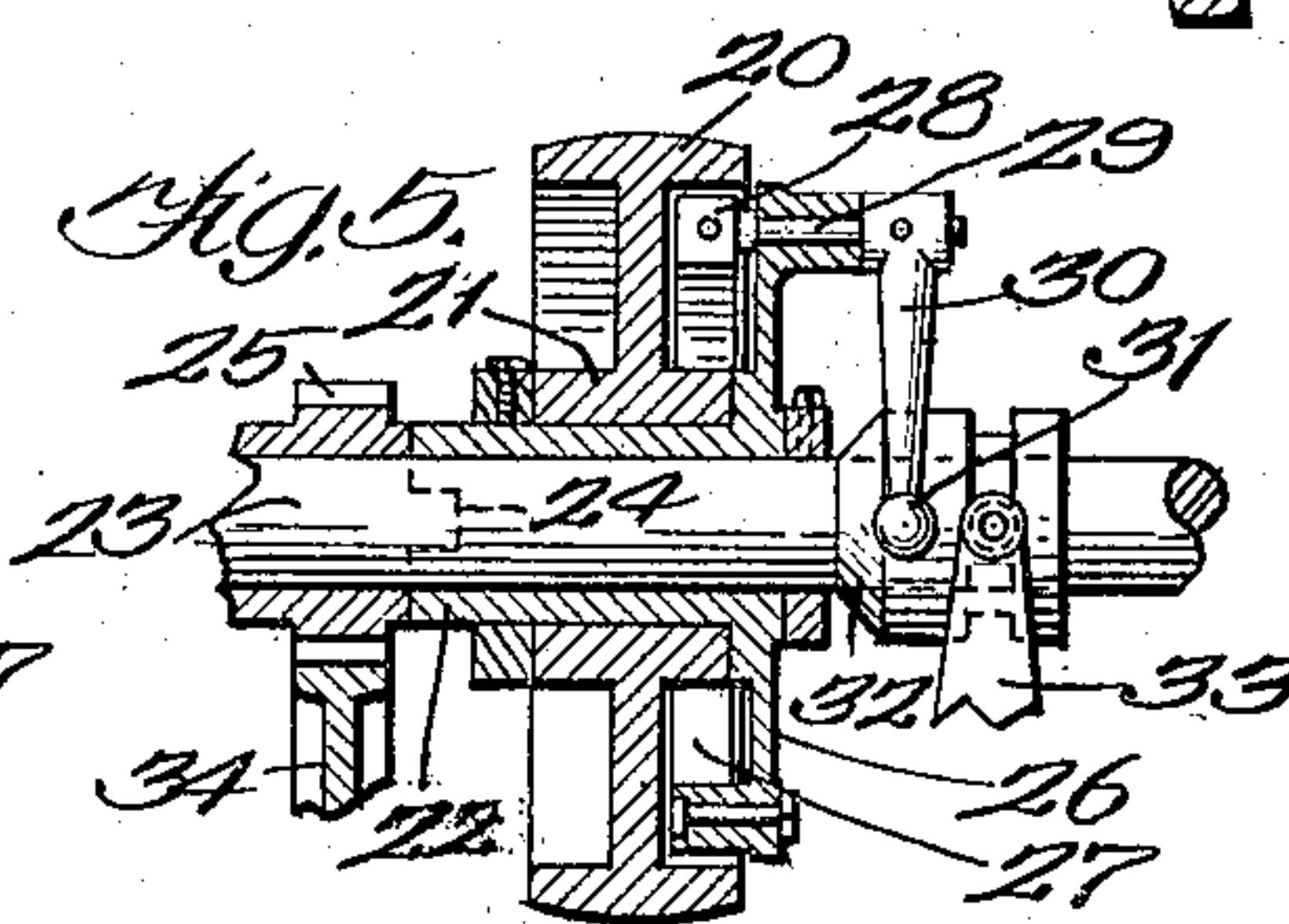
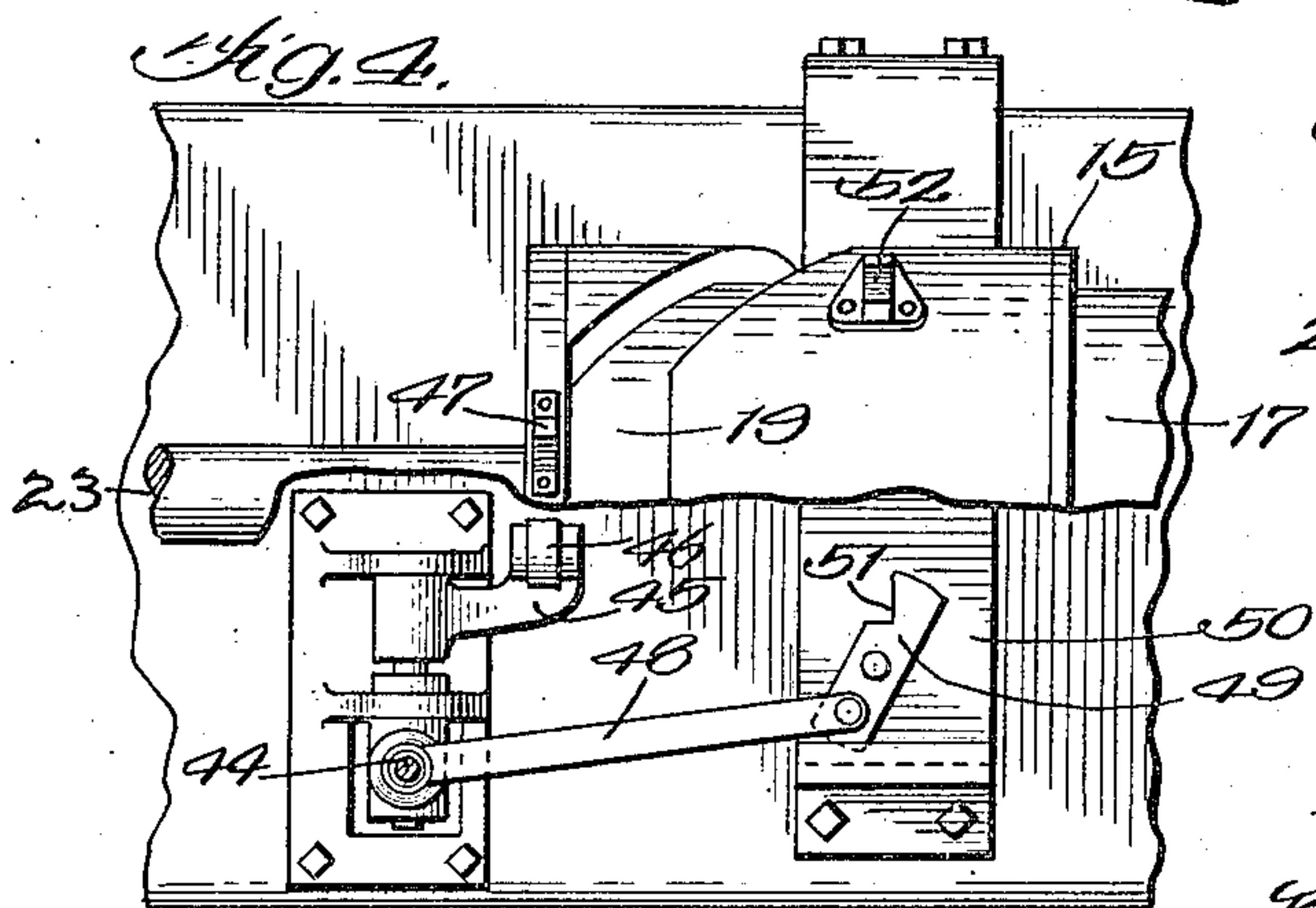
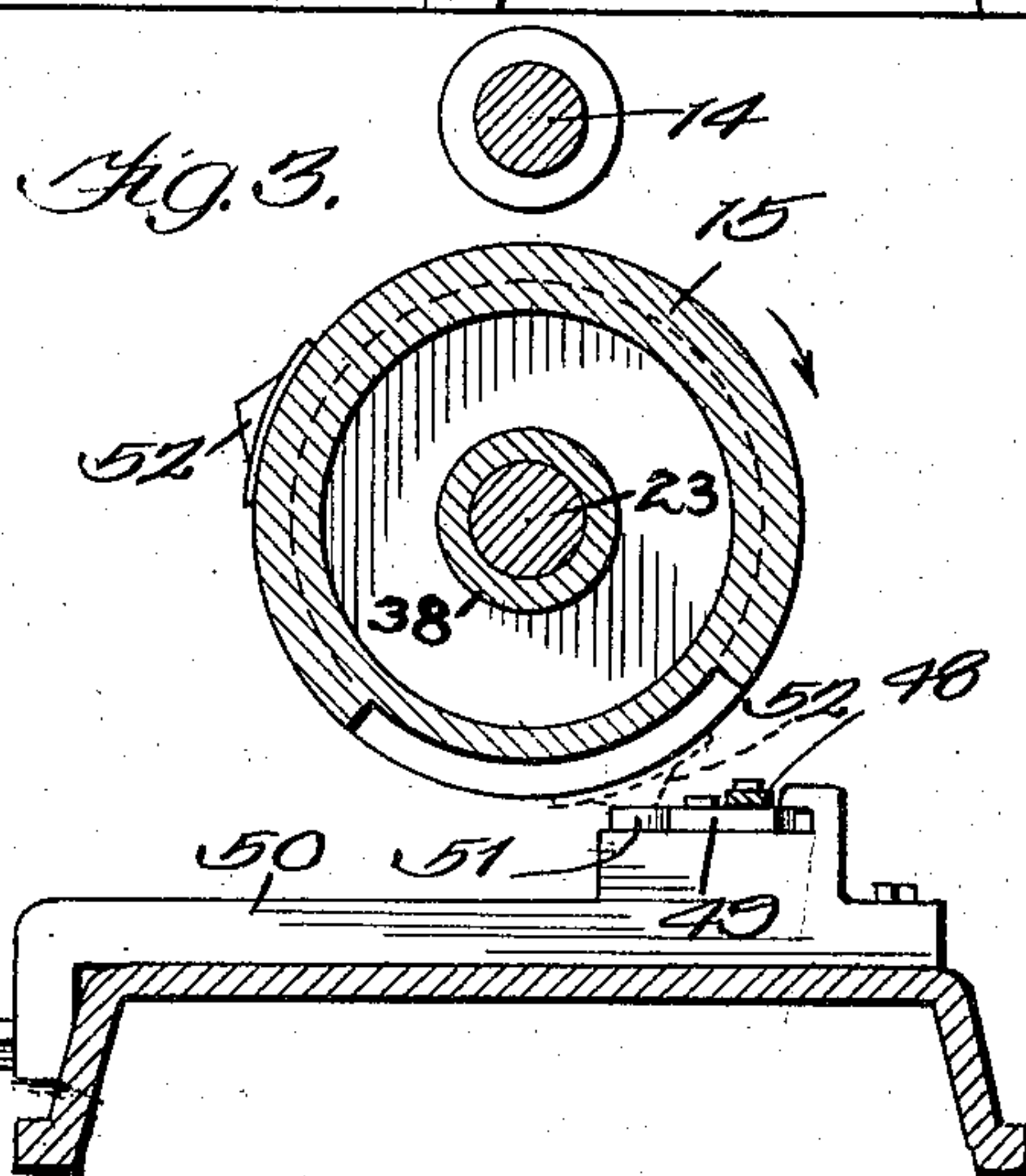
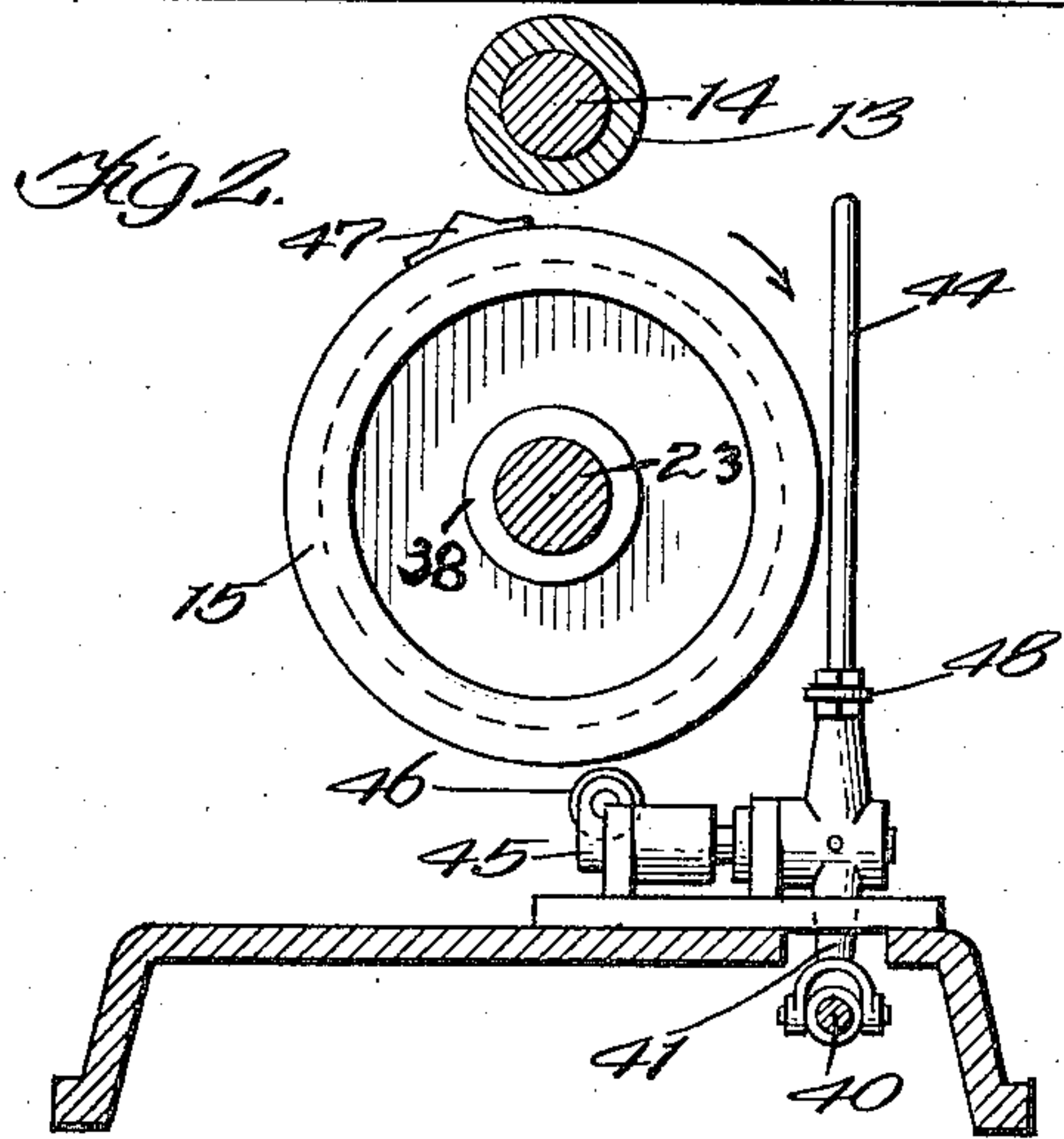
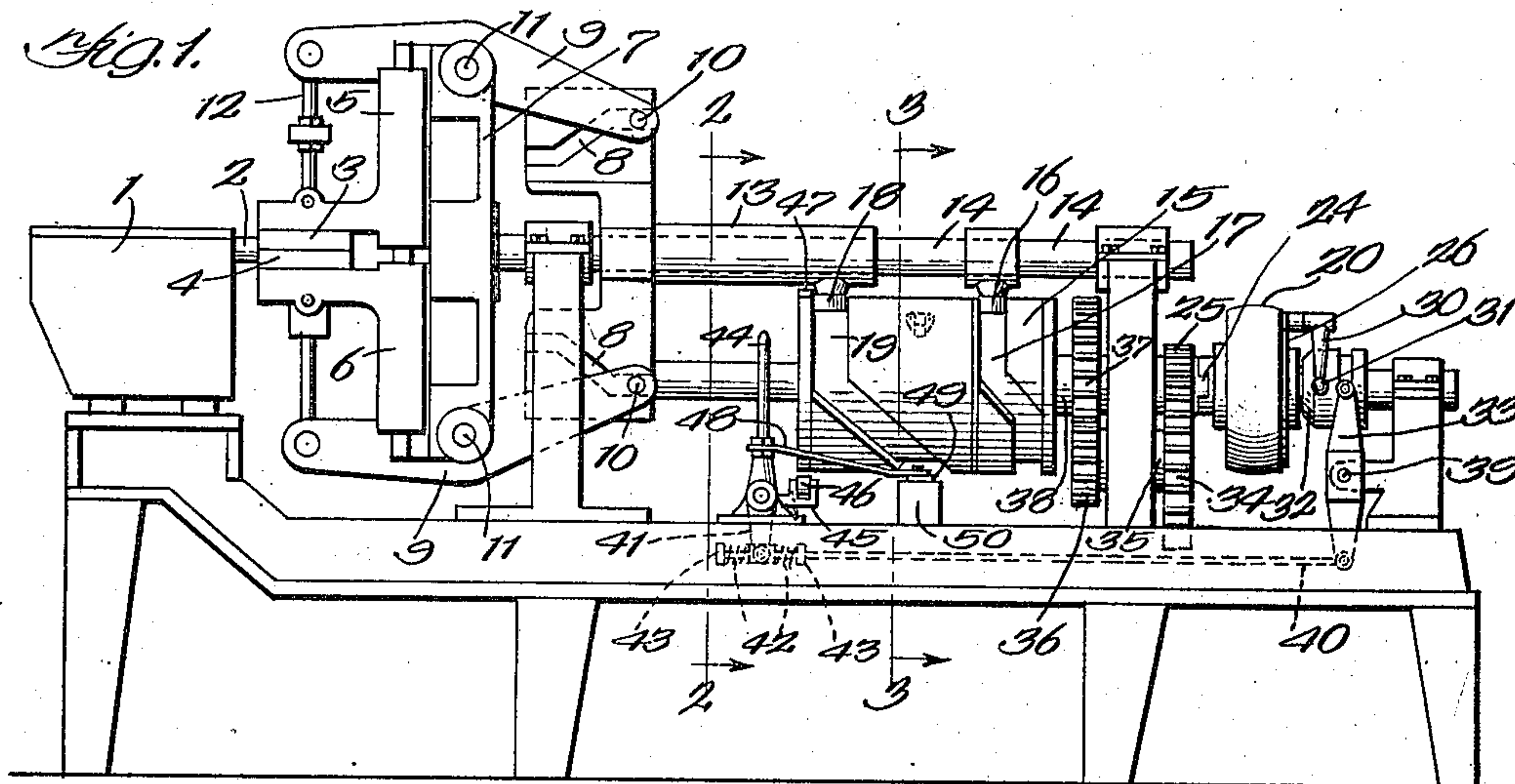


Jan. 2, 1923.

1,440,557

F. F. SCHRODER.  
CASTING MACHINE.  
FILED SEPT. 10, 1920.



Inventor:  
Fred F. Schroder  
By L. H. Bragg  
Att'y.



Patented Jan. 2, 1923.

1,440,557

# UNITED STATES PATENT OFFICE.

FRED F. SCHRODER, OF CHICAGO, ILLINOIS, ASSIGNOR TO HENRY G. SAAL, OF CHICAGO, ILLINOIS.

## CASTING MACHINE.

Application filed September 10, 1920. Serial No. 409,343.

*To all whom it may concern:*

Be it known that I, FRED F. SCHRODER, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Casting Machines; of which the following is a full, clear, concise, and exact description:

My invention relates to machinery of the class which automatically comes to rest after completing a cycle of operations; the invention having been embodied in a die casting machine, but to which embodiment the invention is not to be limited. Such a machine is apt to continue in movement too long after its cycle of operations has been finished, due to the momentum of its parts, and operators who are required to do work in relation to the machine after a cycle of its operations has been concluded are sometimes injured when the machinery unduly continues in movement. My invention has for its object the elimination of this objectionable characteristic.

In carrying out my invention hand operated clutch mechanism or other power connecting means is employed to couple the machine with driving means each time a cycle of operations is initiated. Mechanism operated by the machine throws the clutch out of action when a cycle of operations is concluded. This clutch releasing mechanism preferably includes a cam that trips the clutch, the machine thereafter continuing in dying movement, within a calculated interval. If the machine should continue in movement sufficiently beyond this calculated interval it may so far enter upon a succeeding cycle of operations as to injure the operator if he is not on guard for such a contingency. To prevent such an occurrence I provide a device for positively engaging an added or other part of the machine, this device being placed in holding position by the aforesaid cam when releasing the clutch and serving its purpose if the machine should not cease its dying movement within normal range.

I will explain my invention more fully by reference to the accompanying drawing showing the preferred embodiment thereof as applied to a die casting machine and in which Fig. 1 is a side elevation of the machine; Fig. 2 is a sectional view on line 2—2 of Fig. 1; Fig. 3 is a sectional view on line

3—3 of Fig. 1; Fig. 4 is a plan view of that part of the machine where my device may be located; and Fig. 5 shows one form of clutch.

Like parts are indicated by similar characters of reference throughout the different figures.

The die casting machine illustrated operates upon liquid material, such as molten white metal, which solidifies in its molded form while being sufficiently cooled in the machine. By governed means, admission of molten material may occur from the melting pot 1 through the discharge nozzle passage 2, as set forth in my co-pending application Serial No. 299,341, filed May 23, 1919.

Compressed air effects the ejection of sufficient metal through the nozzle passage 2 into the mold formed by the dies 3, 4 which are to define the shape of the casting. The nozzle 2 has abutting engagement with the mold or die structure 3, 4. When sufficient molten metal has been admitted to the die structure to form the casting the sprue is closed. The die 3 is removably secured to a die carrier 5. The die 4 is likewise secured to a die carrier 6. The upright portions of the die carriers are in tongue and groove connection with the head 7. The die carriers are thus vertically movable transversely of the horizontal plane at which the opposing faces of the dies 3 and 4 meet. Timely operated cams 8 are reciprocable longitudinally of the axis of the machine. Cam levers 9 carry cam rollers 10 which operate in the cam grooves in the reciprocable cams 8. Said cam levers are intermediately fulcrumed at 11 upon the head 7. The forward end of each cam lever is in pivotal connection with a rod 12, these rods being connected at their inner ends respectively with the die carriers. The cams 8 are mounted upon the common carrier 13 by means of which said cams are reciprocated. When the cam carrier 13 is drawn forwardly the front ends of the levers 9 are moved toward each other with the result that the die carriers are moved toward the axis of the machine until the adjacent faces of the dies 3 and 4 meet to close the mold space whereupon the molten metal is exuded into the mold to an extent sufficient to form the cast object. The cam carrier 13 is then moved rearwardly to separate the carriers



and the dies thereon to permit removal of the cast object.

The reciprocable horizontal supporting rod 14 carries the head 7 and it is slidably mounted to be movable within and longitudinally of the reciprocable cam carrier 13 whereby the dies are moved toward and from the nozzle 2.

The reciprocable rod 14 and the head 7 fixedly secured thereto and the reciprocable cam carrier 13 are operated in orderly sequence by the cam cylinder 15. The rod 14 carries a cam roller 16 receivable in the cam groove 17 of the cylinder 15. The cam carrier 13 carries a cam roller 18 receivable in a cam groove 19 in the cylinder. The cam grooves 17 and 19 are so shaped and related and the cam cylinder 15 is so rotated that the cam carrier 13 and the cams fixed thereon are advanced first to close the mold 3, 4 whereafter the cam carrier 13 and the head 7 are advanced in fixed relation to each other to bring the front faces of the dies 3 and 4 against the discharge end of the discharge nozzle 2. When this adjustment has been effected forcible passage of molten metal into the mold is effected. The cam carrier 13 is then moved rearwardly whereby the cam levers 9 are operated to open the mold.

I have illustrated a belt driven pulley 20 as one means for operating the machine. The hub 21 of this pulley is free to turn upon and with respect to the sleeve 22 which itself is free to turn upon and with respect to the shaft 23. The sleeve 22 is coupled at 24 with the pinion 25 which is free to turn upon and with respect to the shaft 23. The sleeve 22 is provided with a flange 26 which carries a split band 27 which may be expanded by a cam 28 to bring it into engagement with the inner peripheral surface of the pulley. The cam 28 is mounted upon a shaft 29 which may be turned by a clutch finger 30 to expand the band. The finger carries a knob 31 that is engageable by the clutching cone 32 for the purpose of rocking the finger to apply the clutch band to the pulley. The clutching cone 32 is slidably mounted upon the shaft 23 and may be moved in either direction along the same by the clutch lever 33. When the band 27 is applied to the pulley 20 the pinion 25 turns with the sleeve 22 which turns with the pulley when the clutch is applied. The pinion 25 is in mesh with a spur gear 34 keyed upon the shaft 35. A pinion 36 is also keyed upon the shaft 35 and is in mesh with the spur gear 37 fixed upon the quill shaft 38 that carries the cylinder 15 and which is, through the intermediation of the gearing described, rotated at a reduction in the speed at which the pulley 20 is turned.

The clutching lever 33 is centrally pivoted at 39. It is operable by means of a rod 40 which slides in the lower end of a lever 41, being held in assembly with this lever

through the intermediation of aligned springs 42 that abut against said lever at their inner ends and against nuts 43 on the rod 40 at their outer ends. The lever 41 is provided with a handle 44 whereby the rod 40 may be moved in either direction to effect movement of the clutching cone 32. The lever 41 has an extension 45 which carries a roller 46 whose plane of rotation is in the plane of rotation of the cam 47 upon one end of the cam cylinder 15. The cam 47 will serve automatically to engage the roller 46 when the cam carrier 13 is withdrawn to its rearmost position, the cylinder 15 being in rotation, whereby the rod 40 is operated to release the clutch. The cylinder 15 will normally rotate further through a short arc, due to its momentum, coming to rest in preparation for the next cycle of operations which is initiated, as before, by a reapplication of the clutch effected by the normal operation of the clutch lever 41.

To guard against the automatic initiation of the next cycle of operations in case the cylinder should move too far after the clutch is released, I provide a holding device now to be described.

A link 48 connects the lever 41 with one end of a locking bar 49 centrally pivoted upon a stationary mounting 50. This locking bar is formed with a clearing notch 51 that is placed within the plane of rotation of a lug 52 upon the cylinder 15 when the cylinder is being driven through the intermediation of the clutch but which is obviously brought outside of this plane of rotation when the clutch is released. When the cylinder is being driven the lug 52 will clear the bar 49 by passing through the notch, but when the clutch is released the bar will be directly in the plane of rotation of the lug. The lug and the cam 47 are so angularly displaced that the cylinder may normally continue to rotate after the clutch is released only to a point where the lug will not engage the holding bar. If, however, the cylinder should continue to rotate sufficiently further the lug will engage the holding bar positively to arrest the rotation of the cylinder before a new cycle of operations is entered upon.

Claims covering the release of the clutch by the machine are contained in my aforesaid co-pending application.

While I have shown the application of my invention to a die casting machine, I do not wish to be limited to such a use of my invention.

While I have herein shown and particularly described the preferred embodiment of my invention I do not wish to be limited to the precise details of construction shown as changes may readily be made without departing from the spirit of my invention, but



Having thus described my invention I claim as new and desire to secure by Letters Patent the following:

1. The combination with a driving element; of a machine to be driven thereby; a clutch for coupling the driving element in driving relation with said machine; a manually operable lever mechanism for applying the clutch, said machine and lever mechanism having co-operating parts whereby the machine will release the clutch upon completing an operating cycle; and a holding device operated by said lever mechanism when operated to release the clutch, said machine having an element engageable with said holding device when thus operated positively to stop the operation of the machine and so related to the power disconnecting part upon the machine as normally to permit the machine to cease its movement without having it positively stopped by said holding device.

2. The combination with a driving element; of a machine to be driven thereby; a clutch for coupling the driving element in driving relation with said machine; a manually operable lever mechanism for applying the clutch, said machine and lever mechanism having co-operating parts whereby the machine will release the clutch upon completing an operating cycle; and a holding device operated by said lever mechanism when operated to release the clutch, said machine having an element engageable with said holding device when thus operated positively to stop the operation of the machine.

3. The combination with a driving element; of a machine to be driven thereby; a clutch for coupling the driving element in driving relation with said machine; a normally operable lever mechanism for applying the clutch, said machine and lever mechanism having co-operating parts whereby the machine will release the clutch upon completing an operating cycle; and a holding device operated by said machine when releasing the clutch, said machine having an element engageable with said holding device when thus operated positively to stop the operation of the machine and so related to the power disconnecting part upon the machine as normally to permit the machine to cease its movement without having it positively stopped by said holding device.

4. The combination with a driving element; of a machine to be driven thereby; a clutch for coupling the driving element in driving relation with said machine; a normally operable lever mechanism for applying the clutch, said machine and lever mechanism having co-operating parts whereby the machine will release the clutch upon completing an operating cycle; and a holding

device operated by said machine when releasing the clutch, said machine having an element engageable with said holding device when thus operated positively to stop the operation of the machine.

5. The combination with a driving element; of a machine to be driven thereby; mechanism for coupling the driving element in driving relation with said machine; a manually operable lever mechanism for operating the coupling mechanism to couple the machine with the driving element, said machine and lever mechanism having co-operating parts whereby the machine will actuate the coupling mechanism to disconnect the machine from the driving element upon completing an operating cycle; and a holding device operated by said lever mechanism when disconnecting itself from said driving means, said machine having an element engageable with said holding device when thus operated positively to stop the operation of the machine and so related to the power disconnecting part upon the machine as normally to permit the machine to cease its movement without having it positively stopped by said holding device.

6. The combination with a driving element; of a machine to be driven thereby; mechanism for coupling the driving element in driving relation with said machine; a manually operable lever mechanism for operating the coupling mechanism to couple the machine with the driving element, said machine and lever mechanism having co-operating parts whereby the machine will actuate the coupling mechanism to disconnect the machine from the driving element upon completing an operating cycle; and a holding device operated by said lever mechanism when disconnecting itself from said driving means, said machine having an element engageable with said holding device when thus operated positively to stop the operation of the machine.

7. The combination with a driving element; of a machine to be driven thereby; mechanism for coupling the driving element in driving relation with said machine; a manually operable lever mechanism for operating the coupling mechanism to couple the machine with the driving element, said machine and lever mechanism having co-operating parts whereby the machine will actuate the coupling mechanism to disconnect the machine from the driving element upon completing an operating cycle; and a holding device operated by said machine when disconnecting itself from said driving means, said machine having an element engageable with said holding device when thus operated positively to stop the operation of the machine and so related to the power disconnecting part upon the machine as nor-



mally to permit the machine to cease its movement without having it positively stopped by said holding device.

8. The combination with a driving element; of a machine to be driven thereby; mechanism for coupling the driving element in driving relation with said machine; a manually operable lever mechanism for operating the coupling mechanism to couple the machine with the driving element, said machine and lever mechanism having co-operating parts whereby the machine will actuate the coupling mechanism to discon-

nect the machine from the driving element upon completing an operating cycle; and a holding device operated by said machine when disconnecting itself from said driving means, said machine having an element engageable with said holding device when thus operated positively to stop the operation of the machine.

In witness whereof, I hereunto subscribe my name this 2nd day of September A. D., 1920.

FRED F. SCHRODER.