

W. N. GARTSIDE.
CORE FORMING MACHINE.
APPLICATION FILED JULY 20, 1907.

898,734.

Patented Sept. 15, 1908.

3 SHEETS—SHEET 1.

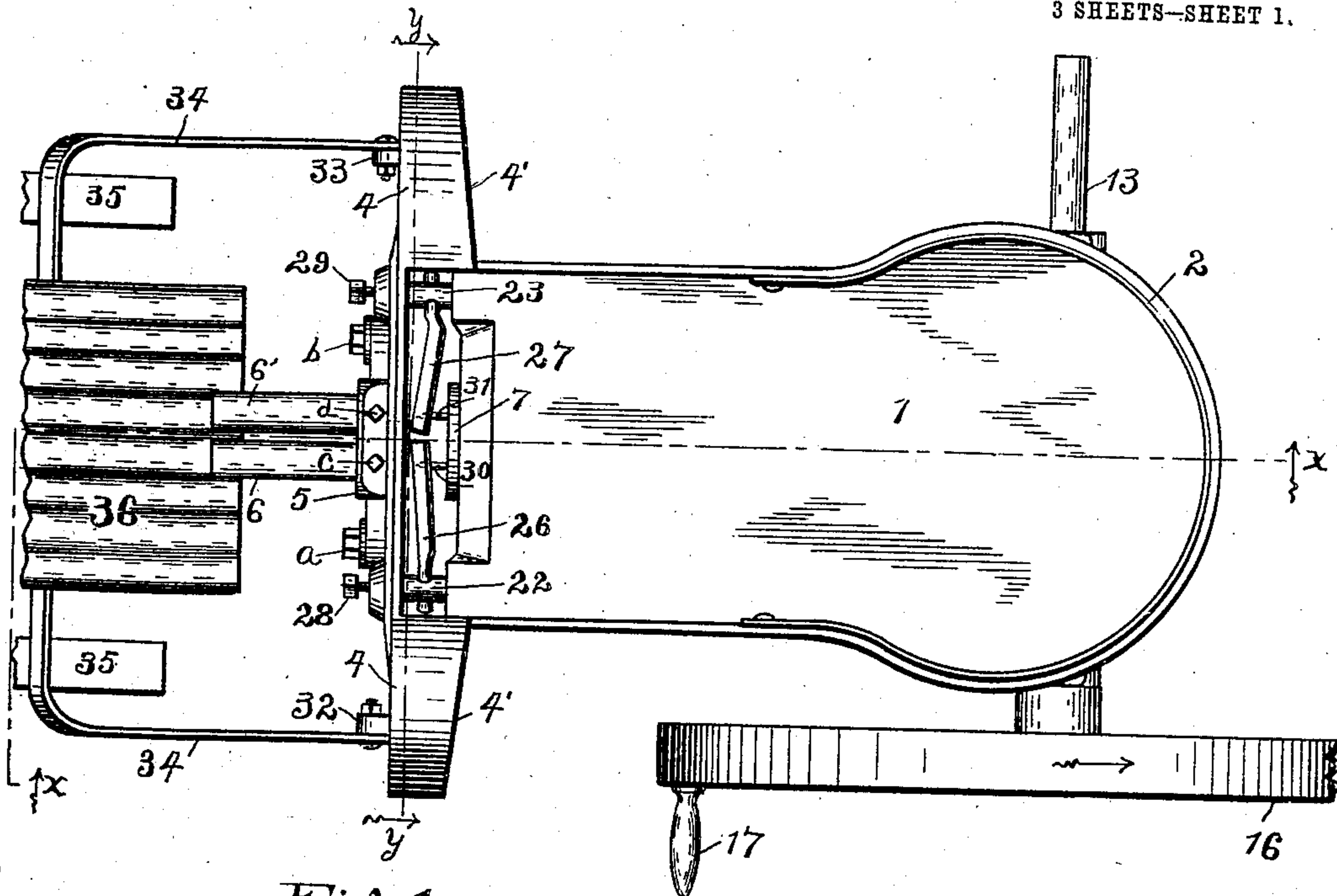


Fig. 1.

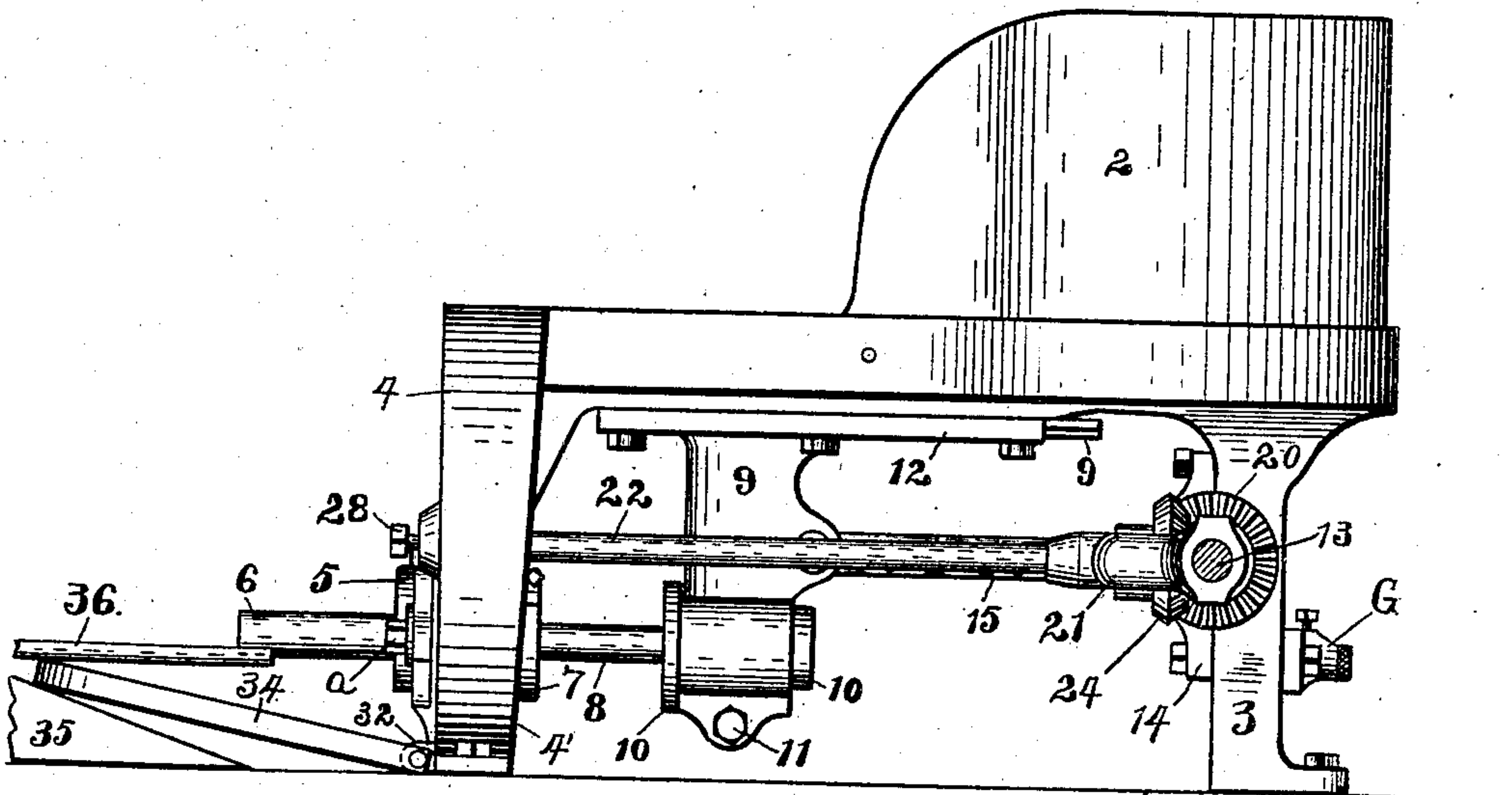


Fig. 2.

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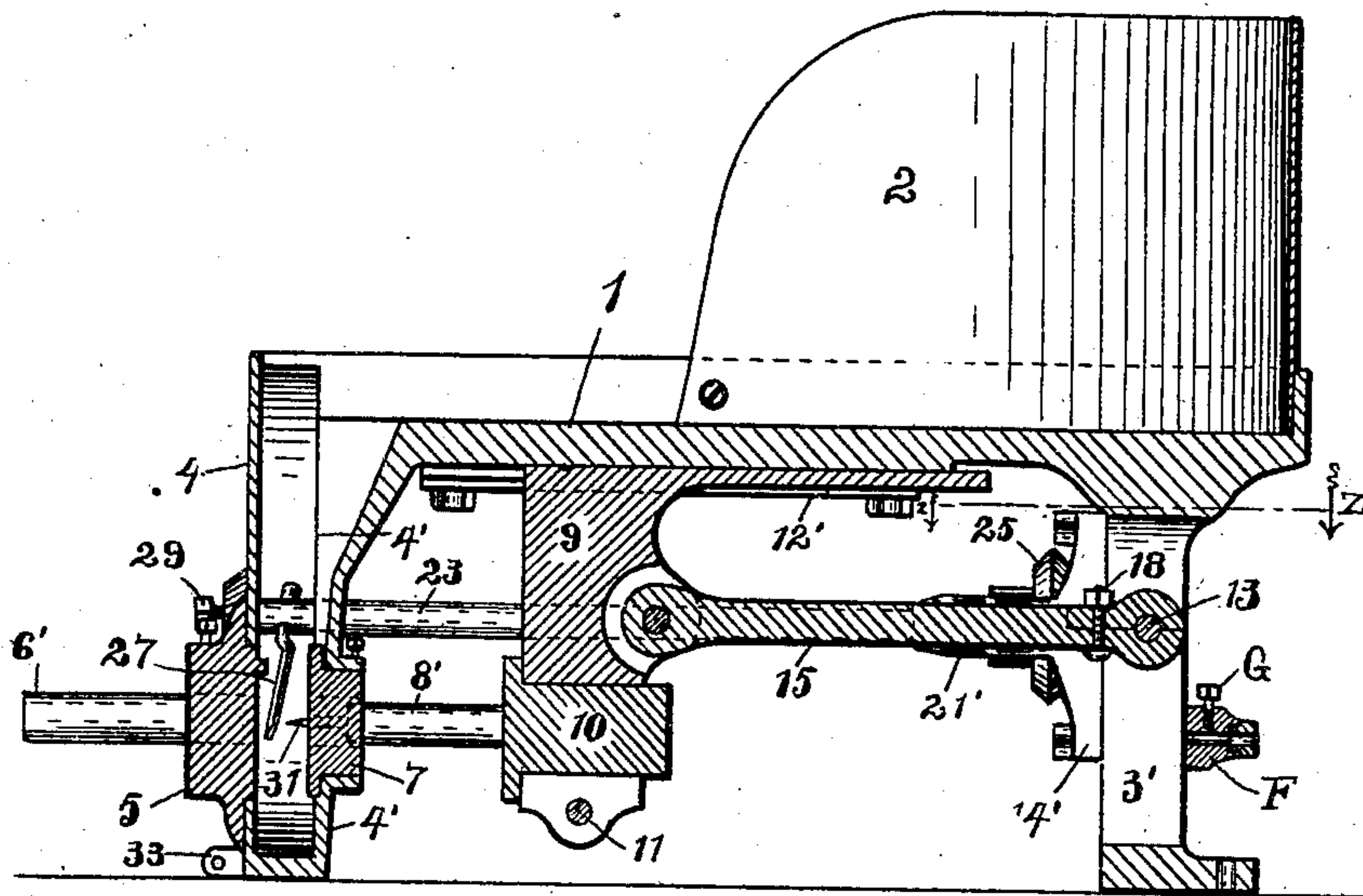


Fig. 3

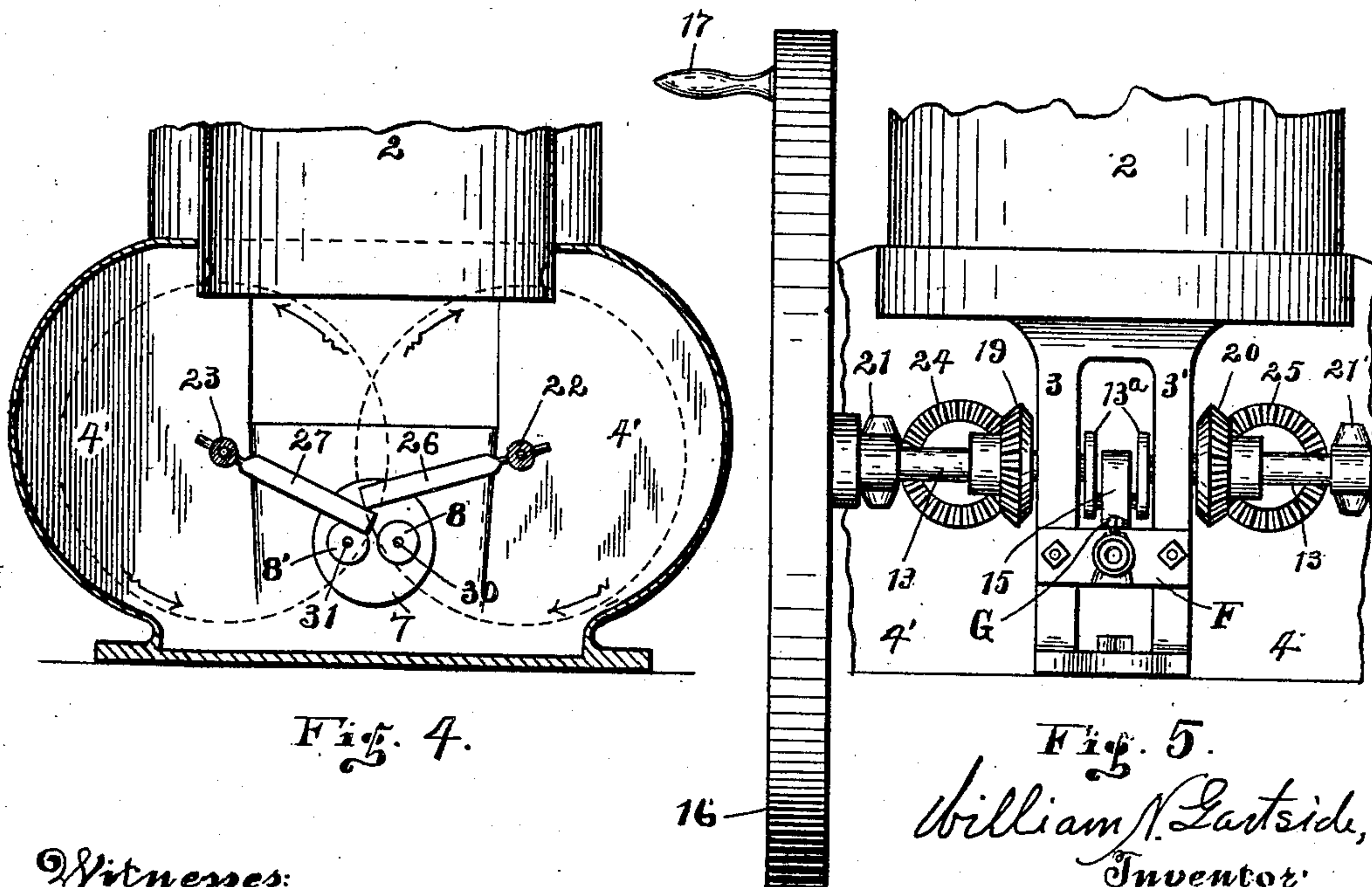


Fig. 4.

Fig. 5.

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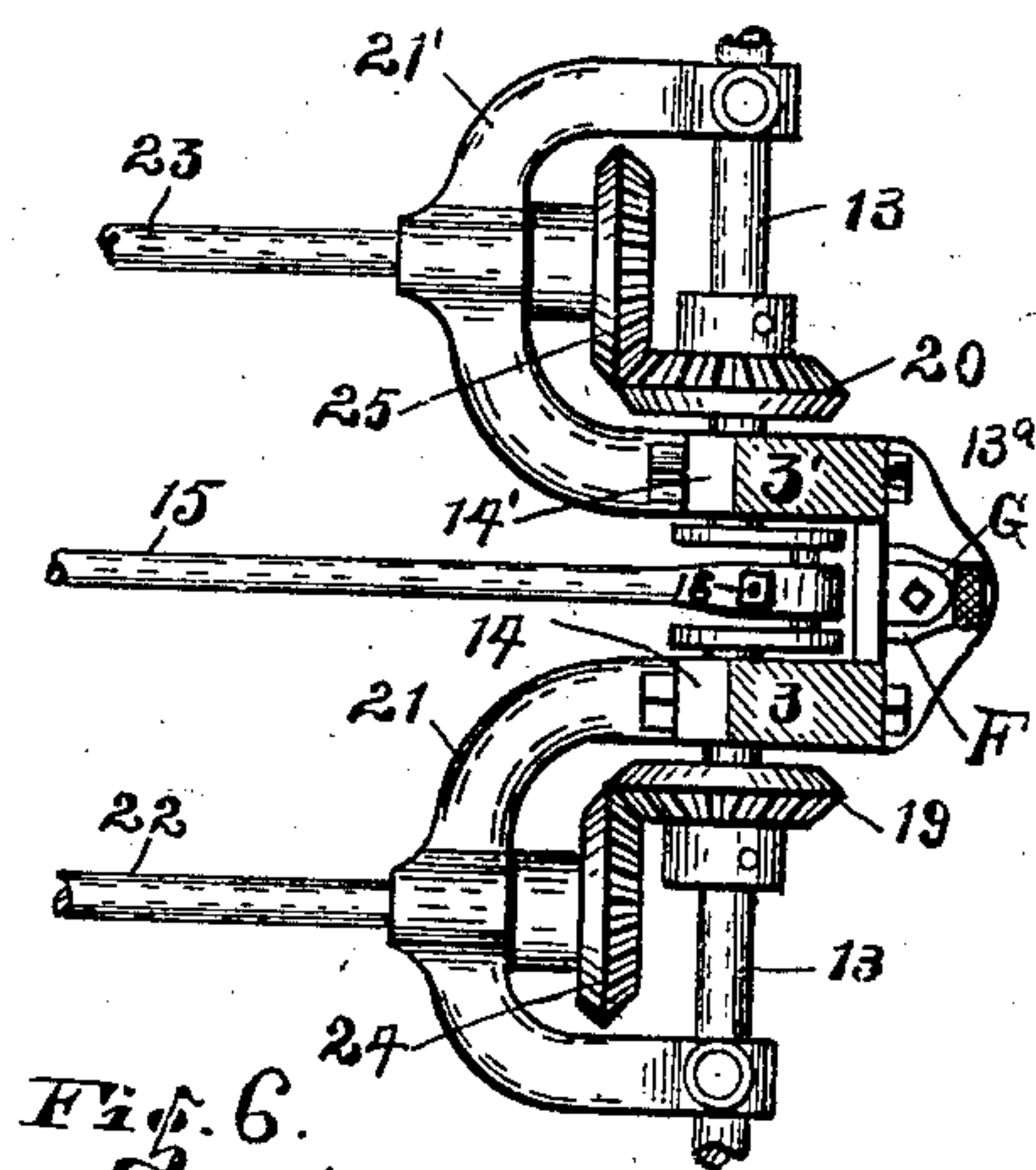
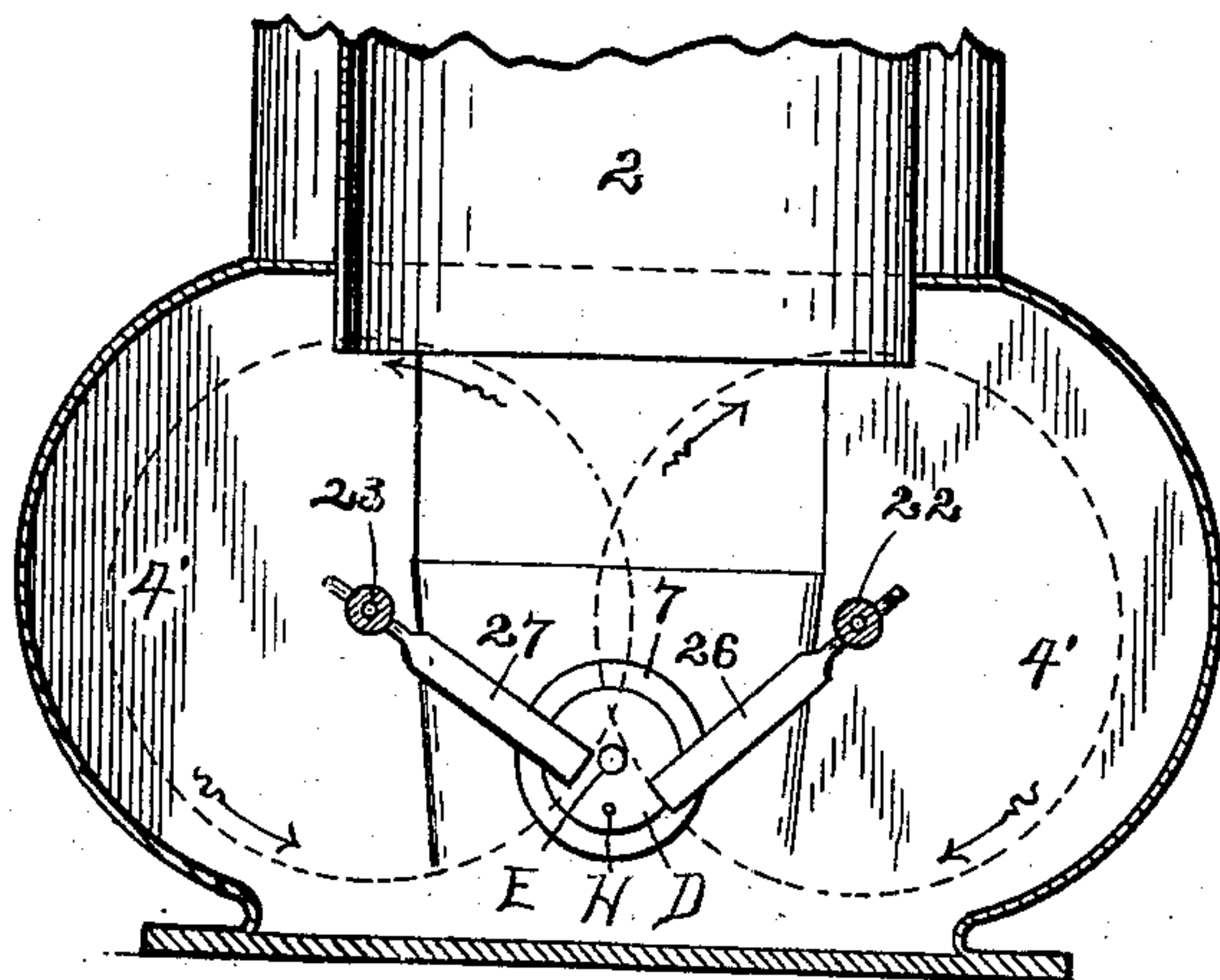
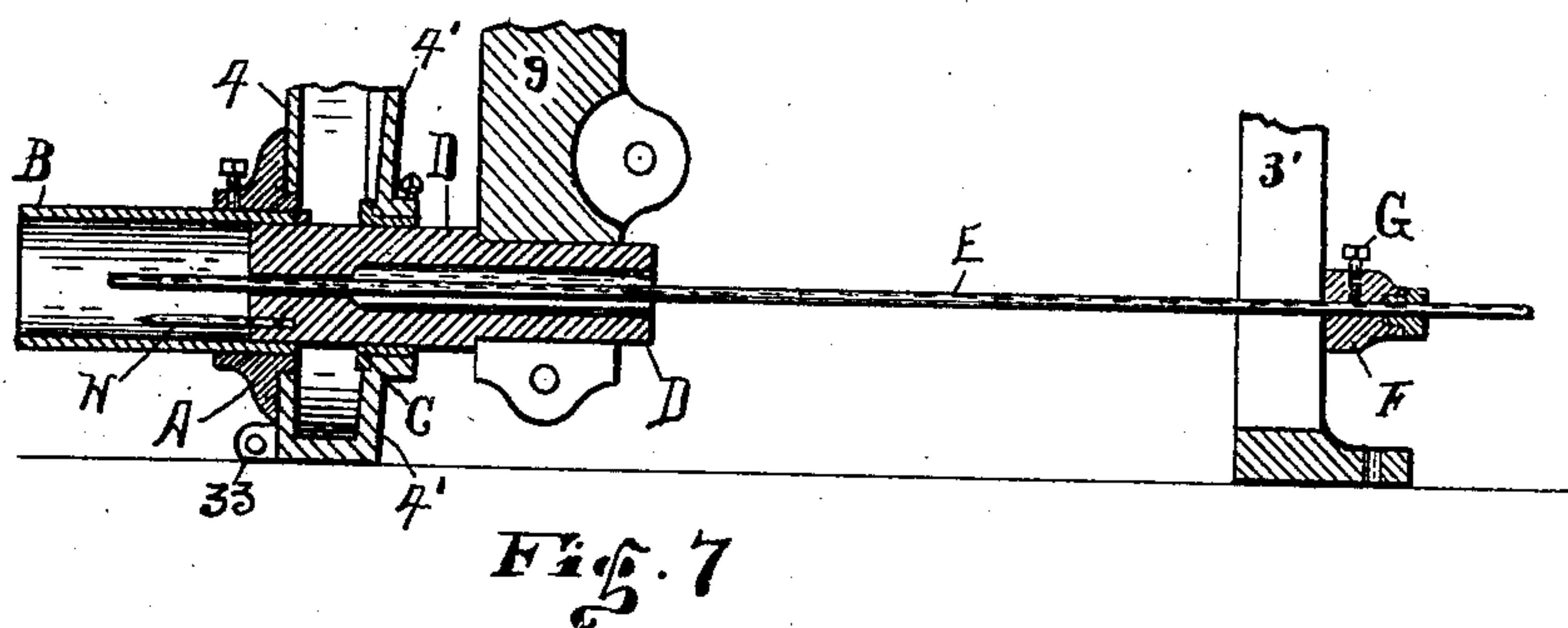
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

WILLIAM N. GARTSIDE, OF RICHMOND, INDIANA.

CORE-FORMING MACHINE.

No. 898,734.

Specification of Letters Patent.

Patented Sept. 15, 1908.

Application filed July 20, 1907. Serial No. 384,769.

To all whom it may concern:

Be it known that I, WILLIAM N. GARTSIDE, a citizen of the United States, residing at Richmond, in the county of Wayne and State of Indiana, have invented a new and useful invention which is denominated a Core-Forming Machine, of which the following is a full and accurate specification and exposition not only of the specific invention itself, but also of one form of mechanism in connection with which the invention is operative and practically efficient.

In connection with the molders' trade it is necessary for certain classes of work that sand-cores be formed, it is also necessary that such cores be provided with a central vent, the material of which the core is composed must be of a certain compactness and also equally compact in all parts of the core being formed,—in other words the core must not be more compact or hard on the under than on the upper-side, and also the core being formed must be of a cohesive strength sufficient to retain it in shape until the liquid metal is deposited therearound after which it should lose its cohesive quality and quickly disintegrate and will flow from the space in the metal formed thereby. To produce, by machinery, said cores having the qualities above designated is the primal object of this invention.

Another object, broadly stated, is the provision of a core-machine which will be strong and durable in construction, efficient and rapid in operation, easily operated and controlled, and which can be manufactured and sold at a comparatively low price.

The specific object of this invention is to provide, in combination with a core forming machine or the like, a swiper, or swipers, for filling the core-mold and for loosening up the sand being delivered thereto, in connection with a plunger, or plungers, for compressing the core being formed to the proper density and for feeding and delivering the finished product.

A further object is to provide, in connection with a core forming machine, one or more swipers for loosening up the sand being employed whereby the sand will be delivered thereby into the space where it is being formed at an equal compactness at all points, to illustrate negatively: If the swipers were not used then the cores formed by the machine would be hard on the underside and soft on the upper side, and for that reason the core would be useless. And, finally, my ob-

ject is to provide a core forming machine in which the feed will be the same regardless of the size or shape of the core being formed, thereby dispensing with a multitude of gears and the time and labor necessary to make the various changes.

Other objects and particular advantages will be brought out and made clear in the course of this specification, and the parts and operations which are new and useful will be defined in the appended claims.

The preferred embodiment of the principles of my present invention is shown most clearly in the accompanying drawings, in which—

Figure 1 is a plan view of my invention in operative position. Fig. 2 is a side elevation of the invention complete. Fig. 3 is a longitudinal central section of the invention, as taken on the line X—X of Fig. 1. Fig. 4 is a cross sectional view of the invention, as taken on the line Y—Y of Fig. 1. Fig. 5 is a rear elevation of the invention. Fig. 6 is a plan view of rear portion of the mechanism below the table. And Figs. 7 and 8 are detail views of modified forms of the invention.

Similar reference characters denote like parts throughout the several views of the three sheets of drawings.

In order that the construction and operation of my invention may be more fully understood I will now take up a detail description thereof in which I will refer to the construction and its intended operation as briefly and as comprehensively as I may.

The numeral 1 denotes a horizontal table having an upturned flange rising from its sides and rear, and a guard 2 extends up from its rear and a portion of its sides to form a material containing space. The rear end of the table 1 is supported by a pair of united standards 3 and 3', which are spaced apart as in Fig. 5; and the front portion of the table is supported by the face-plate 4, which rises above the surface of the table, and whose sides project outward in the segment of a circle, as in Figs. 1 and 4, for the purpose presently appearing; and from the outer edges of the face-plate are rearwardly projecting flanges integral therewith which flanges are connected in the rear, below the table, by an auxiliary plate 4', parallel with the face plate, by which is formed a chamber, which I term the mixing chamber, which chamber opens at the top to the surface of the table as shown in Figs. 3 and 4. All of

said parts, with the possible exception of the guard 2, may be integral with each other, and together forming the frame of the machine.

A comparatively large (circular) aperture 5 is formed through the face-plate 4 near its lower portion, and located central thereof laterally, which aperture is adapted to be closed by a cap or head 5 fitting thereinto, filling said aperture, and extending out therefrom and overlapping the joint therebetween shown in Fig. 3. Said cap or head is detachably secured by cap-screws *a* and *b*. In this instance there are two former-tubes, 6 and 6', extending out horizontally through the cap 5, it however being understood that a greater or less number of such tubes may be employed and that they may be of other configuration in cross section than that shown. These tubes of course lead into the mixing-chamber in the rear of the face-plate as indicated. Said tubes are detachably secured in the cap 5 by the set-screws *c* and *d* as indicated. Directly opposite said aperture in the face-plate 4 is a similar aperture formed through the auxiliary plate 4', as indicated in Fig. 4, in which is detachably secured the cap or head 7 through which, in this instance, operate the two plungers 8 and 8' which plungers may be varied to correspond in cross section with the interior of the respective former-tubes 6 and 6' in a portion of the interior of which they operate. Said plungers are carried and operate with the cross-head 9 to which they are indirectly and detachably connected by the thimble 10, said thimble being adjustably secured clamplike by the bolt 11 as indicated.

It is manifest that the caps 5 and 7 and the thimble 10 are to be made in sets, according to the nature of the core to be formed, to be changed when desired and replaced by others of various size and form.

Located longitudinally of and secured in the center of the underside of the table 1 are a pair of guides 12 and 12' by which is supported and slidably mounted the depending cross-head 9 above referred to.

The numeral 13 denotes the drive-shaft extending across and carried revolubly by the boxings 14 and 14' which latter are secured to the forward faces of the standards 3 and 3'. In the center of said shaft 13 and operative between said standards is the crank 13^a in which is pivoted the rear end of the pitman 15, and the forward end of said pitman is pivoted to the central rear portion of the cross-head 9, as shown in Fig. 3, the function of said pitman being to move the cross-head back and forth within the limits of said crank, thereby moving the forward ends of the plungers forward and backward into and out of their respective former-tubes and across the chamber space between the caps 5 and 7. Said pitman is attached on said crank by being split horizontally from

the rear end extending forward some distance whereby it may be spread apart to surround the contact portion therefor of the pitman, after which it may be secured in normal operative position by the bolt 18, substantially as indicated in Fig. 2.

On one end of the shaft 13 is secured a fly-wheel 16, which may be revolved by the handle 17, or in place of said handle a power pulley may be connected to the opposite end of said shaft if desired.

Secured to the shaft 13 and adjoining the outer faces of the two standards 3 and 3' are the oppositely disposed miter-wheels 19 and 20.

The numerals 21 and 21' denote arms or brackets, secured at one end to the boxing 14 and 14' from which they extend forwardly and outwardly apart and then rearward where they encircle the shaft 13 as indicated in Fig. 5, thereby forming journal bearings for said axle, but their more particular function is to form supports for the rear ends of the respective swiper-shafts which I will now describe.

The numerals 22 and 23 designate the swiper-shafts which are pivotally mounted at their forward ends in the face of the face-plate 4, from which they extend rearwards through the said mixing-chamber, through the auxiliary plate 4', and then extend back to near, and in a line with, the shaft 13, being arranged at right angles thereto. Said swiper-shafts pass through bearings therefor formed in the arms 21 and 21', respectively, which supports their rear portions in the positions indicated. Secured on the rear ends of said shafts 22 and 23, respectively, are the miter-wheels 24 and 25, which mesh with said miter wheels 19 and 20, respectively, and operate at right angles thereto.

Adjustably mounted to the shafts 22 and 23 are the respective swiper-blades 26 and 27, which are set at an angle, with reference to their cross section, as shown in Fig. 3, and when operated they are each adapted to swipe upwards over the inner ends of the former-tubes, one being geared slightly in advance of the other, and both being geared to pass over the inner ends of said former-tubes immediately following the withdrawal of the plungers therefrom, as is clearly indicated in Fig. 1, and being oppositely disposed as to their movements, they turn upward, outward, and inward through their respective portions of the mixing-chamber. Said swiper-blade each has a stem at its base which is inserted in an aperture therefor formed at right-angles through the respective shafts 22 and 23, and after being adjusted to the desired inclination they are securable by the respective set-screws 28 and 29.

Extending forward from the forward ends of each of the plungers 8 and 8' is a needle-

point piercer, designated by the numerals 30 and 31, which are driven into the sand being formed in the tubes 6 and 6', and which of course are withdrawn as the plungers recede, thereby forming the vent aperture longitudinally of the core being formed.

Extending forward from the lower portion of the face-plate 4 are two ears 32 and 33 to which are pivoted the ends of the frame 34 whereby the forward central portion of the frame may be adjusted to the height desired and supported by wedges or the like designated by the numeral 35.

The numeral 36 denotes a sheet metal pan or tray adapted to rest on the frame 34 with its rear edge underneath the former-tubes and preferably on a line therewith as shown in Fig. 2.

I will call attention to the fact that the swipers are geared whereby one of them will move slightly in advance of the other; that the plungers are geared to reciprocate at right angles to the movements of the swipers; and that the swipers and the plungers are geared to operate synchronously, receiving the actuations from a common source of power. I would also emphasize the fact that the cross-head is reciprocally suspended from the underside of the table, and that the other parts which are liable to become damaged by sand and dirt are located underneath and are protected by the table thereabove.

Reference has hereinbefore been made to various modifications of the specific construction of my invention herein shown, some of these modifications are shown in the accompanying drawings which I will now describe: The modifications shown in Figs. 7 and 8 are intended, more particularly, for forming a single core of comparatively large size, for which purpose the cap 5 is removed to be replaced by the cap A having fitted therein the large former-tube B, in lieu of the tubes 6 and 6'. The cap 7 is replaced by the cap C having an aperture therethrough the size of the interior of the tube B. And the plungers 8 and 8' and the thimble 10 is replaced by the plunger D which is carried by the cross-head 9, and operates through the cap C, with its forward end adapted to fit in the former tube B as shown. Extending centrally and longitudinally through the plunger D is a round aperture for the rod E, which rod is secured as follows: Secured across the rear faces of the standards 3—3' is a hanger F in which is adjustably securable the said rod E, by means of the set-screw G. Said rod E is projected forward through the plunger D and extends some distance into the interior of the former-tube B as shown. Extending forward from the face of the plunger D, below the central aperture through the plunger, is a needle-point piercer H. With this modified construction it is apparent that I am enabled to form a large core of

sand with substantially the same mechanism previously explained, the only material difference being the employment of the stationary rod E, around the forward end portion of which the core is formed, this change being necessary in order to provide a larger vent aperture in the core being formed.

By the employment of the vent-rod E and the piercers secured in the ends of the plungers it is apparent that I am enabled to provide the cores being formed with double vents therethrough, and that the two vents may be of different sizes.

It will now be notably apparent that if the machine be arranged as shown in Fig. 2 that it may be operated by turning the shaft 13 to the right, in the manner above stated, which will cause the pitman 15 to move the cross-head back and forth carrying the plungers as specified, and that the swipers will be carried around in their chamber as indicated by the circular dotted lines in Fig. 4. Now if a quantity of sand of the requisite dampness and consistency be contained on the table 1 it may be fed off the forward end of the table and deposited in said mixing chamber, therefore, if the machine be operating as stated, the results will be substantially this: The plungers on their forward stroke will, in the first instance, press a portion of the sand into the forming-tubes, the plungers will then be withdrawn, and the swiper-blades, continually stirring up the sand in the mixing-chamber, will swipe across the rear end of the former-tubes, and by reason of the inclination of said blades they will fill the space, left by the plungers in the former-tubes, after which the plungers will again be driven forward into the former-tubes thereby packing the sand deposited by the swipers and moving forward the core being formed, after which the plungers will be withdrawn and allowing the swiper-blades to act as before, and these operations will continue as long as desired, the finished cores being pushed forward onto the tray 36.

It should be understood that the inclination of the swiper-blades are such as to always fill the space left in the former-tubes by the plunger, or plungers, the surplus sand being moved away from the rear end of the former-tubes, by the swiper-blades, when the plungers are moving forward, by which it is apparent that the amount of sand and its compactness in the finished core may be predetermined and regulated with absolute exactitude. By reason of the swiper-blades operating upward over the ends of the former-tubes it is evident that I overcome and counterbalance the tendency of the sand to settle to the bottom of the former-tubes. In this instance I show my machine arranged to operate horizontally, but I have found that it may be constructed to operate vertically with only slight modifications of the con-

struction and with no changes in the principles thereof.

It should also be understood that a single swiper-blade may be employed in place of two, and that the swiper or swipers may operate by a different mechanism than that described. I also desire that it be understood that various changes and modifications may be made in the details of construction without departing from the spirit of my invention or of sacrificing any of the advantages thereof.

Having now fully shown my invention and the best means for its construction to me known at this time, what I claim and desire to secure by Letters Patent of the United States, is—

1. In combination with a core forming machine having a mixing-chamber and one or more former-tubes leading therefrom and a plunger for each former-tube operating back and forth through said chamber; a swiper-blade for each former-tube, each of the swiper-blades being adjustably mounted on a shaft having a constant rotation in one direction and extending across the mixing-chamber parallel with the plungers, said swiper-blades being disposed at an angle with reference to the inner end of the former-tube over which it is adapted to move on its upward rotation to press the core material thereinto during the interval that the plunger therefor is withdrawn and at same time removing the surplus material from the path of the plunger, means for changing the axial inclination of the swiper-blades, and means for operating the plunger and the swipers in succession, all substantially as shown and described and for the purposes set forth.

2. In combination with a core forming machine having a core material chamber and a former-tube leading out therefrom, and a plunger adapted to pass through said chamber and enter the former-tube; of a swiper-blade adapted to pass over the inner end of the former tube and press a portion of the core material into the former tube and at same time removing the surplus core material from in front of the plunger, the forward stroke of the plunger following directly after

said action of the swiper-blade, all substantially as shown and described.

3. In combination with a core forming machine having a core material chamber and a pair of former-tubes leading out from the chamber and a plunger for each of said tubes, each plunger being adapted to operate across through the material chamber and enter its respective former tube at each forward stroke; a pair of swiper blades turning in opposite directions through the material chamber and operating at right angles to the operations of the plungers and adjoining the inner ends of the former-tubes and adapted on their upward movements to fill the former tubes with the core material immediately in advance of the entrance of the plungers thereto, one of said swiper blades being timed slightly in advance of the other by which their paths of rotation may overlap each other, all substantially as shown and described.

4. In combination with a core forming machine having a core material chamber and formers leading out from said chamber and plungers reciprocating through said chamber; of swipers adapted to pass across the inner ends of the formers and deposit therein an amount of core material equal to the amount of material pressed forward in the tube by the plungers on their preceding forward stroke, and means whereby the angular inclination of the swiper blades may be adjusted.

5. In combination with a core forming machine of the character set forth, a set of shafts of constant rotation in one direction and opposite to each other, a swiper blade carried by each shaft and disposed at right angles thereto, means for adjusting the angular inclination of each blade by the means whereby it is secured to its shaft, all substantially as shown and described.

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

WILLIAM N. GARTSIDE.

Witnesses:

EVA MILLER,
R. W. RANDLE.