

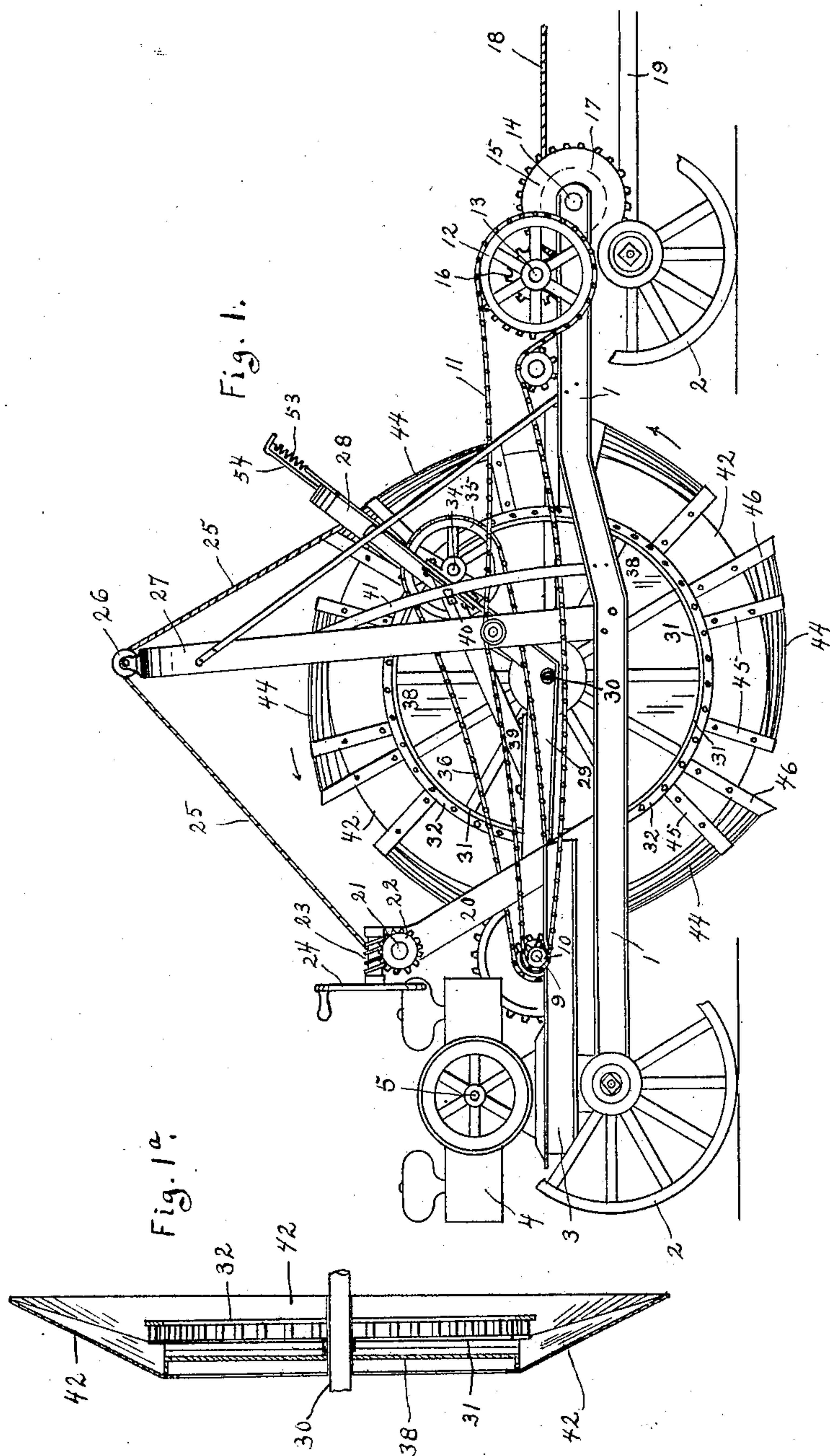
No. 887,129.

PATENTED MAY 12, 1908.

B. M. ROLPH.  
DITCHING MACHINE.

APPLICATION FILED JULY 19, 1906.

5 SHEETS—SHEET 1.



Inventor

Witnesses

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J. B. Lewis

Benjamin M. Rolph,  
Walter N. Haskell,  
his Attorney

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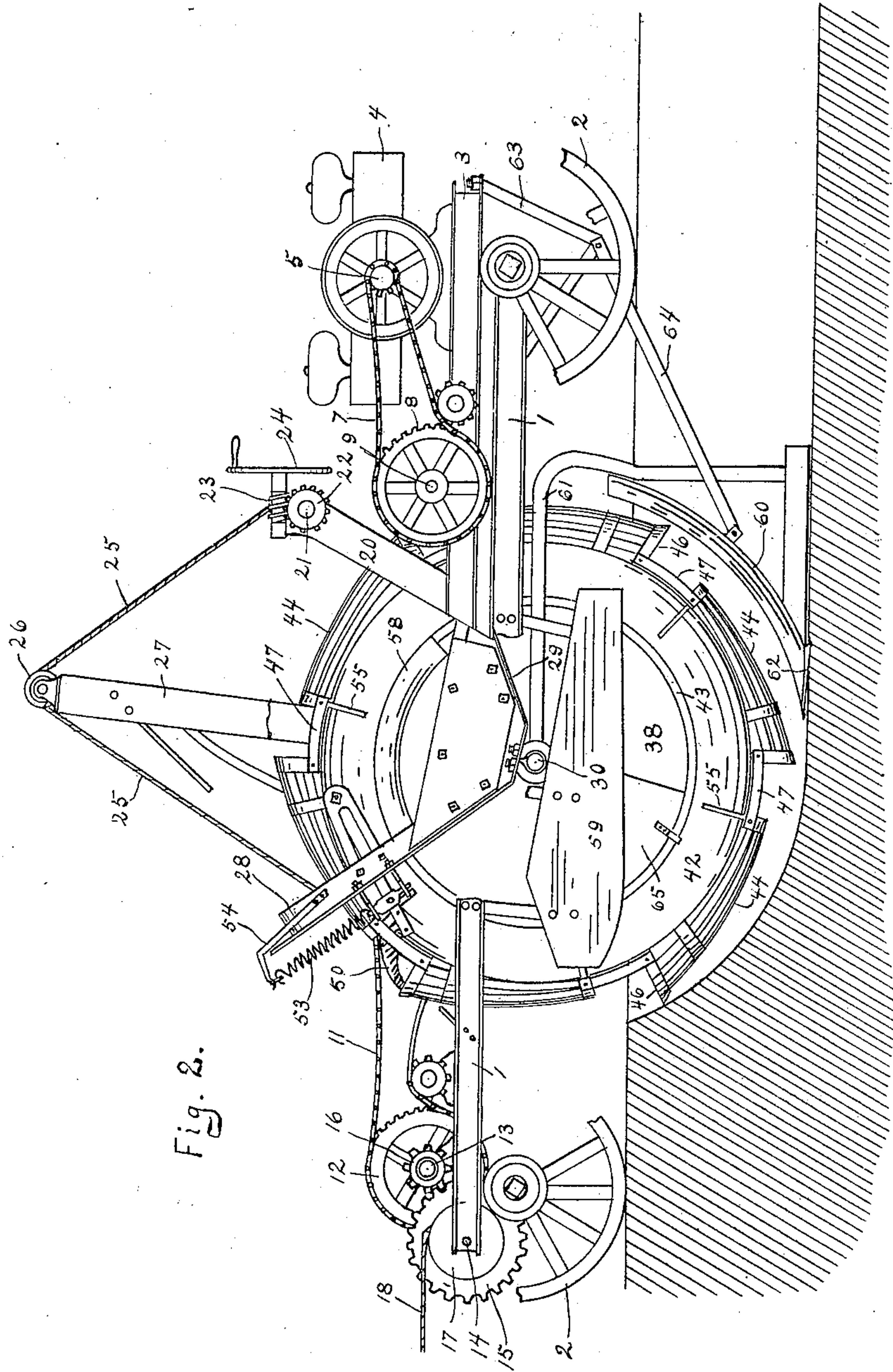


Fig. 2.

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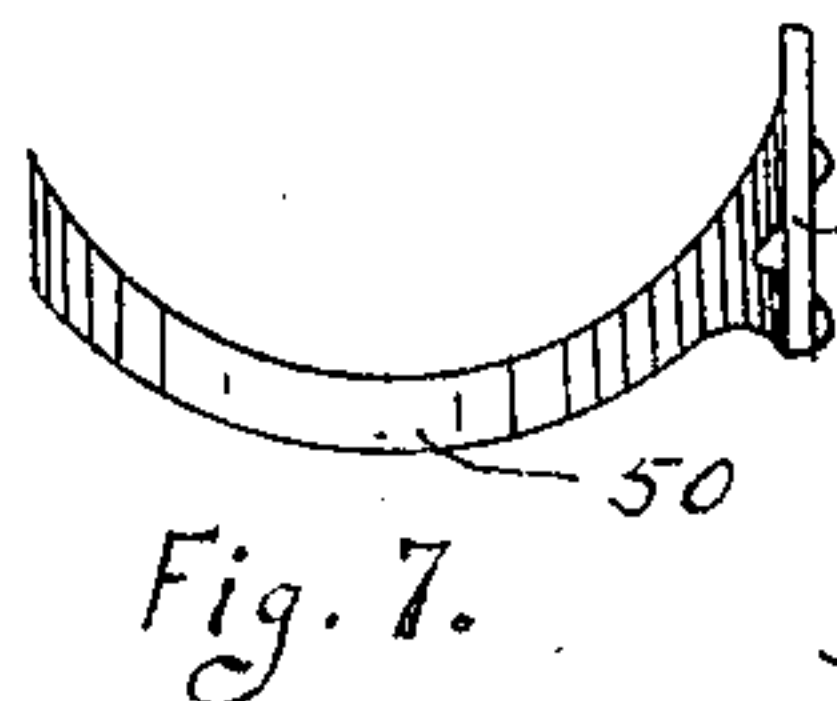
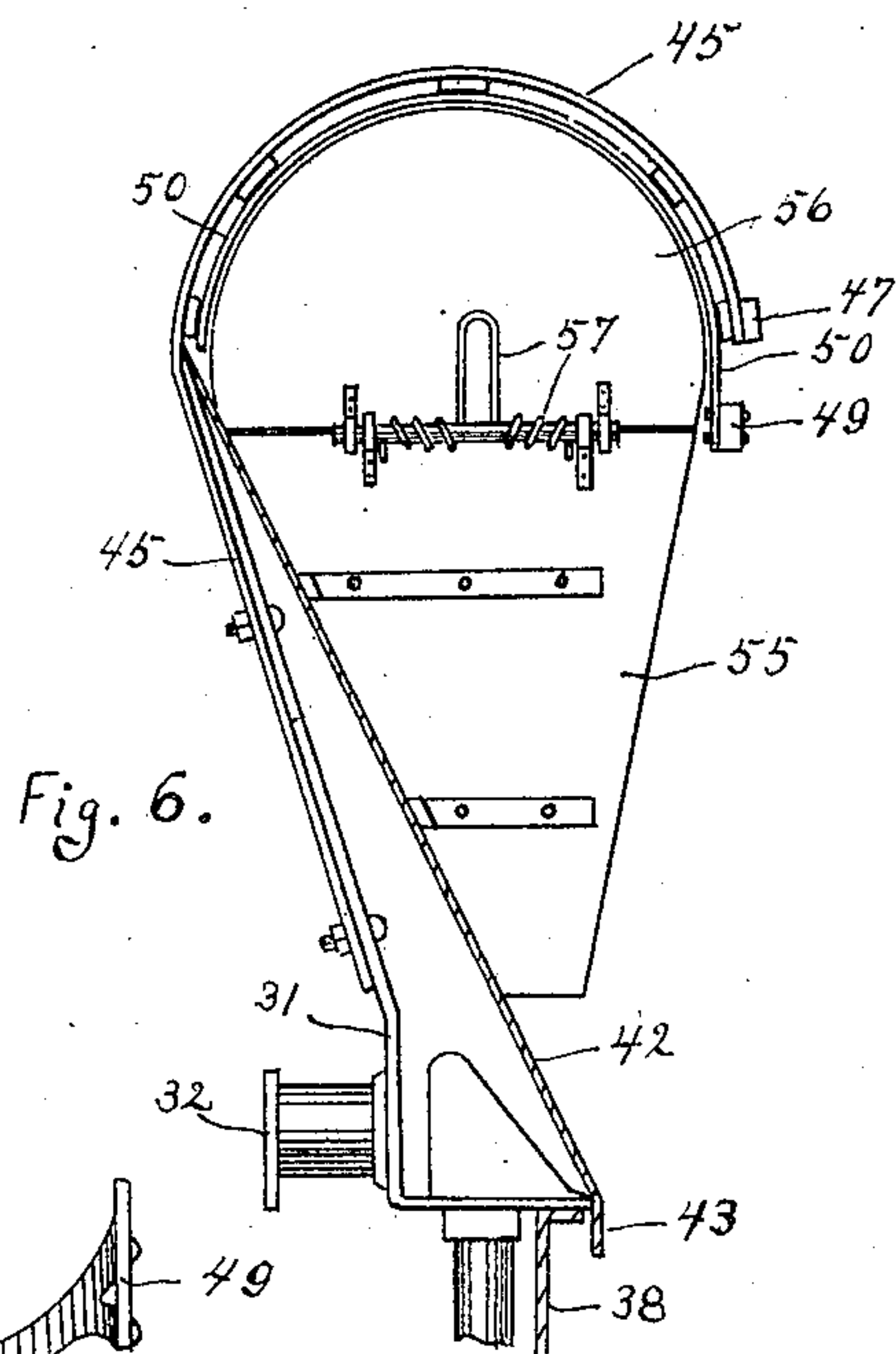
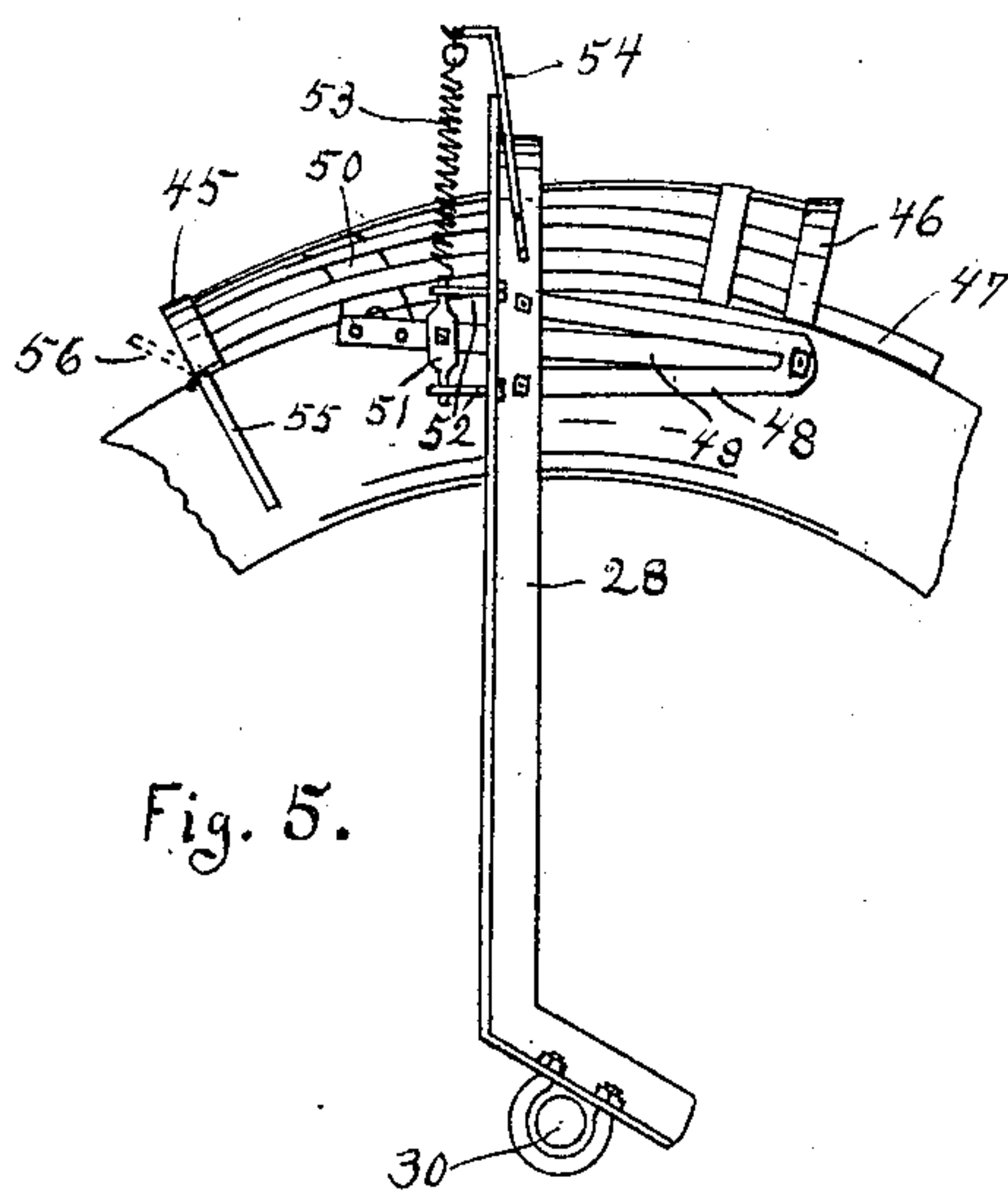
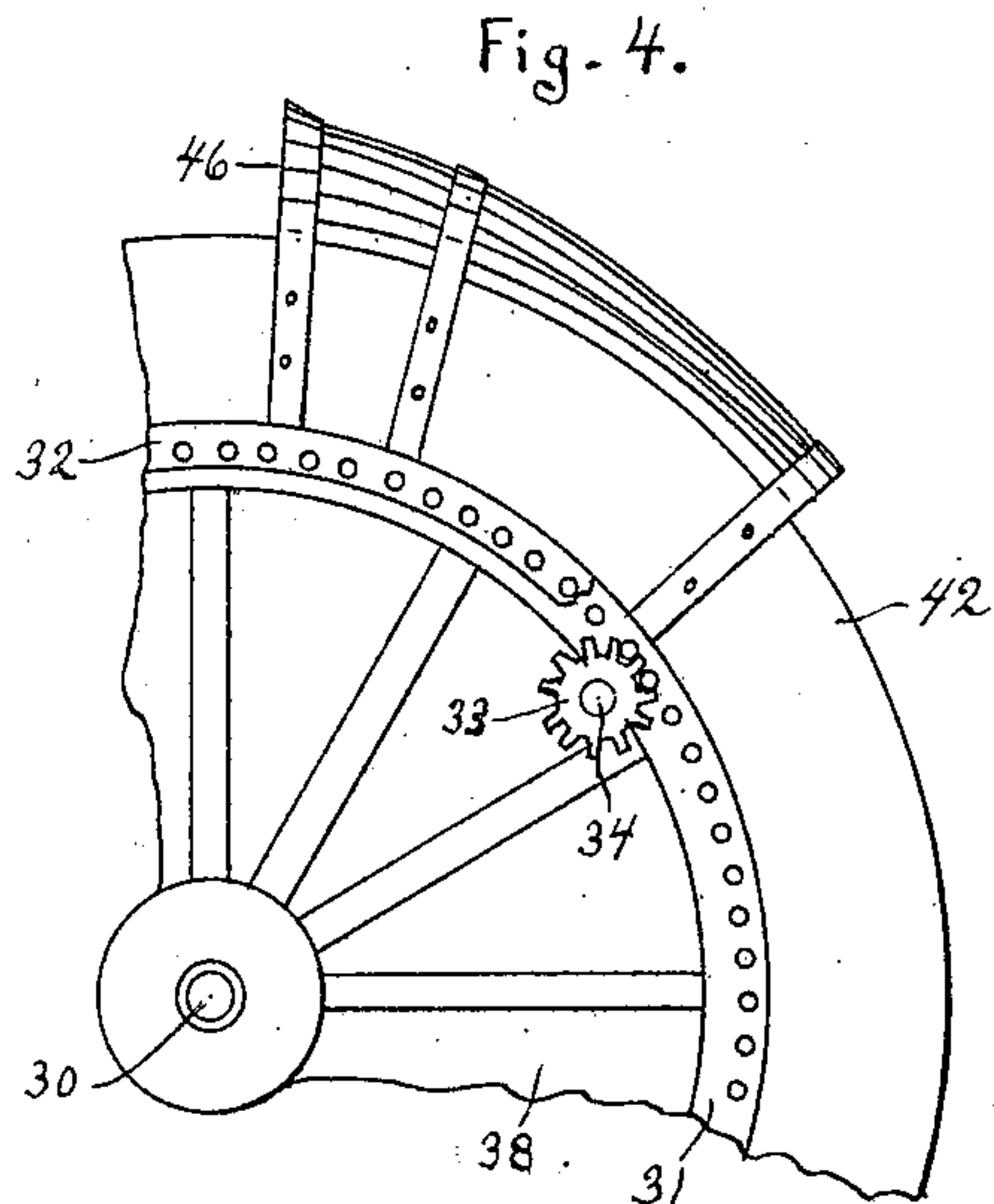
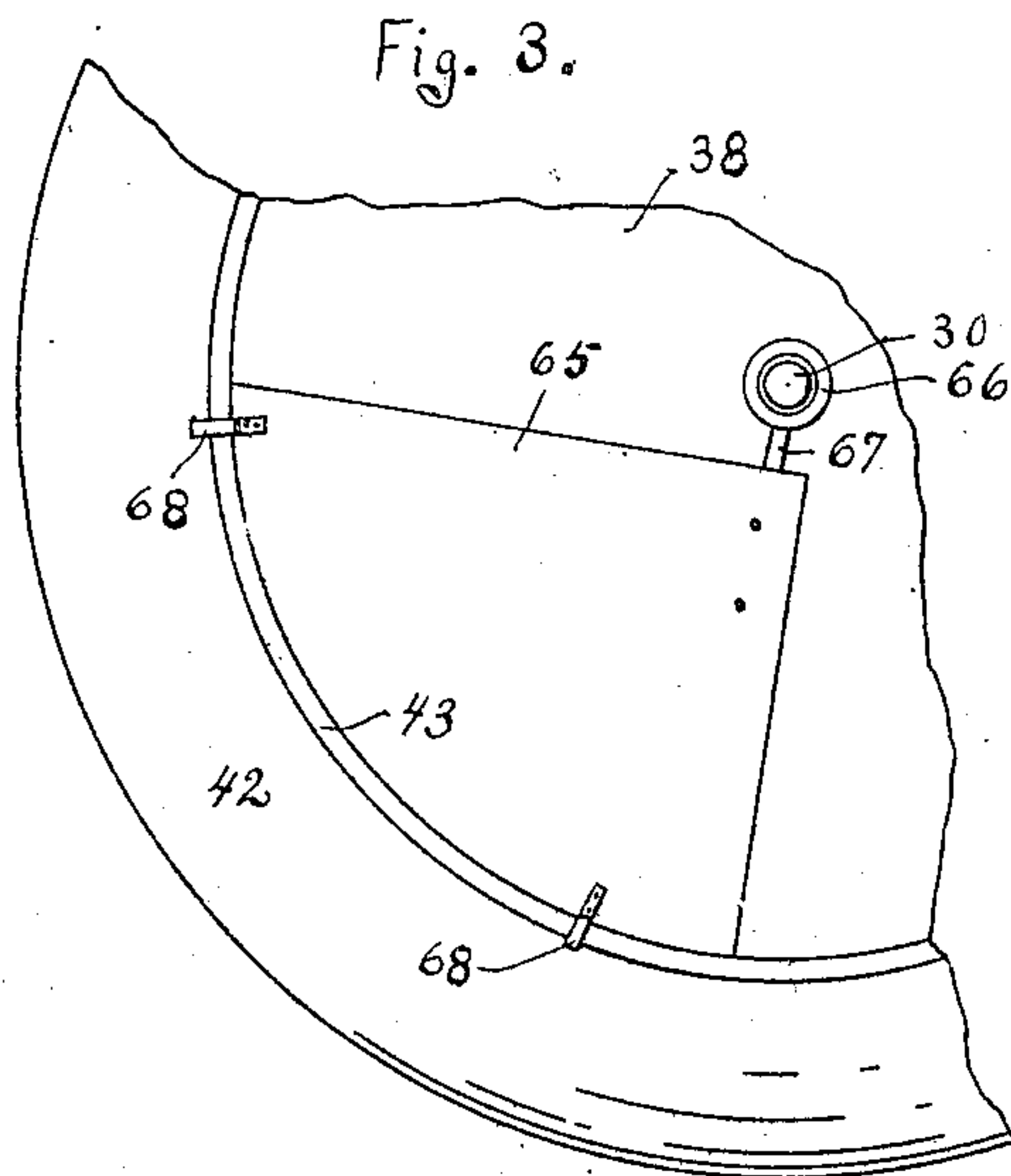
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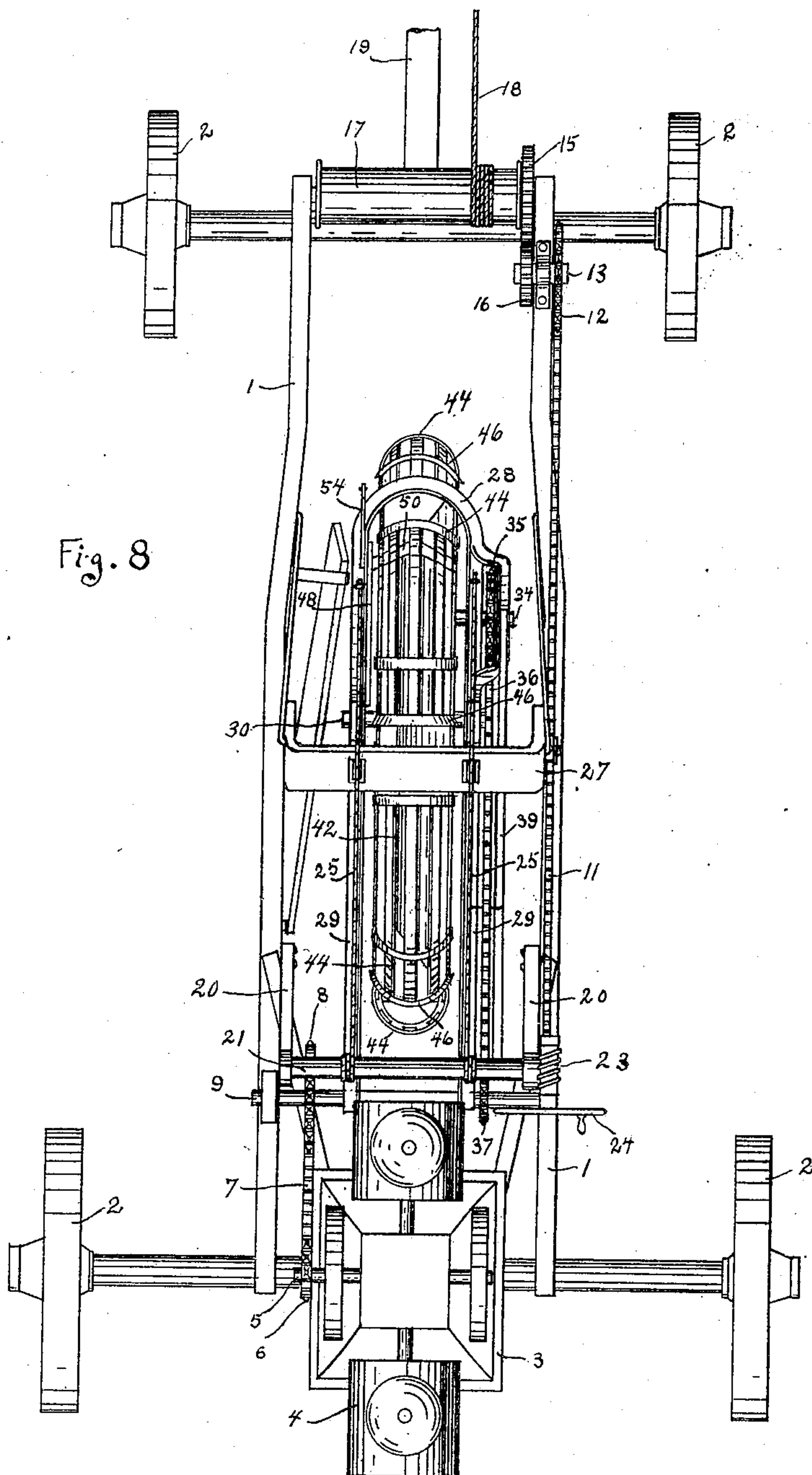


Fig. 8

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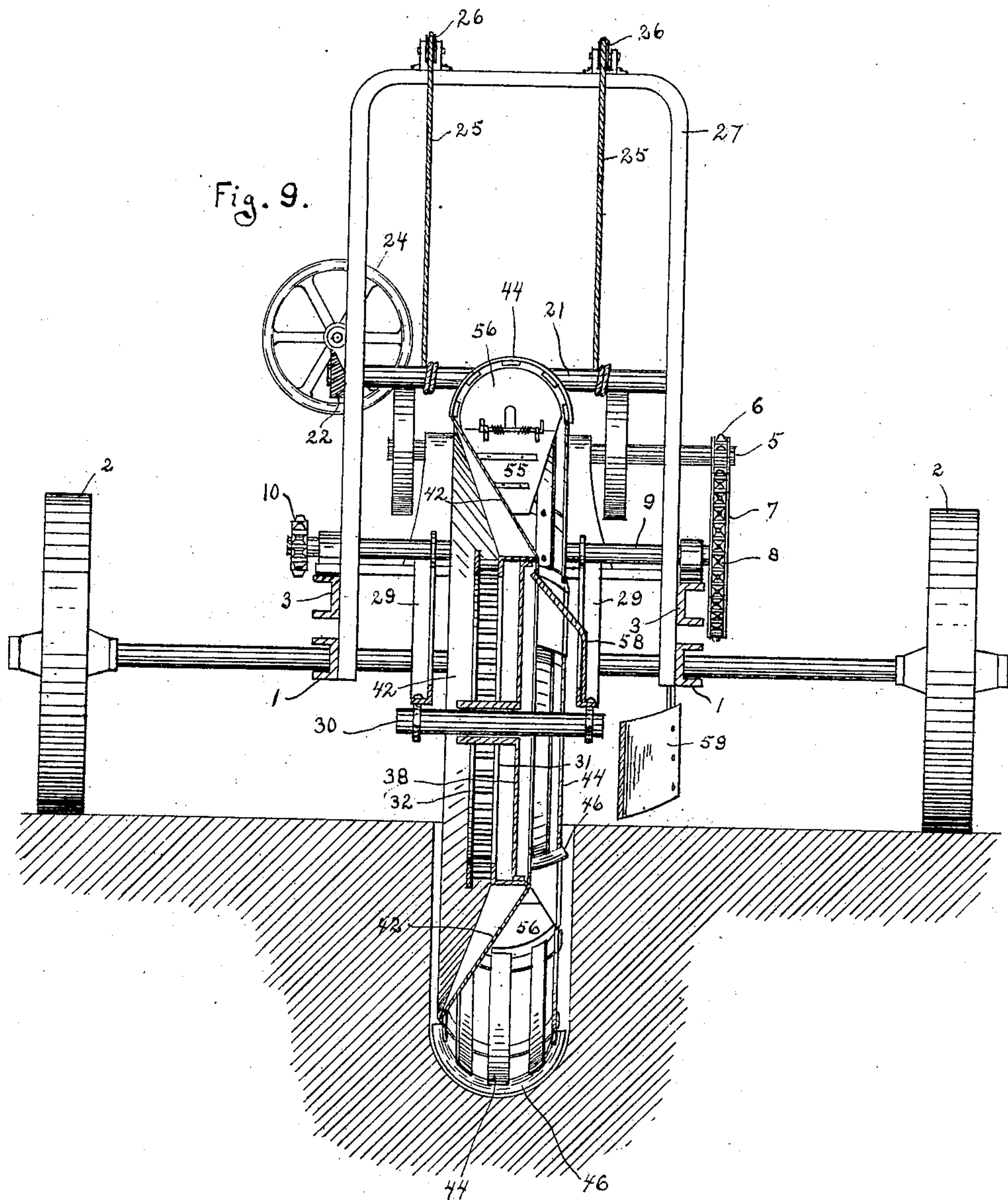
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5 SHEETS—SHEET 5.



Inventor

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By Walter N. Haskell,

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# UNITED STATES PATENT OFFICE.

BENJAMIN M. ROLPH, OF DIXON, ILLINOIS.

## DITCHING-MACHINE.

No. 887,129.

Specification of Letters Patent.

Patented May 12, 1908.

Application filed July 19, 1906. Serial No. 326,838.

*To all whom it may concern:*

Be it known that I, BENJAMIN M. ROLPH, a citizen of the United States, residing at Dixon, in the county of Lee and State of Illinois, have invented certain new and useful Improvements in Ditching-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention has reference to tiling machines, and pertains more particularly to means for digging the trench in which the tile is to be laid.

In machines of this class, difficulty has been encountered in working in some kinds of soil, such as heavy clay or in wet soil, in which the scoops would become clogged up with the earth, and rendered inoperative. My device is designed to overcome these difficulties and operate with equal ease and success in any kind or quality of soil.

The machine consists primarily of a wheel, rotatably mounted, centrally of such machine, and provided on its periphery with a series of scoops, formed of spaced apart bars. Novel means are also provided for emptying such scoops of their contents, in succession, at a desired point in the rotation of said wheel, and discharging the contents of the scoops at the side of the trench.

Other novel features are contained in my invention, as will more fully appear from the following specification, reference being had to the accompanying drawings, in which

Figure 1 is a side elevation, showing the right side of the machine. Fig. 1<sup>a</sup> is a vertical cross-section through the wheel 31 and flange 42 supported thereby. Fig. 2 is a similar view of the left side thereof. Fig. 3 is an enlarged detail, showing the swinging guard 65. Fig. 4 is an enlarged detail, showing part of the means for operating the scoop wheel. Fig. 5 is a detail, showing the scoop-cleaning devices, in side view. Fig. 6 illustrates the rear end of one of the scoops and mechanism appurtenant thereto. Fig. 7 is a plan view, in detail, of the cleaner 50. Fig. 8 is a plan view of my device. Fig. 9 is a vertical cross-section centrally of the scoop-wheel, looking toward the rear of the machine.

1 represents the frame of the machine, supported by carrying-wheels 2 2. Fixed on the rear part of the frame 1 is a platform 3, on which is supported a small engine 4, the operation of which imparts rotation to the shaft 5, mounted centrally of such engine. On one end of the shaft 5 is fixed a small sprocket-wheel 6, the movement of which is imparted by means of a sprocket-chain 7 to a sprocket-wheel 8, fixed on one end of a rotary shaft 9, journaled on the platform 3. (Fig. 2.) On the opposite end of the shaft 9 is a sprocket-wheel 10, communicating by means of a sprocket-chain 11 with a sprocket-wheel 12 on a rotary shaft 13 mounted on the forward part of the frame 1.

In the front end of the frame 1 is journaled a shaft 14, upon which is fixed a gear-wheel 15, meshing with and actuated by a gear-wheel 16 fixed on the shaft 13. Fixed on the shaft 14 is a drum 17, to which is attached one end of a cable 18. Such cable extends forwardly from the machine, around a pulley fixed at a point in the line of the projected trench, (not shown) and back to the forward end of the tongue 19 of the machine, to which the other end of the cable is secured. Upon the operation of the engine 4 movement is imparted to the drum 17, through the mechanisms hereinbefore described, to cause the cable 18 to be coiled upon the drum. By this means the machine is caused to move slowly forward in a direct line.

On the rear part of the frame 1 is fixed a pair of supports 20, in the upper ends of which is journaled a shaft 21, provided on one of its ends with a worm-gear wheel 22 actuated by a worm 23 supported above the same, and operated by a hand-wheel 24. Secured to the shaft 21 is a pair of cables 25, which pass forwardly over pulleys 26 supported on an arched frame 27, rigidly supported on the frame 1, centrally of the machine. The forward ends of the cables 25 are attached to the sides of an arch 28, swingingly supported on the shaft 9 by means of a pair of arms 29, integral with the lower ends of the arch.

Supported at the point of junction of the arms 29 and arch 28 is a rotary shaft 30, to which is secured a large wheel 31, provided with a gear-rim 32, actuated by a gear-pinion 33, fixed on a short shaft 34, rotatably mounted in one side of the arch 28. On the shaft 34 is also fixed a sprocket-wheel 35, engaged by a sprocket-chain 36, actuated by a sprocket-wheel 37 fixed on the shaft 9. The



spaces between the spokes of the wheel 31 are closed by a web, or plate 38, preferably of sheet-metal. By operation of the wheel 24 the cables 25 are wound upon the shaft 21 or unwound therefrom, as desired, to raise or lower the arch 28 and wheel 31 supported therein.

In Fig. 1 the arm 29 and arch 28 are shown to be united by a brace 39, on which is fixed a clip 40, loosely engaging a guide 41, secured at its upper end to the arch 27 and at its lower end to the frame 1. This serves to steady the wheel 31, and prevent side-movement thereof. Secured to the periphery of the wheel 31 is a dish-shape flange 42, the concave side of which is on the right-hand side of the machine, such flange being provided with an inner rim 43. A series of scoops 44 are secured to the flange 42 by means of cross-pieces 45, such scoops being each formed of a plurality of longitudinal, spaced-apart bars. Each of the scoops 44 is provided at its forward end with a cutter-blade 46, semicircular in form, and of slightly greater diameter than the scoop. The scoops are attached to the flange 42 at one edge only, as will appear in Fig. 6, the ends of each adjacent pair being connected by a bar 47 on their unattached sides, to give a greater degree of rigidity to such scoops.

Extending rearwardly from one side of the arch 28 is a frame 48, (Fig. 5.) to the rear end of which is pivotally secured a bar 49. To the front end of the bar 49 is fixed a cleaning blade 50, semicircular in form, and conforming to the inner surface of the scoops 44. Secured to the bar 49 is a member 51, the ends of which engage a pair of perforated guides 52, fixed to the arch 28. A contractile coiled spring 53 is attached at its lower end to the member 51 and at its upper end to a support 54, fixed to the arch. This results in a flexible contact of the cleaner 50 with the inner surface of the scoop at all times.

Each of the scoops 44 is closed at its rear end by a plate 55, secured to the flange 42 at right angles thereto, and a door 56, hingeably attached to such plate, and held normally in position by a coiled spring 57. Between the door 56 and bars of the scoop is left a space sufficient to permit the passage of the cleaner 50.

Through the operation of the engine 4, and simultaneously with the forward movement of the machine resulting therefrom, the wheel 31 is caused to rotate in the direction shown by the small arrows, the scoops 44 gradually working down into the ground until they have reached the desired depth. Each in turn becomes filled with earth, carrying its load to the upper side of the wheel, where it is detached by the cleaner 50. Upon being loosened the dirt falls from the scoops and upon the flange 42, by which it is directed to one side of the machine and upon a shield 58,

supported on the arch 28 and arm 29, adjacent to the flange 42. The upper portion of the shield 58 slopes outwardly and downwardly at an angle substantially the same as that of the flange 42. In passing over this shield the contents of the scoops is carried still further away from the wheel, until it falls to the ground at the side of the trench. By reason of the scoops being formed of spaced-apart bars there is less resistance to the operation of the cleaner, this being of special value when the machine is working in soil of a heavy or muddy character. To aid in keeping the dirt away from the trench a scraper 59 is supported from the frame 1 on that side of the machine on which the dirt falls.

The scoops 44 are normally closed by the doors 56, but in case a hard substance comes between the cleaner 50 and one of such doors, the door is permitted to swing open, as shown in dotted lines in Fig. 5, and permit the release of the object.

The cutters 46 are of sufficient size to cut a trench having a width which will readily permit the movement of the wheel 31 therein, but if desired, greater freedom of the parts in the trench can be secured, by disposing the cutters 46 so that they will be alternately to the right or left of the center line of the wheel 31.

In rear of the wheel 31 is supported a semicylindrical scoop 60, by means of a beam 61, loosely supported on the shaft 30. The forward end of the scoop is provided with an inclined foot 62, which prevents the point of the scoop becoming embedded in the earth. Supported from the rear part of the machine is a frame 63, to which is pivotally attached the rear end of a bar 64, the front end of such bar being loosely secured to the rear of the scoop 60. The bar 64 is parallel with the arm 29, so that in the raising or lowering of the wheel 31 the scoop 60 maintains the same relative position with reference to the scoops 44. This results in the point of the scoop always being in position at the bottom of the trench. In the event of any earth falling back into the ditch, it is picked up by the scoop 60 and returned to the scoops 44. By this means the trench is at all times kept clean, and it is not necessary to have the same cleaned with shovels after the machine has passed.

The purpose of the web 38 is to prevent the contents of the scoops from falling through the wheel and interfering with the operation of the driving mechanism. It will be seen that the greater part of the operating machinery is on that side of the machine opposite to that on which the earth is delivered.

In the operation of the machine the earth which is excavated is deposited in a continuous pile at the side of the ditch, the dirt being prevented to a great extent from re-



turning to the ditch by means of the scraper 59. In the event, however, of any of the earth passing over or under the scraper, and reëntering the trench, it would do so at the side of the scoop-wheel, and might become packed between the web 38 and the side wall of the trench, interfering with the free operation of the wheel. Especially might this be the case if the dirt were in the shape of lumps or chunks. To obviate this difficulty I provide a swinging shield 65, loosely supported on the shaft 30 by means of a collar 66 and arm 67. (Fig. 3.) The outer edge of the shield is held loosely in position in rear of the rim 43, and is held in contact therewith by means of clips 68. The normal position of the shield 65 is adjacent to the forward part of the scraper 59, a point where the greatest danger exists of the dirt falling into the trench and clogging the scoop-wheel. In case a portion of the earth does return to the trench, it will become clogged, if at all between the wall of the trench and the shield 65 and such shield will swing rearwardly with the obstruction until it passes beyond the web and falls into the trench in rear of the wheel.

The tension of the spring 57 is such as to hold the door 56 normally closed, and prevent the passage of the earth therethrough upon the operation of the cleaner 50, the intention being to have the contents of the scoop pass downwardly therefrom.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is

1. In a tiling machine, a rotatable ditching wheel, supported centrally thereof; a plurality of scoops on the periphery of said wheel, each formed of parallel, spaced-apart bars, and each provided at its forward end with a cutter-blade and at its rear end with a spring-controlled, outwardly opening door; and a stationary cleaner, adapted to engage the inner faces of said scoops, in succession, at a desired point in the rotation of said wheel, substantially as shown and described.

2. In a tiling machine, a rotatable ditching-wheel, supported centrally thereof; a plurality of scoops on the periphery of said wheel, each formed of parallel, spaced apart bars; a stationary cleaner, adapted to engage the inner faces of said scoops, in succession, at a point where such scoops are uppermost in their rotation; and an inclined flange adapted to receive the earth from said scoops and convey the same toward one side of the wheel, substantially as shown and set forth.

3. In a tiling machine, a rotatable ditching-wheel, supported centrally thereof; a plurality of scoops on the periphery of said wheel, each formed of parallel, spaced apart bars; a stationary cleaner, adapted to engage the inner faces of said scoops, in succession, at a point where such scoops are

uppermost in their rotation; an inclined flange, adapted to receive the earth from said scoops and convey the same toward one side of the wheel; and an inclined shield, adjacent to said flange, and adapted to receive the earth therefrom, and convey it farther away from said wheel, substantially as described.

4. In a tiling machine of the class named, a scoop therefor, comprising a plurality of parallel, spaced-apart bars, supported in semi-cylindrical form; a semi-circular cutter-blade at the forward end of such scoop; and a spring-controlled outwardly opening door at the rear end of such scoop, and spaced apart from said bars to permit the passage of a cleaner along the inner faces thereof; substantially as shown and described.

5. The combination, with the frame and carrying wheels thereof, of the arch 28, swingingly mounted in the machine, so as to be vertically movable therein; the wheel 31, rotatably mounted in the arch 28, and provided with the flange 42; a plurality of scoops 44 on the periphery of the wheel 31, each formed of longitudinal, spaced-apart bars; the cleaner 50, flexibly supported from the arch 28; means for rotating the wheel 31; means for raising or lowering the arch 28, as desired; and means for moving the machine forward simultaneously with the operation of the wheel 31, substantially as and for the purpose named.

6. In a machine of the class named, the combination with the frame and carrying wheels thereof, of the arch 27, rigidly mounted on said frame, and provided with pulleys 26 upon its upper part; the arch 28, swingingly supported from the frame, so as to have vertical play within the arch 27; the shaft 21, supported upon the frame 1; the cables 25, attached at their rear ends to the shaft 21, and at their forward ends to the arch 28, and supported by the pulleys 26; the wheel 31, rotatably mounted in the arch 28, and provided on its periphery with a plurality of scoops 44; means for operating the shaft 21; means for rotating the wheel 31; and means for preventing side movement of said wheel, substantially as shown and set forth.

7. In a machine of the class named, the combination of the wheel 31, rotatably mounted in the machine; the flange 42, affixed thereto; a plurality of scoops 44, fixed to the periphery of said wheel, provided at their forward ends with cutting blades 46, and at their rear ends with doors 56; and the cleaner 50, mounted in said machine in position to pass through such scoops upon the rotation of said wheel, and separate the contents therefrom, substantially as shown and described.

8. In a tiling machine, the combination with the frame and carrying wheels thereof,



of the arch 28, swingingly mounted in such frame; the wheel 31, rotatably mounted in said arch and provided with the flange 42; a plurality of scoops 44, fixed to the periphery of such wheel, formed of spaced-apart bars, and provided with cutting blades 46; the doors 56, in the rear ends of the scoops 44, and means for holding such doors normally closed; the bar 49, pivotally supported on the arch 28; the cleaner 50, fixed to the movable end of the bar 49, and means for holding the cleaner 50 in contact with the inner surface of said scoops, substantially as shown and set forth.

9. In a machine of the class named, the combination with the frame 1 and wheels 2 thereof, of the arch 28, swingingly mounted in such frame, so as to be capable of vertical movement; the wheel 31, rotatably mounted in the arch 28, and provided on its periphery with a plurality of scoops 44; the rotary drum 17, supported in the front end of the frame; the operating cable 18, attached to said drum; the rotary shaft 9, supported on the frame 1 in rear of the wheel 31; means for rotating the shaft 9; means for imparting the rotation of the shaft 9 to the drum 17 to rotate such drum; means for imparting the rotation of the shaft 9 to the wheel 31, to rotate such wheel; means for raising and lowering the arch 28, as desired, means for cleaning the scoops 44 in succession, at the upper side of the wheel 31, and means for delivering the contents of the scoops at the side of the trench, substantially as and for the purpose set forth.

10. In a tiling machine, the combination of the wheel 31, rotatably mounted in the machine and provided with a plurality of scoops 44, and the scoop 60 suspended in rear of the wheel 31, and capable of vertical adjustment so as to retain the same relative position with reference to said wheel, substantially as shown and described.

11. In a machine of the class named the combination with the frame and carrying

wheels thereof, of the arch 28, swingingly supported therein, so as to be capable of vertical adjustment; the rotary wheel 31, mounted in such arch, and provided with the web 38 and flange 42; a plurality of scoops 44 on the periphery of the wheel 31; the shield 58, supported on the arch 28 adjacent to the flange 42; the scraper 59, supported from the frame 1, on that side of the machine on which the contents of the scoops 44 is delivered; means for raising and lowering the arch 28, as desired, means for rotating the wheel 31; and means for cleaning the scoops 44 in succession, at a point on the upper side of said wheel, substantially as shown and set forth.

12. In a tiling machine the combination of the arch 28, suitably mounted in the machine, so as to be capable of vertical adjustment therein; the wheel 31, rotatably mounted in the arch 28, and provided with the web 38 and flange 42; the scoops 44, on the periphery of the wheel 31; shield 65, swingingly supported adjacent to the web 38; means for rotating the wheel 31; and means for cleaning the scoops 44 in succession, at a point on the upper side of the wheel 31, substantially as shown and for the purpose mentioned.

13. In a tiling machine, the combination of the arch 28, swingingly supported in the machine, so as to be capable of vertical adjustment therein; the shaft 30, supported by the arch 28; the wheel 31, fixed on the shaft 30, and provided on its periphery with a plurality of scoops 44; the scoop 60, pivotally supported on the shaft 30, and the bar 64, pivotally supported beneath the machine at its rear end and loosely connected with the scoop 60 at its forward end, substantially as and for the purpose named.

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

BENJAMIN M. ROLPH.

Witnesses:

C. W. BREWSTER,  
UREY HOWARD.