

G. W. PHILLIPS.
NUT HULLER.
APPLICATION FILED NOV. 21, 1907.

916,008.

Patented Mar. 23, 1909.
3 SHEETS—SHEET 1.

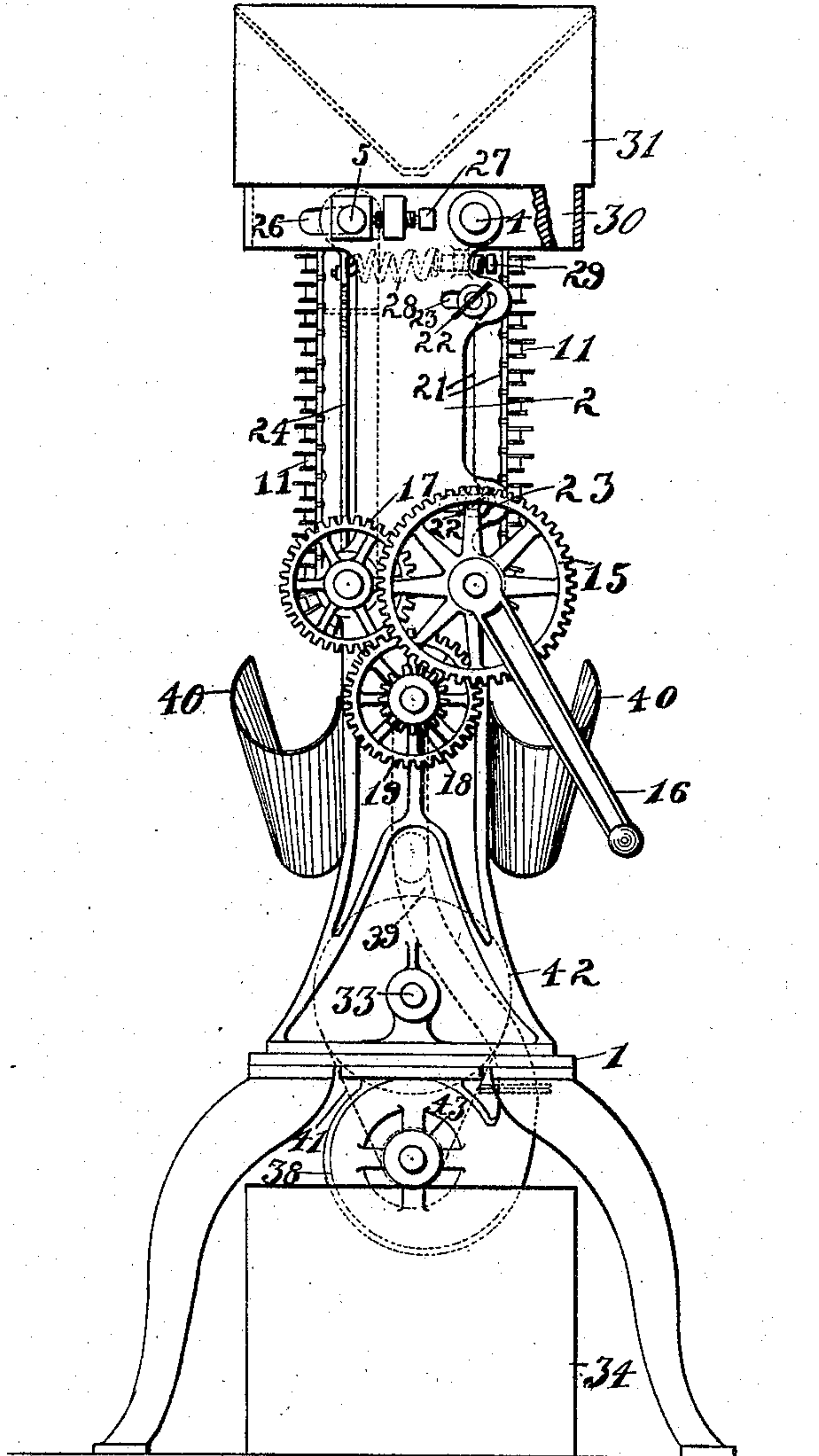


Fig. 1.

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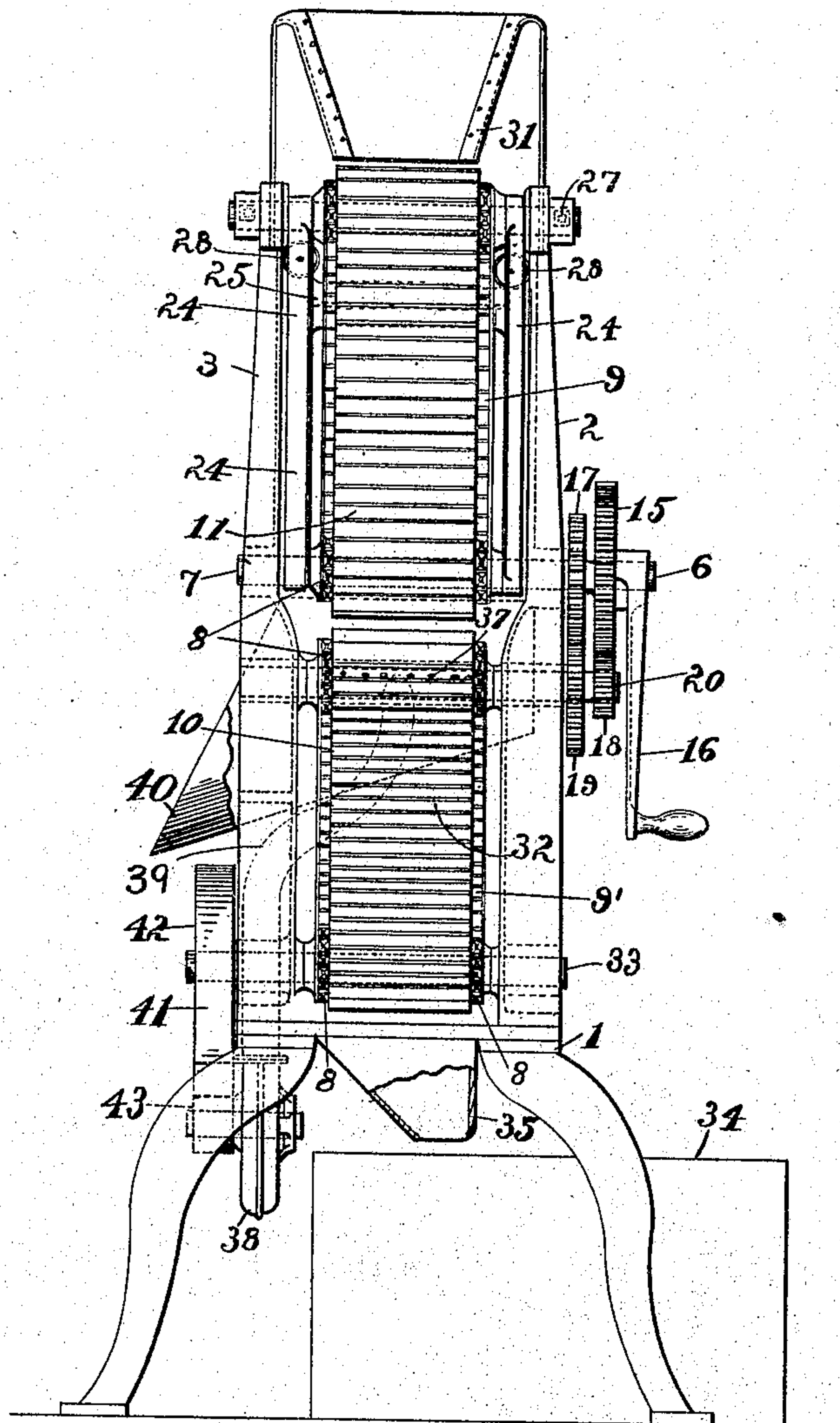


Fig. 2.

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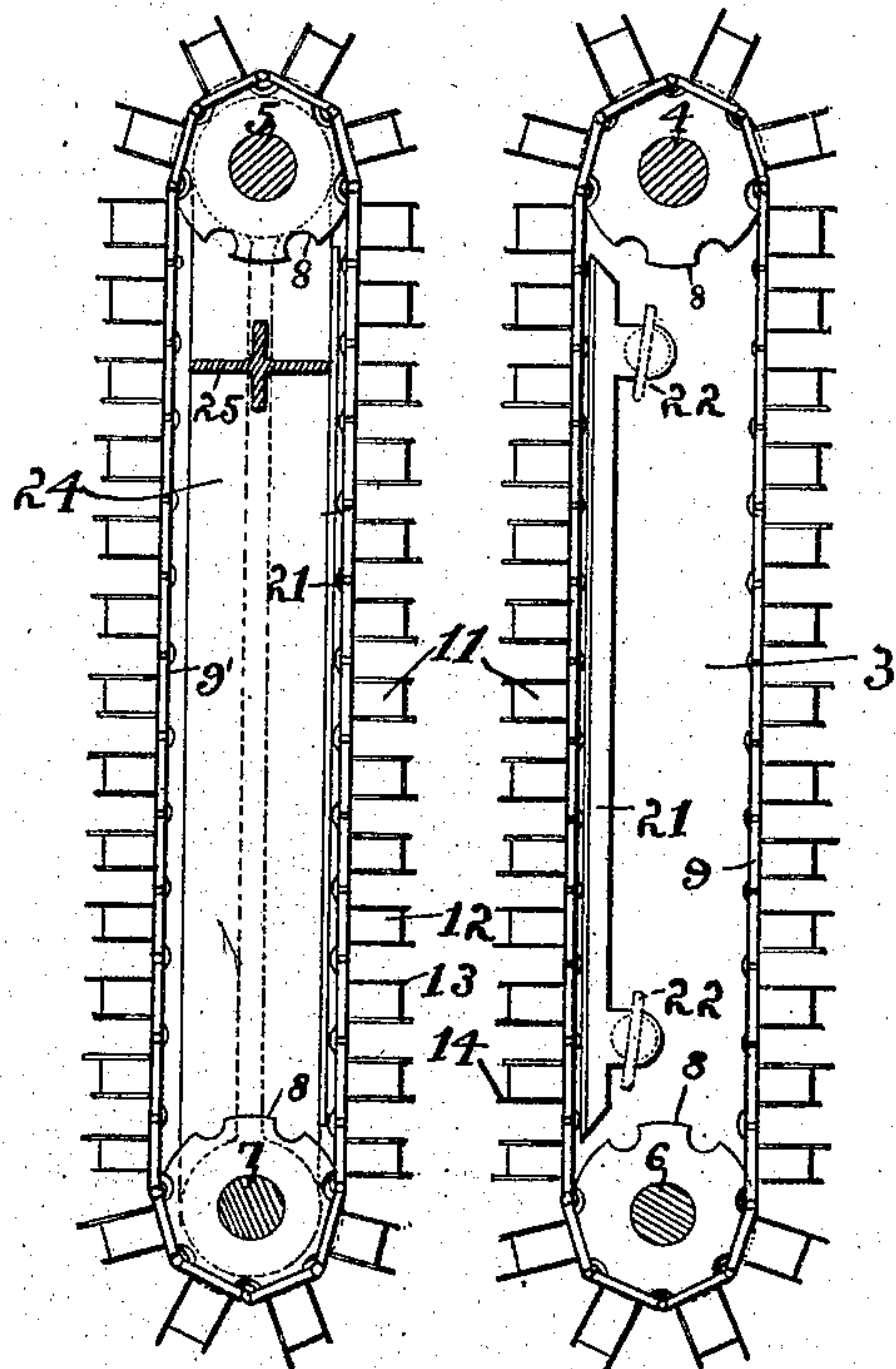


Fig. 3.

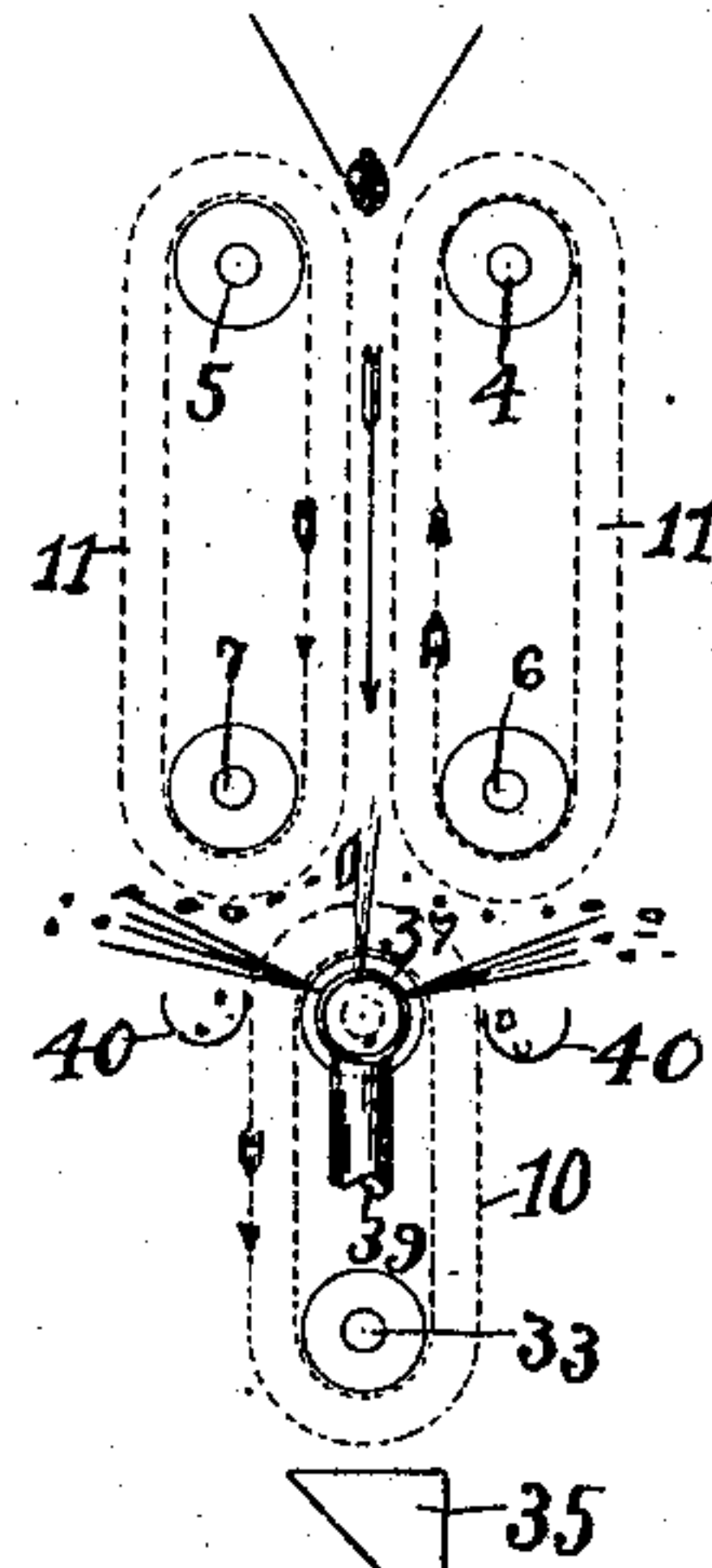
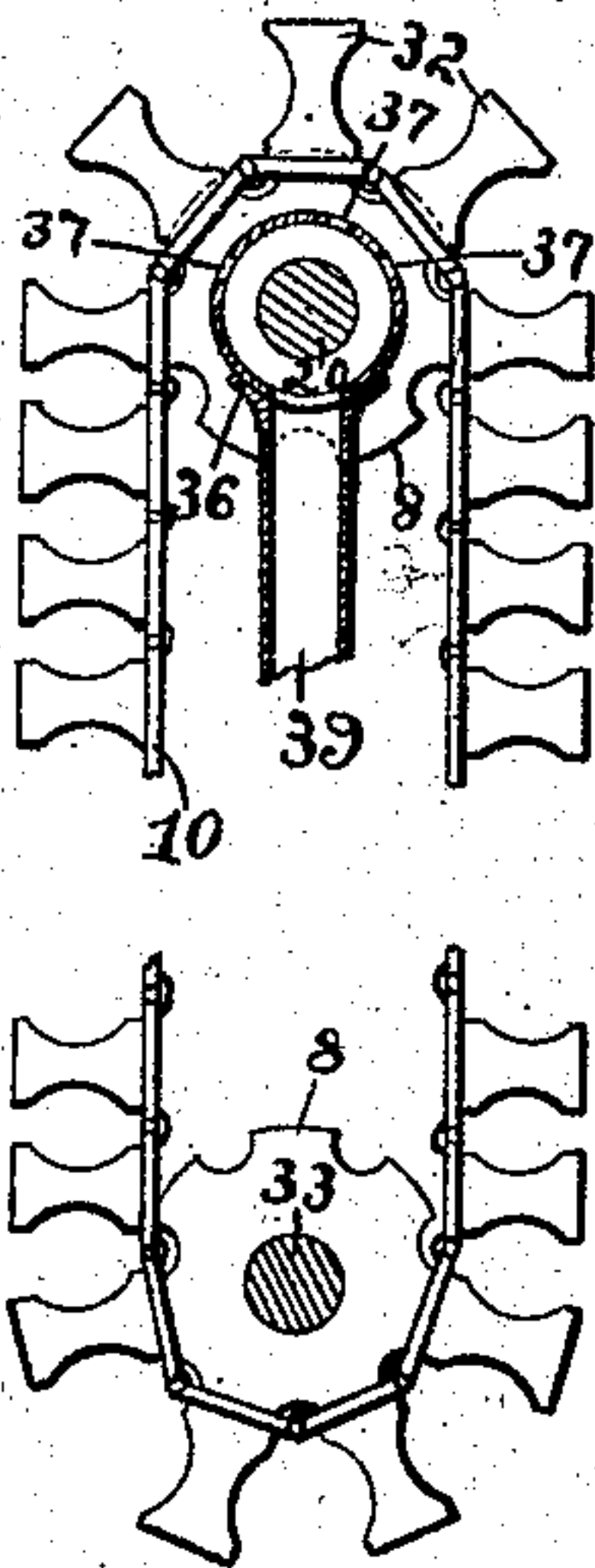


Fig. 4.

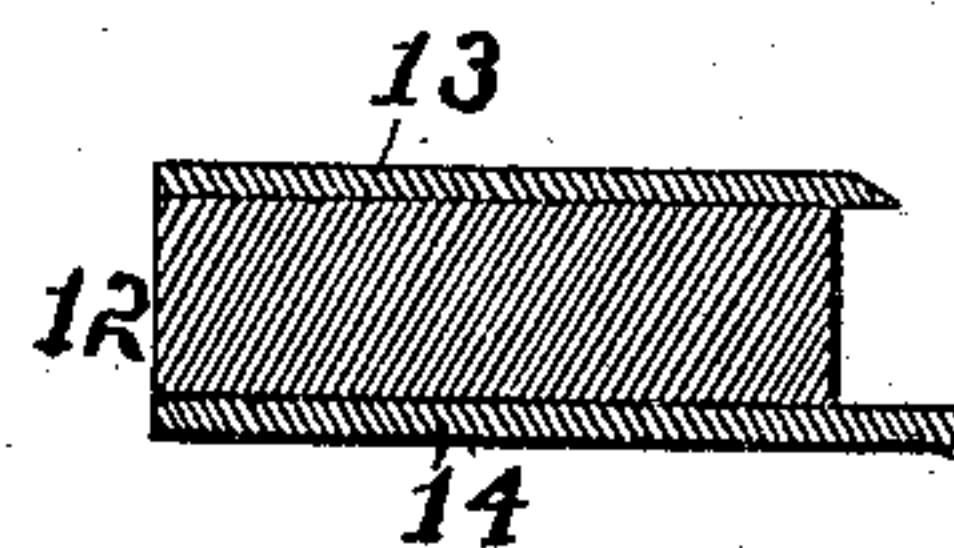


Fig. 5.

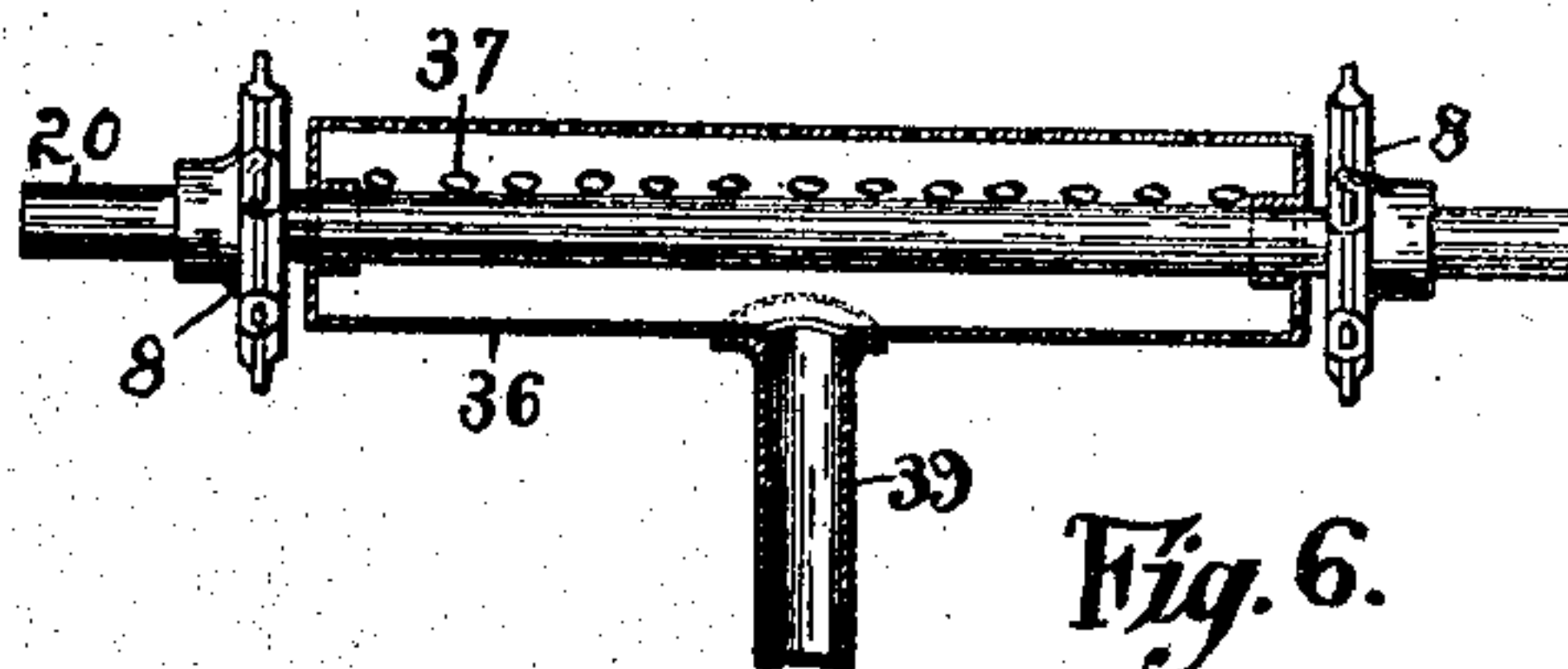


Fig. 6.

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UNITED STATES PATENT OFFICE.

GEORGE W. PHILLIPS, OF CAPELLE, CALIFORNIA.

NUT-HULLER.

No. 918,008.

Specification of Letters Patent.

Patented March 23, 1909.

Application filed November 21, 1907. Serial No. 403,229.

To all whom it may concern:

Be it known that I, GEORGE W. PHILLIPS, a citizen of the United States, residing at Capelle, in the county of Napa and State of California, have invented certain new and useful Improvements in Nut-Hullers, of which the following is a specification.

My invention relates to hulling machines and more particularly to that class of devices used for hulling nuts, such as almonds. In doing such work it is very important that the machine be adapted to remove the hull in all of its stages from green to dry and from nuts with a thin shell as well as from those with a hard shell. It is also desirable that the nuts be separated from the hulls and other refuse after being broken therefrom.

The object of my invention is to provide a machine in which the nuts to be acted upon are caught between relatively movable series of blades or knives and the outer covering or husk stripped off and when desired, the nuts discharged into suitable mechanism for separating the removed portions from the nuts.

An embodiment of my invention is shown in the accompanying drawings in which:

Figure 1 is a side elevation of the machine. Fig. 2 is an end elevation looking from the left of Fig. 1. Fig. 3 is an elevation of the associated hulling chains, and of the lower carrier. Fig. 4 is a diagram illustrating the relation of the hulling devices to the almond carrier and the cleaning or separating device. Fig. 5 is a cross section of one of the hullers. Fig. 6 is a sectional view showing the upper shaft of the almond carrier in connection with the pneumatic blast pipe and discharge.

Referring to Figs. 1 and 3 it will be seen that the principal parts of the machine comprise two upper associated, relatively movable series of husking or hulling devices which operate with a cutting, grinding and dragging action, and a lower carrier which receives the hulled or husked nuts and after they have been cleaned, discharges them. Intermediate of these devices is a pneumatic cleaning and separating device for blowing out the broken and ground husks, chaff, etc. leaving the shells of the nuts clean and free from such material.

The nuts are fed promiscuously in at the top between the hullers as indicated in the diagram, Fig. 4 and pass downwardly by gravity and the action of a portion of the

husking devices while they are exposed to the combined action of the two husking devices, the separated worthless material passing down with them. At the lower ends of the series of husking devices, air blasts drive out the light worthless material, while the nuts, which are heavier, continue downward to the lower carrier. These operative parts are all preferably carried by a single frame shown as composed of a table 1 and two vertical standards 2 and 3. In these standards are the upper shafts 4 and 5, and the lower shafts 6 and 7. Near each end of each of the shafts is a sprocket wheel 8 and upon said wheels are mounted sprocket chains 9 and 9'. Riveted or otherwise secured to these chains are the series of hulling devices 11, whose construction is best shown in the upper part of Fig. 3 and in Fig. 5. Each member of the series comprises a head or block 12 and two attached plates 13 and 14, the forward edges of which project somewhat beyond the block. One of the plates, as 14, projects slightly beyond the other one and has a thin, straight, blunt edge; and the other blade has a sharp cutting edge. Carried by the chains as shown in Fig. 3, the blades of the opposite series extend toward each other and in proximity, and between them and exposed to their action, the nuts pass downwardly. The effective action of these series of plates is secured, preferably by running the chains at differential speeds, and preferably, also, by running their approximate members in opposite directions. This latter feature is clearly illustrated in the diagram, Fig. 4, and the former feature will be understood by an inspection of the gearing in Fig. 1.

On the shaft 6 of one chain or series of hulling devices is a gear 15 and an operating crank 16, for which of course, a power pulley can be substituted. From this gear 15 a gear 17 on the shaft 7 is driven at much higher speed. I have found it a convenient method of gearing up, to include in the gear system the upper shaft 20 of the carrier for hulled nuts. On said shaft 20, is a small pinion 18 and a gear 19, which meshes with the gear 17, and drives the latter at the speed transmitted through the pinion 18. The speed of gear 15 is preferably about what it is convenient for an attendant to impart, say 50 revolutions, and I prefer to gear the shaft 7 in the proportion of about 5 to 1, or say 250 revolutions; but of course these figures only

represent the relative speeds of the two series of hulling chains and can be changed to suit conditions or circumstances.

Where the hulling devices run in proximity, which is during their effective operation, backing plates 21 are provided, partly to keep the flexible chains in their proper lines of motion, partly to provide means for slightly changing their relative position, and partly to provide means whereby they can yield bodily to any unusual internal pressure, such as a stone or other hard substance or even a nut of unusual size. One pair of these plates is adjustably secured to the standards 2 and 3 by means of thumb nuts 22 and slots 23 and the other pair is secured to or formed upon a frame which is loosely mounted between the standards. The frame preferably comprises two side pieces 24 and a cross piece 25, the ends of the frame being perforated for the reception of the shafts 5 and 7 respectively and the ends of the shaft 5 project through slots 26 in the standards so that the upper end of said frame may be moved toward and from the shaft 4. This movement of the frame will cause the hulling devices carried thereby to be adjusted relatively to the other hulling devices, which adjustment between the two sets of devices can be also varied by means of the backing plates 21 upon the standards 2 and 3. The frame is yieldingly held in position by having the boxing of the shaft 5 held against adjustable stops 27 by two springs 28, the tension of which springs can be varied by means of adjusting nuts 29.

Mounted on top of the standards, preferably removable, by means of legs 30, is a hopper 31, through which the nuts are fed to the upper ends of the hulling devices. From there they pass down between the two series of blades and are subjected to the cutting and drawing action caused by the blades moving in opposite directions and at different rates of speed. By having the alternate blades shorter than the others, pockets or troughs are formed in the faces of the hulling devices into which the nuts are forced by the longer of the opposing series and held while the hull is torn or removed by the joint action of the two series of blades. The holding and tearing process is materially assisted by the sharpened edges of the shorter blades which readily enter the hull when it is soft and where it is hard it cuts or cracks it without the danger of crushing the nut, and especially where the shell of the nut is thin or soft. By running the chains on one side faster than on the other the positions of the longer blades relatively to the opposing pockets are constantly shifting or changing whereby the nuts are given more or less of a rotary motion which is constantly presenting the nut in a new position to the action of the blades

until the hull is completely removed. By holding the hulling devices yieldingly at their upper ends they will automatically separate and the unhulled nuts can be introduced and acted upon without danger of breaking any of the parts and the chains are made long enough to permit the blades to act upon the nuts until the hull is entirely removed.

After the nuts pass through the hulling portion of the machine they are preferably delivered to the cleaning portion which consists of a series of pockets or troughs formed upon the chains 10 by longitudinally recessed blocks 32. The shaft 20 and sprockets 8 upon which the upper portion of the chains 10 and blocks 32 are supported is located directly below the space between the two hulling belts so that as the chains pass over the pulleys the blocks are separated and the pockets are opened for the reception of the nuts as they fall from the hulling devices, but as the chains pass into the straight portion of their travel the pockets gradually close and thereby hold the nuts until the pockets are opened by the chains passing over the sprockets on the shaft 33 at the bottom of the standards 2 and 3. From there the nuts pass into a suitable receptacle 34 through a spout 35.

Surrounding the shaft 20 is a tube or pipe 36 which is perforated as at 37 and connected with a blower whose casing is shown at 38, by a conduit 39. The perforations are preferably arranged in three longitudinal series, one directly on top which is adapted to project a current of air up between the hulling devices and the other two are arranged to project blasts of air laterally. The top perforations are preferably smaller than the others so that the upper blast is of less force than the others and only sufficient to deflect the lighter particles to one side or the other without danger of blowing out the lighter nuts. But by the time the chains have carried the nuts into the current of air from the larger openings they have become so firmly seated in the pockets that they are not blown therefrom. As the hulls and refuse portions are blown off by these blasts they are preferably deposited in troughs or chutes 40 at the sides of the standards 2 and 3 and from there delivered at the end of the machine. The blower is preferably operated by a band 41 which passes over a pulley 42 on the end of the lower shaft 33 and a smaller pulley 43 on the end of the blower shaft.

Although I have described my invention as applicable to almonds it is evident that other nuts of the same general character can be quickly hulled and thoroughly cleaned by the continuous process of passing them down through the machine, the power being supplied by the crank in the smaller

machines and by mechanical means in the larger ones.

I do not wish to confine myself to the exact constructions and arrangements herein described and shown in the drawings, as I desire to avail myself of such modifications and equivalents as fall properly within the spirit of my invention.

What I claim is:

10 1. In a nut-huller, the combination of two opposing surfaces, each provided with transversely arranged blades, the alternate blades being shorter than the others and provided each with a knife-edge, and means for moving
15 the adjacent portions of said surfaces in opposite directions and at different rates of speed.

2. In a nut-huller, two opposing relatively movable members each including a series of
20 flexibly connected blocks, blades on said blocks having their edges projecting beyond the fronts thereof, one of the blades being sharpened and the other projecting beyond said sharpened blade, means for varying the
25 distance between said members, and means for moving said blades in opposite directions and at different rates of speed.

3. In a nut-huller, the combination of a support, two opposing flexible members mov-
30 ably mounted therein and provided with projecting blades, means for adjusting said members relatively to each other, relatively adjustable backing-plates for the opposing portions of said members, and means for
35 moving the members in opposite directions.

4. In a nut-huller, the combination of vertically arranged hulling mechanism, a pipe

below the same provided with series of vertically and laterally arranged perforations, the vertical perforations being smaller than
40 the others, a blower connected with said pipe, and a conveyer for the cleaned nuts.

5. In a nut-huller, the combination of vertically arranged hulling mechanism, an endless conveyer below the same provided with
45 longitudinally recessed bars forming pockets, means for moving the bars to open and close the pockets, and means for passing currents of air between the bars to clean the nuts.

6. In a nut-huller, three movable endless
50 and flexible members two of which oppose each other and are provided with hulling devices, while the third is located beneath and between the other two, automatically opening and closing pockets in the third member,
55 and a blower.

7. A nut huller comprising two upper and two lower shafts, sprocket chains connecting each upper shaft to the lower one, hulling mechanism carried by said chains, a verti-
60 cally arranged conveyer located below the hulling mechanism, a blower located near the upper end of the conveyer, and a system of gearing connecting the lower shafts of the hulling mechanism with the conveyer and
65 blower.

In testimony whereof I affixed my signature, in presence of two witnesses, this 23rd day of September 1907.

GEORGE W. PHILLIPS.

Witnesses:

THOMAS D. DENY.

E. L. WEBBER.