by the rotation of said vertical shaft, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PHILIP ARGALL.

Witnesses:

JAMES A. McCLURG,
L. R. SCOTT.