

No. 652,285.

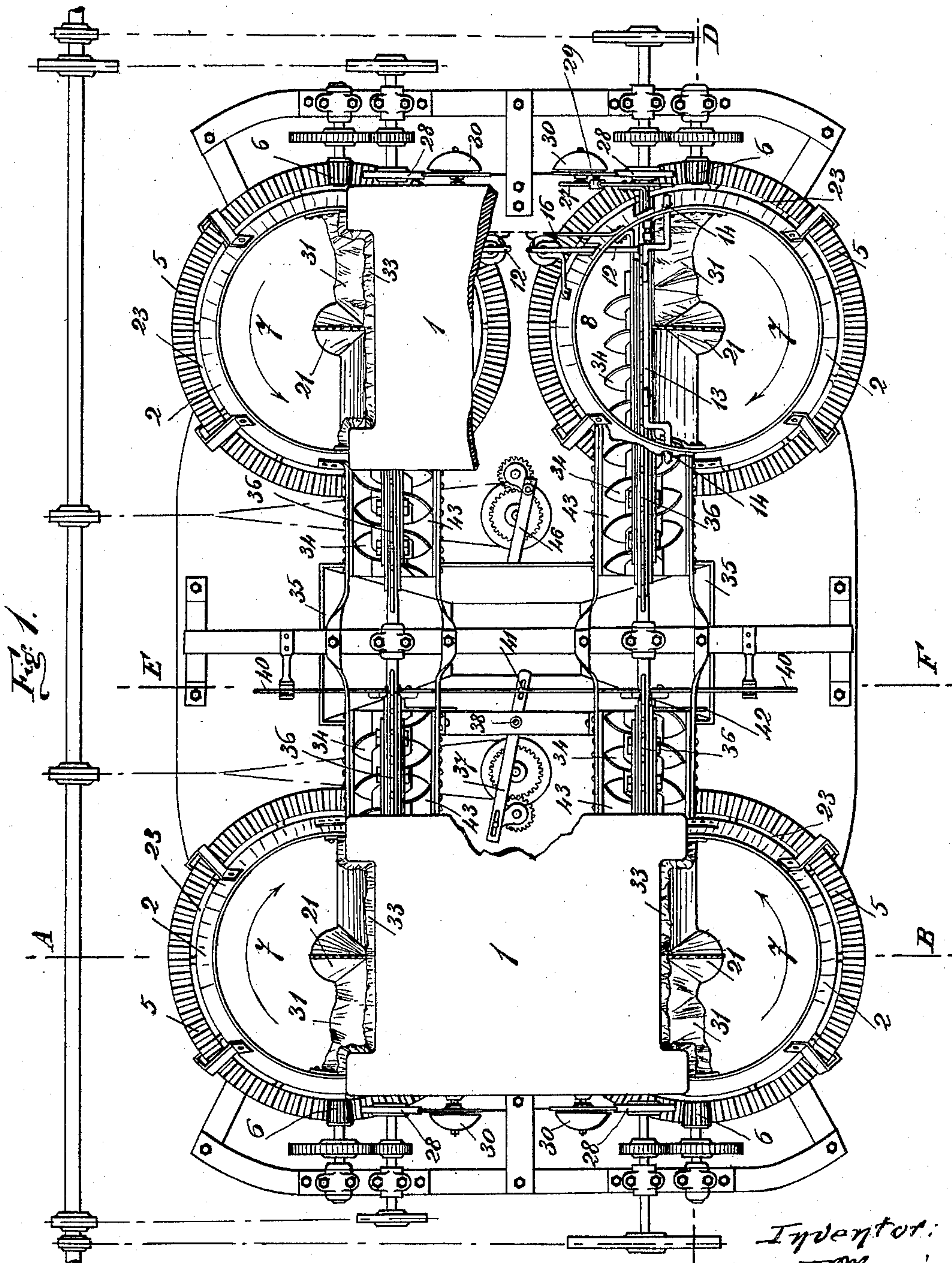
Patented June 26, 1900.

A. MUSCIACCO.
APPARATUS FOR MIXING FERTILIZERS, &c.

(Application filed May 20, 1899.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses:
m. c. massie
E. E. Ellis

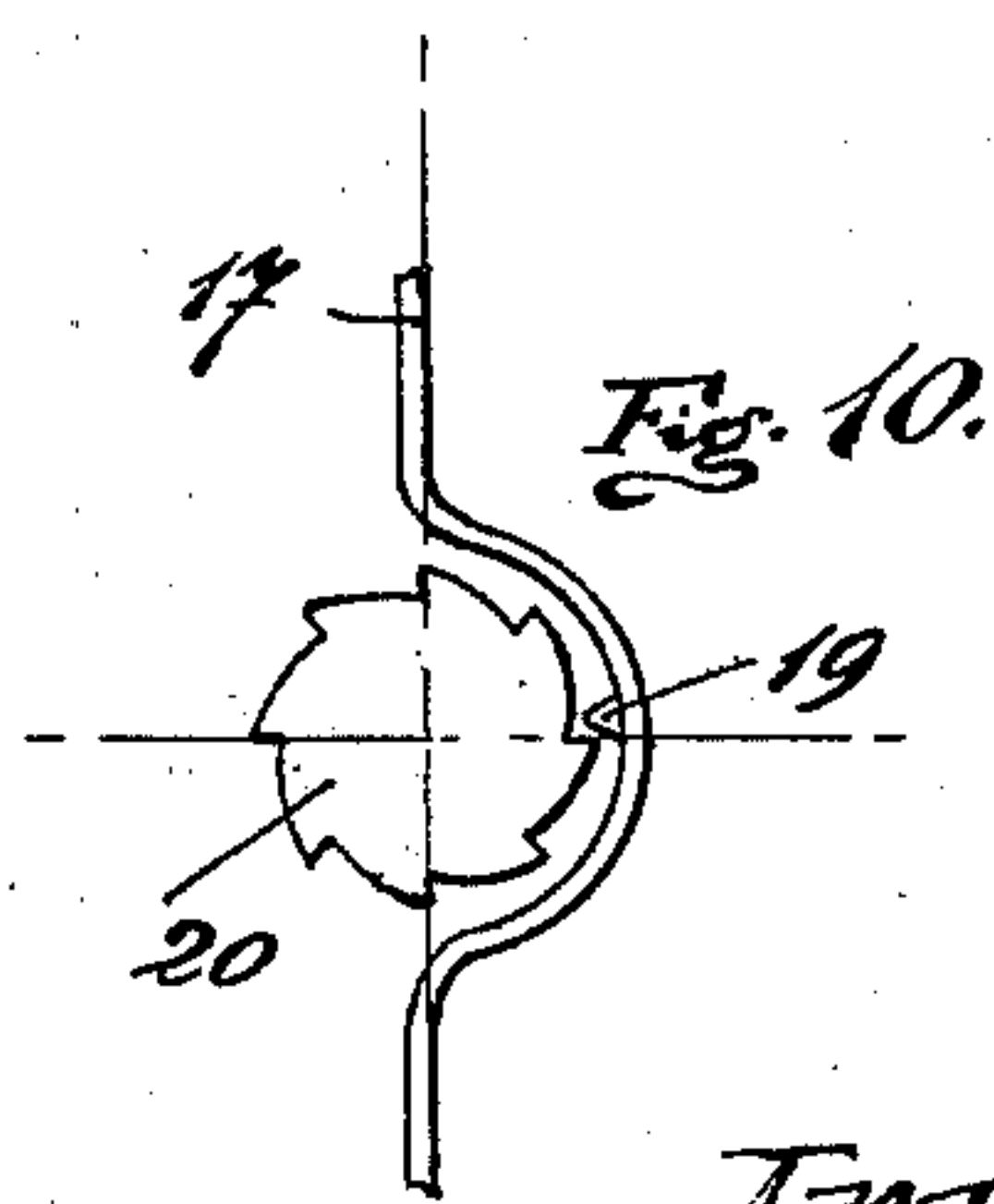
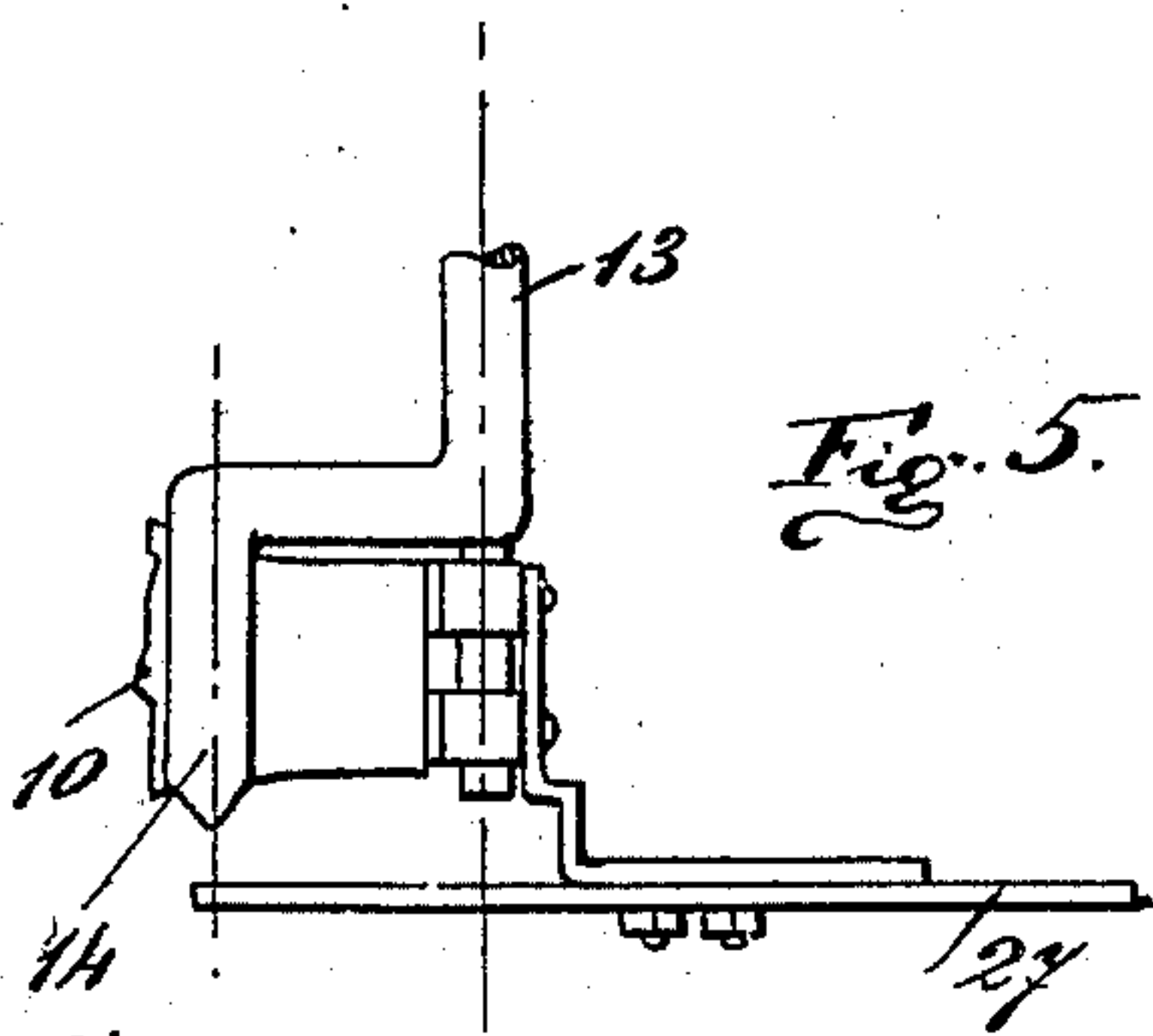
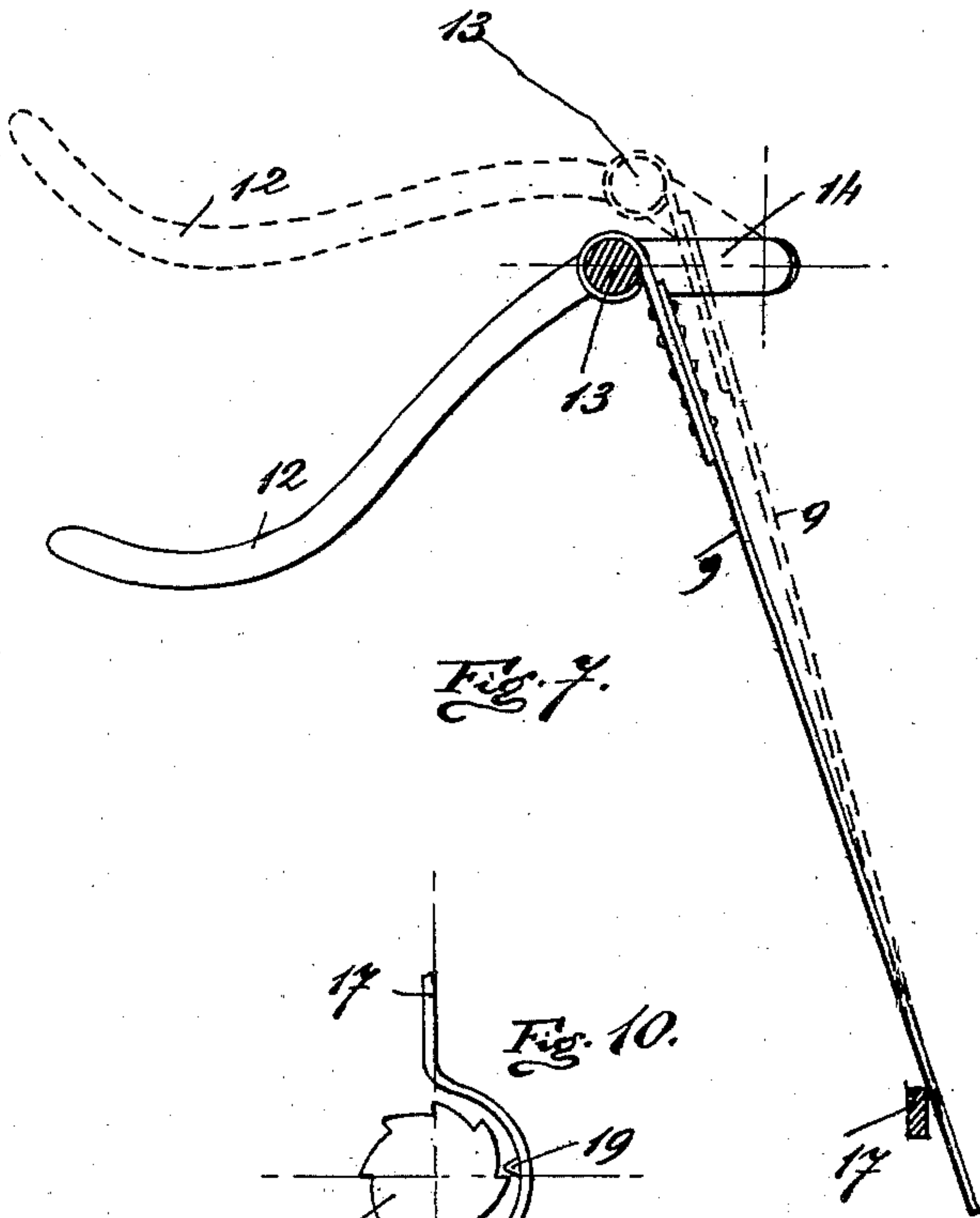
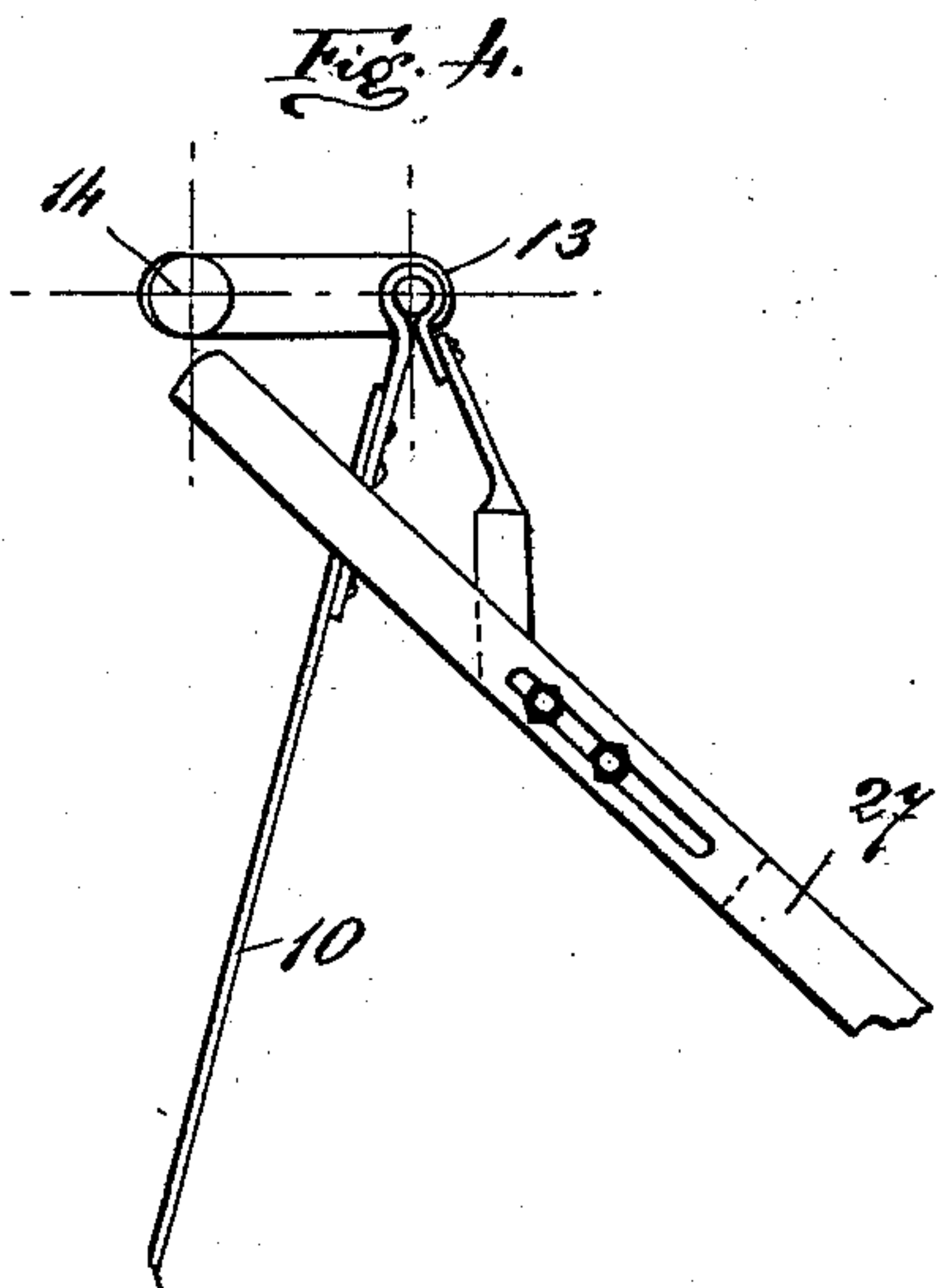
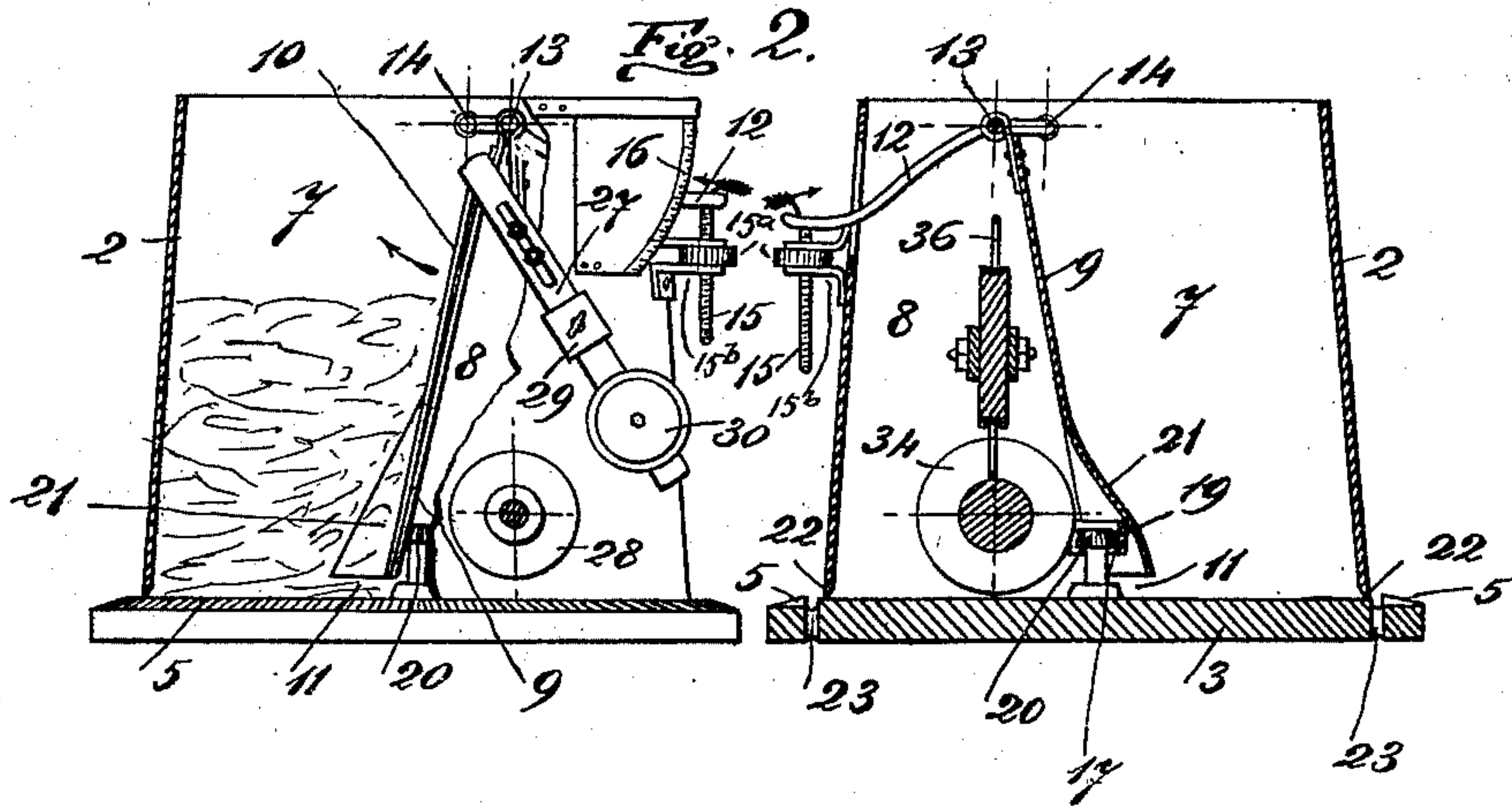
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4 Sheets—Sheet 2.



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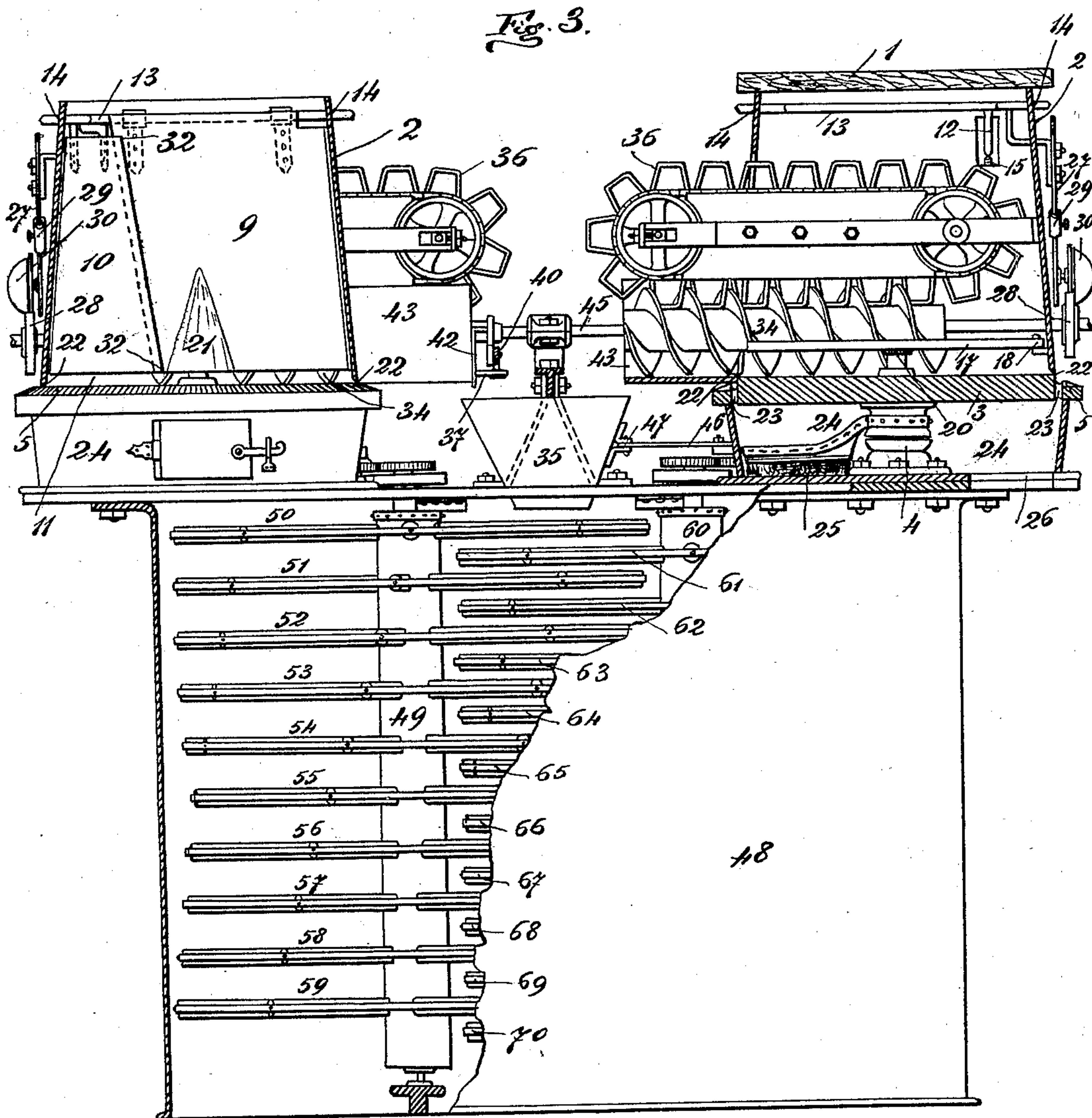
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(No Model.)

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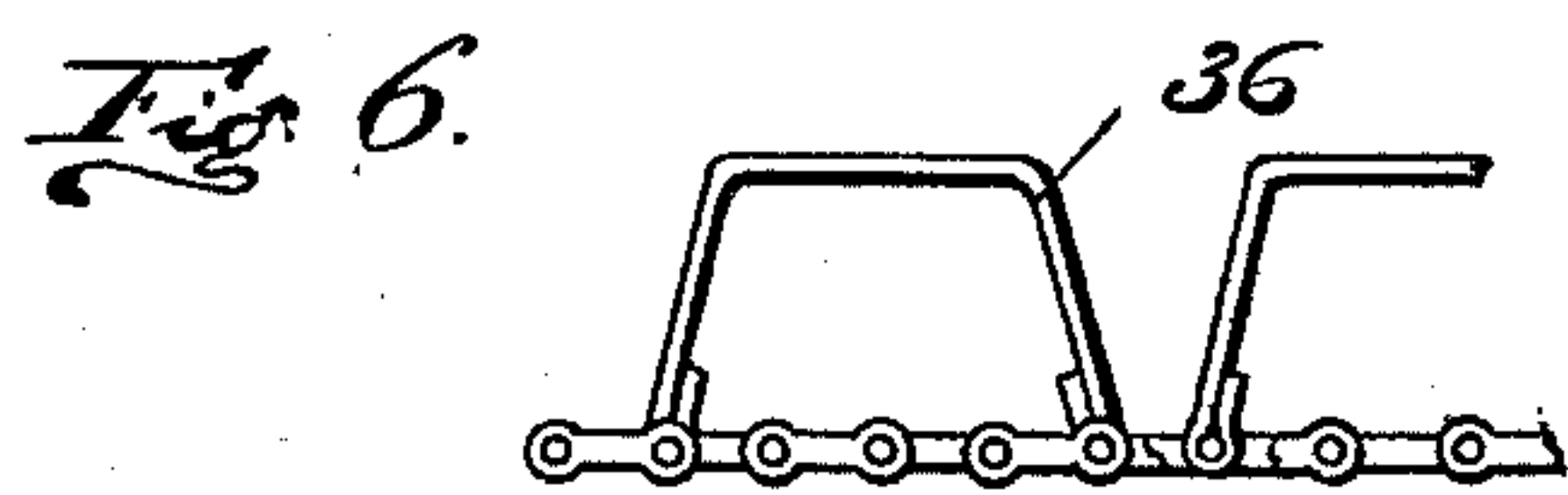
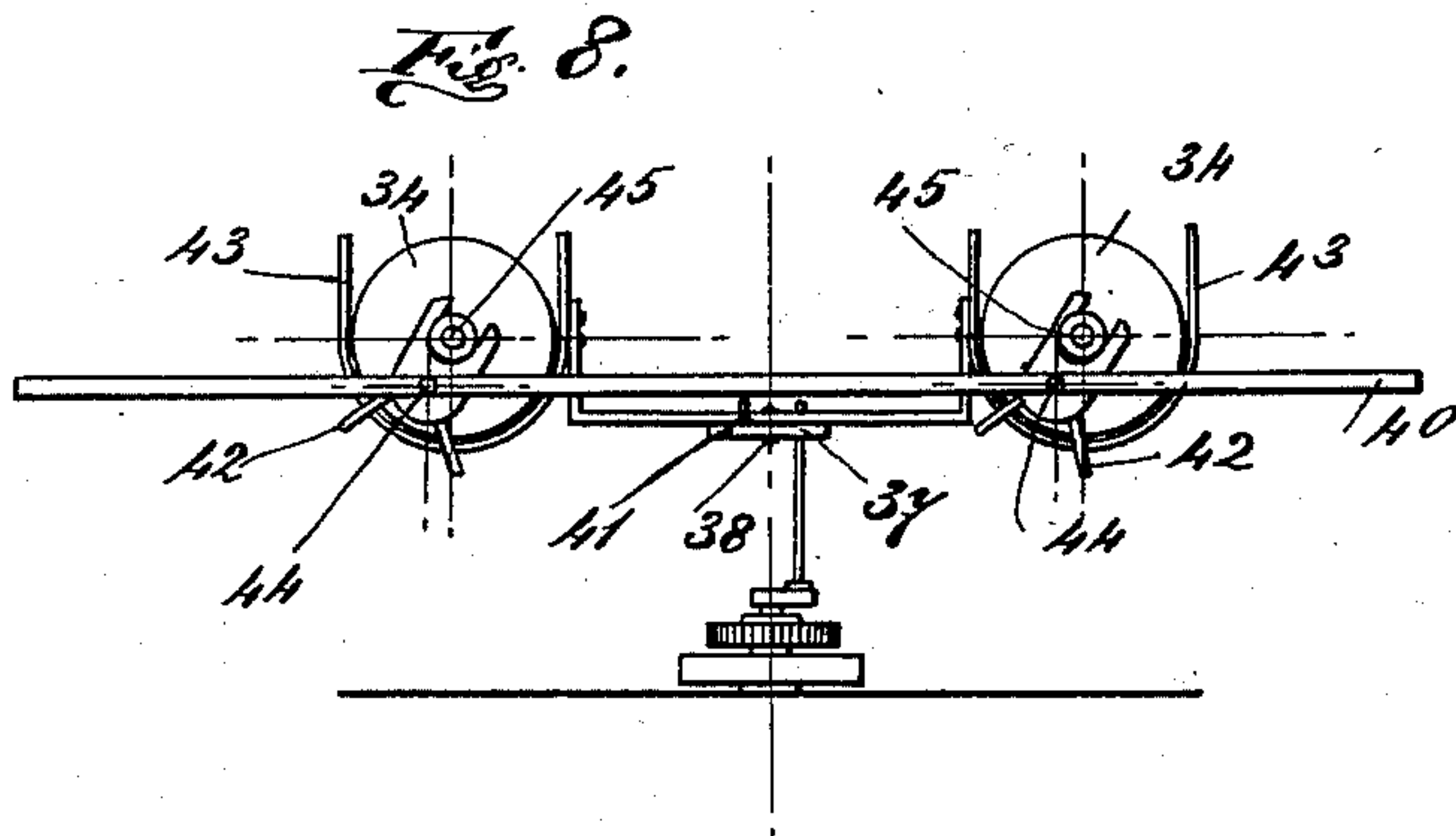
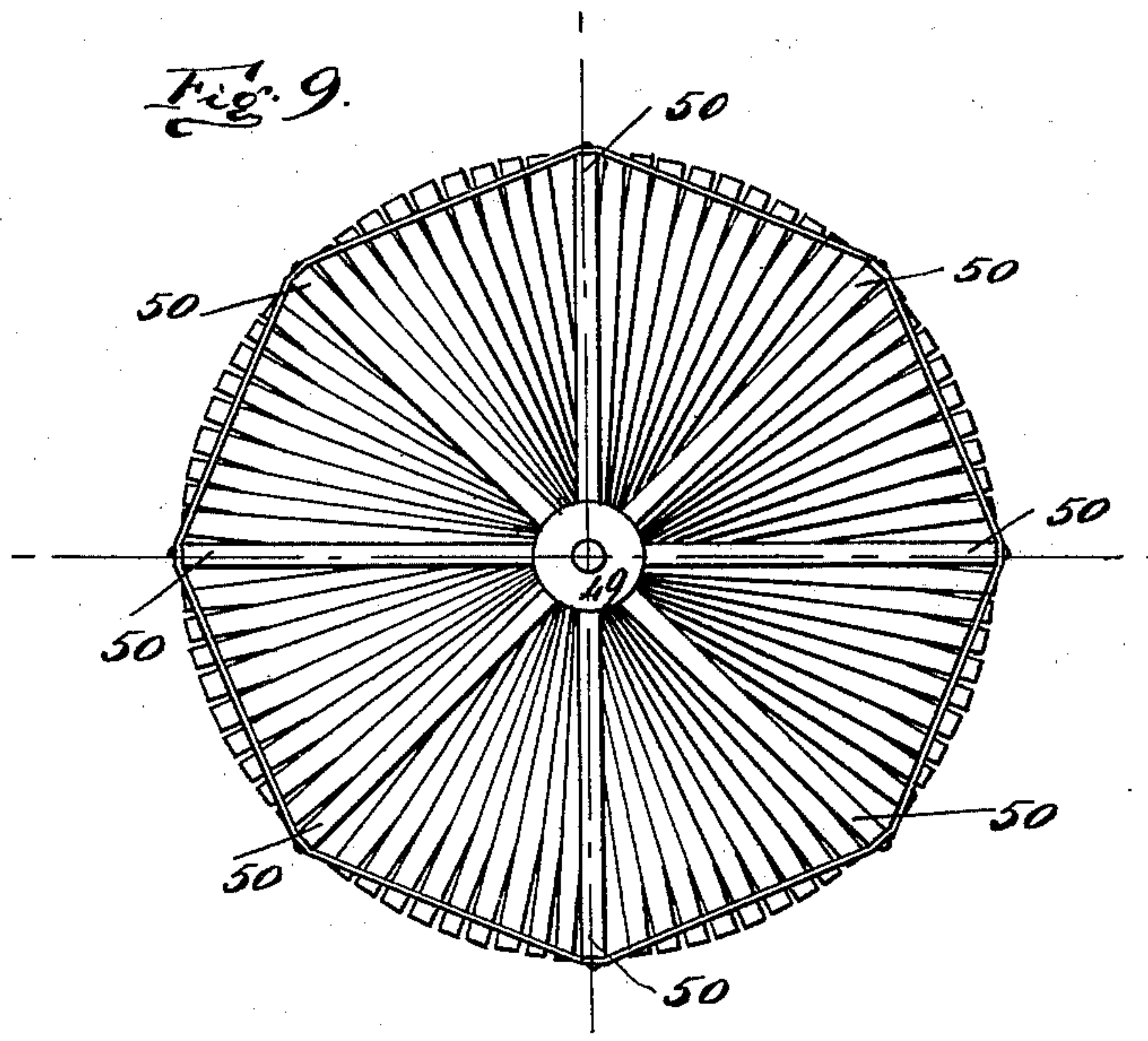
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(No Model.)

4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

AUGUSTO MUSCIACCO, OF BRINDISI, ITALY.

APPARATUS FOR MIXING FERTILIZERS, &c.

SPECIFICATION forming part of Letters Patent No. 652,285, dated June 26, 1900.

Application filed May 20, 1899. Serial No. 717,619. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTO MUSCIACCO, residing at Brindisi, in the Province of Lecce, Italy, have invented certain new and useful
5 Improvements in Apparatus for Proportioning and Mixing Powders; and I do hereby 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 ap-
10 pertains to make and use the same.

My invention relates to machines or apparatus for proportioning and mixing powders and other similar substances; and it consists, substantially, in such features of improve-
15 ment as will hereinafter be more particularly described.

The form of machine shown in the accompanying drawings is one in which four different kinds or descriptions of powders are
20 to be mixed together in predetermined proportions, variable according to the will of the operator, and is specially designed for the manufacture of manures; but the number of powders to be dosed and mixed, as well as
25 the number and size of the vessels containing them, may vary according to the requirements of the special art for which the apparatus is intended.

In the accompanying drawings, Figure 1 is
30 a general plan of the apparatus, the wooden platforms 1, from which the vessels 2 are charged, being partly removed. Fig. 2 is a section on line A B, Fig. 1. Fig. 3 is a front elevation of the apparatus, the upper part
35 being a section on line C D, Fig. 1, wherein some internal parts are removed to show other parts, which would be hidden thereby. Figs. 4 to 10 are details which will be hereinafter described.

40 Similar letters denote like parts throughout.

The powders to be dosed and mixed are charged into that one of the chambers of the vessels 2 which is outermost. The vessels 2
45 have their bottoms 3, which are caused to revolve on their pivots 4 in the direction of the arrows, Fig. 1, by means of the bevel-wheel rims and the bevel-pinions 6. The chamber 7 of the vessels 2, into which the powders are charged, is divided from the chamber 8, to
50 which said powders are conveyed by the motion of the revolving bottoms 3, by means of a partition consisting of two movable walls 9 and

10, Fig. 3, left side, one of which—namely, 9—I will hereinafter call the “partition proper,” while the other—namely, 10—will be called 55 the “blade.” The said movable walls are so suspended and adjustable with reference to the movable bottoms 3 that an opening 11 of varying height is formed at will between the upper surfaces of said bottoms and the lower 60 edges of said walls, and through which opening the material is conveyed by the bottoms from one chamber to the other of the vessels 2. The material in each vessel is delivered to a conveyer in the second compartment of 65 each vessel, and said conveyers empty into a single hopper common to them all. The direction of the movement of the bottoms 3 is such as to cause the powders or other loose materials to pass from chamber 7 into cham- 70 ber 8 through the right side of the opening 11, Figs. 2 and 3, whose upper side is formed by the lower edge of partition 9. In order to enable the attendant to proportion the quantity of each of the different powders to be 75 mixed according to the requirements, the height of the right side of opening 11 is to be made variable. To such end partition 9 is connected with the arm 12 (see Fig. 2, right side, and Fig. 7, which is an enlarged detail 80 of the same) and mounted loosely on crank-shaft 13, turning upon the journals 14, mounted in the sides of the vessel 2. By turning the screw 15 the crank-shaft 13 is caused to turn upon the journals 14, as shown in dot- 85 ted lines at Fig. 7, and the height of the opening 11 is varied accordingly. The screws 15 work in nuts 15^a, held or supported by brackets 15^b on the side of the vessels. The height of the opening 11 at a given moment 90 may be read on a graduated scale 16, Fig. 2, fixed on the outside wall of each of the vessels 2. For certain descriptions of powders which are liable to clod it is extremely important to avoid their sticking to the rear 95 face of partition 9. The lower end of this partition rests, therefore, on a curved elastic ruler 17, pivoted at 18, Fig. 3, (see also Fig. 2, right side, and plan, Fig. 10,) and fitted with a projecting nose 19, to which an oscil- 100 latory movement is imparted by a ratchet-pinion 20, entering a recess 21, provided for that purpose in the partition 9 and sharing the motion of the revolving bottom 3. At

each revolution of said bottom a shock is imparted by the pinion 20 to the oscillating rod 17 and by this to the lower extremity of the partition 9, which latter is momentarily caused to swing around on the crank-shaft 13, and by this swinging motion any matter clogging to the said partition is at once detached therefrom. The part of the contents of the vessels which may possibly escape through the joint 22 between the stationary cylindrical wall and the flat revolving bottom falls through the holes 23 into the casing 24, situated beneath. The brush 25, partaking of the motion of bottom 3, sweeps the matter which has collected into the casing 24 toward the opening 26, wherefrom it falls into bags arranged underneath.

In order that the apparatus may work regularly and give good results as far as the proportioning of the powders or other materials is concerned, the level of the powders contained in the vessels is never to be allowed to sink beyond a certain minimum height. This is attained by means of the blade 10, attached to the inner edge of the partition 9 and situated above the left side of opening 11, Fig. 3. The blade 10 is adjustably connected with the arm 27, carrying a bell 30, mounted on the outside wall of vessel 2, said arm being provided with a controllable weight 29 and being loosely mounted, together with the blade 10, on the crank-shaft 13, substantially in line with and parallel to the partition 9. (See Fig. 3, Fig. 2, left side, Fig. 4, which is an enlarged detail thereof, and Fig. 5, which is a plan of Fig. 4.) As soon as the level of the powder within chamber 7 sinks beyond a certain minimum, and which renders the pressure exerted against the rear face of the blade 10 insufficient to balance the weight of arm 27 and parts connected therewith, the blade 10 swings in the direction of the arrow, Fig. 2, and arm 27 strikes against the disk 28, whereupon the ringing of bell 30 ensues, giving the attendant the necessary warning as to the vessel 2 being almost empty.

A cloth packing 31 is provided between the partition 9 and blade 10 to make the joint along line 32 32, Fig. 3, a tight one, and a strip of cloth 33, attached both to the edges of the platforms 1 and the upper edges of partitions 9 and blade 10, prevents impurities from falling into the vessels 2 when they are being charged from the said platforms. The powder conveyed to the openings 11 by the revolution of the vessel-bottoms 3 is as soon as it enters chamber 8 taken up by the Archimedean screws 34, which convey the material coming in different quantities from the four vessels 2 to the central hopper 35. No clogging of the powders on the surface of the screws 34 can take place, as the same is swept out all around by the endless chains 36, (see an enlarged detail, Fig. 6,) which are kept in motion by the screws themselves. Said chains are provided with sprockets, as

shown, which enter the spaces between the blades of the screws, and the material is prevented from adhering to the surfaces of the screws in an obvious manner.

Those among the conveying-screws 34 which receive from the vessels 2 such descriptions of powders as are especially liable to clod are fitted with an arrangement intended to pulverize such clods before their falling into the hopper 35. An arrangement for this purpose is shown, by way of example, on the left side of Fig. 1. (See also detail Fig. 8, which is a section on the line E F, Fig. 1.) The link 37, pivoted at 38, by its oscillation imparts a to-and-fro motion to the flat rod 40 connected thereto at 41, Fig. 1.

Two cutters 42 42, sliding on the front face of the screw-casing 43 and connected to rod 40 by means of pivots 44 and swinging back and forth around the axis 45 of the screw 34, (see Fig. 8,) destroy or break up the clods which might reach the inner end of the screw-casing. An oscillatory motion is also imparted to the hopper 35 by the link 46, pivotally connected thereto at point 47, thereby further loosening up the material and preventing any part of the clods from falling into the mixing apparatus proper.

The mixing apparatus consists of a case 48, inclosing two rapidly-rotating vertical wooden shafts 49 60, each of which is fitted from one end to the other with several sets 50 51 52 53 54 55 56 57 58 59 61 62 63 64 65 66 67 68 69 70 of radially-projecting horizontal arms almost as long as the distance between the two shafts, each of said sets having its radial arms shifted with reference to the other, as shown in Fig. 9, which is a plan of shaft 49, and the sets of radial arms projecting from shaft 60 being shifted in the vertical direction with reference to those projecting from shaft 49, and therefore entering the spaces between the same. The powders falling from hopper 35 into casing 48 are most perfectly mixed by falling on the arms above described. When they reach the base of the apparatus, they are collected into bags provided at its base.

The arrangement of shafting and gearing by which the several parts are driven is clearly shown by the drawings and needs no description. It will be understood that the speed of each part must be adjusted according to the different proportions in which the mixing of the powders is to take place or, in other words, to the several heights of the opening 11, through which the powders pass from one chamber to the other, a set of exchange wheels and pulleys being provided to alter the speed of each of the rotating bottoms, as well as that of each of the conveying-screws, the rotary speed of the shafts of the mixing device being allowed to remain unchanged.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine of the character described, a vessel divided into two compartments, means for carrying the material from one compartment into the other, a screw conveyer 5 for conveying the material from the second compartment, and means for preventing clogging of said conveyer by the material.

2. In a machine of the character described, a vessel divided into two compartments, 10 means for carrying the material from one compartment to the other, a screw conveyer for conveying the material from the second compartment, and movable devices entering the spaces between the blades of the conveyer, 15 and operated by the latter to remove adhering material from the surface of said conveyer.

3. In a machine of the character described, a vessel divided into two compartments, 20 means for carrying the material from one compartment to the other, a screw conveyer for conveying the material from the second compartment, and an endless chain having sprockets entering the spaces between the 25 blades of such conveyer.

4. In a machine of the character described, a vessel having a rotatable bottom, a partition dividing the vessel into two compartments, means for varying the distance between the lower edge of said partition and the 30 said rotatable bottom, entirely closing the lower end thereof, and a conveyer in one of the compartments.

5. In a machine of the character described, 35 a vessel, an adjustable partition dividing the same into two compartments, means for carrying the material from one compartment to the other, means for imparting an intermittent oscillating motion to the partition, and 40 means for conveying the material from the second compartment.

6. In a machine of the character described, a vessel having a rotatable bottom, an adjustable partition dividing the vessel into two 45 compartments, means for imparting an oscillating motion to said partition, and a conveyer in one of the compartments.

7. In a machine of the character described, a vessel having a rotatable bottom, a partition dividing the vessel into two compartments, 50 said partition being in two parts, means for varying the distance between the lower edge of one part and the rotatable bottom, a counter-pressure device operating on the other part, a signal or alarm operated on 55 release of said counter-pressure device, and a conveyer in one of the compartments.

8. In a machine of the character described, a vessel divided into two compartments, 60 means for carrying the material from one compartment to the other, a conveyer for conveying the material from the second compartment, and means for cutting up or loosening the material as it leaves the conveyer.

9. In a machine of the character described, 65 a vessel, a rotatable bottom therefor, a vertical movable partition dividing the vessel into

two compartments, a screw for raising and lowering the lower end of said partition, and a conveyer in one of the compartments. 70

10. In a machine of the character described, the combination of the partition, 9, the elastic strip, 7, the ratchet, 20, and means for rotating the latter.

11. In a machine of the character described, 75 a vessel divided into two compartments, means for carrying the material from one compartment to the other, a conveyer for conveying the material from the second compartment, and a swinging blade or cutter located at the 80 outer end of the conveyer.

12. In a machine of the character described, a plurality of vessels each divided into two compartments, a rotatable bottom for each vessel closing both compartments thereof, and 85 carrying the material from one compartment of the vessel to the other, means for conveying the material from each of the second compartments, a receiving-hopper common to all of said conveyers, and a mixing apparatus 90 into which the hopper empties.

13. In a machine of the character described, a plurality of vessels disposed in horizontal arrangement, and each divided into two compartments, means in each vessel for carrying 95 the material from one compartment to the other, means for conveying the material from each of the second compartments, means for chopping or loosening up the material as it leaves the second compartments, a receiving- 100 hopper common to all of the conveyers, and a mixing apparatus into which the hopper empties.

14. In a machine of the character described, a plurality of vessels each divided into two 105 compartments, a rotatable bottom for each vessel closing both compartments thereof, and carrying the material from one compartment of the vessel to the other, means for conveying the material from each of the second compartments, a receiving-hopper common to all 110 of said conveyers, means for imparting a shaking motion to the hopper, and a mixing apparatus into which the hopper empties.

15. In a machine of the character described, 115 a plurality of vessels disposed in horizontal arrangement, and each divided into two compartments, means in each vessel for carrying the material from one compartment to the other, means for conveying the material from 120 each of the second compartments, a receiving-hopper common to all of the conveyers, and a mixing apparatus into which the hopper empties, the same consisting of a casing provided with vertical shafts having radial 125 arms, the arms of one set passing through the spaces between the arms of the other set.

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

AUGUSTO MUSCIACCO.

Witnesses:

VIRGINIO CARNEVALI,
MICHELEOR BRAGES.