

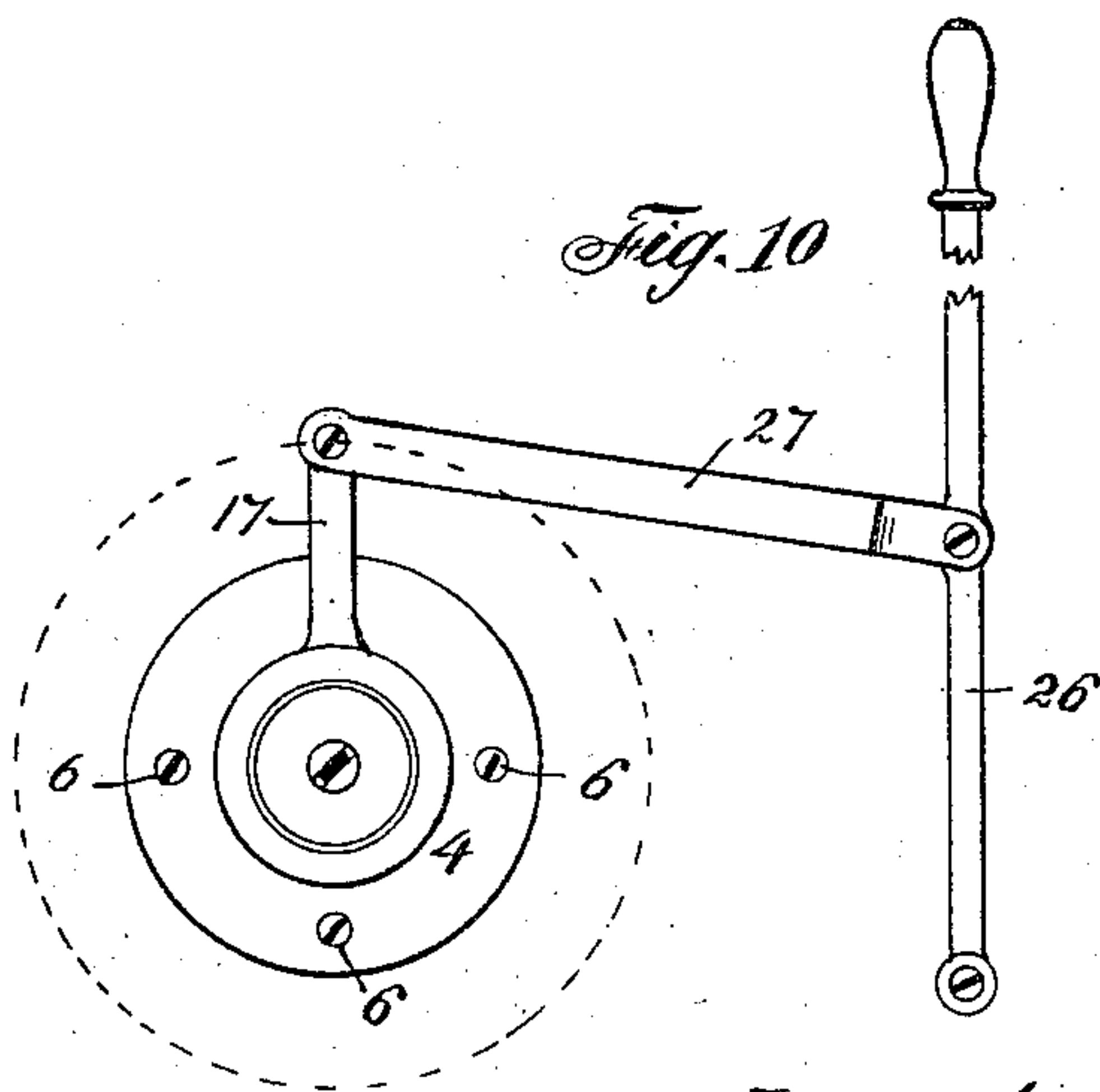
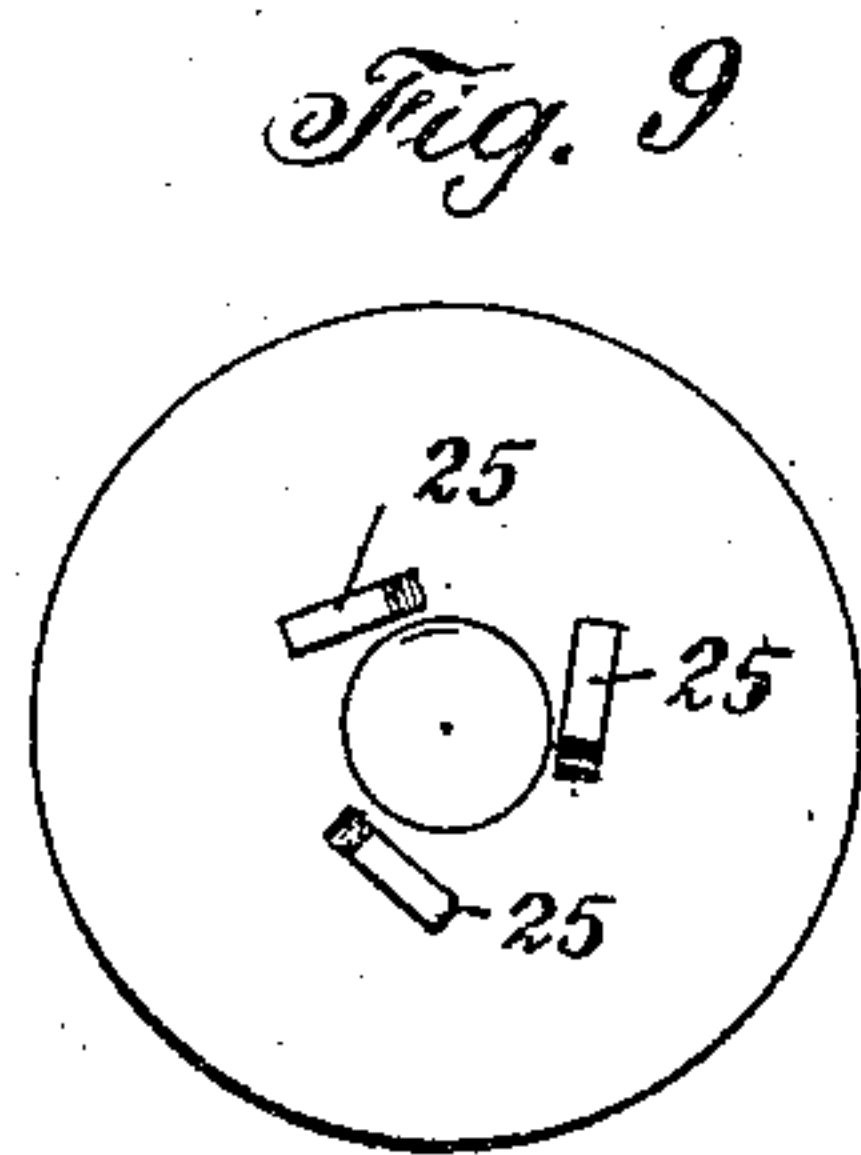
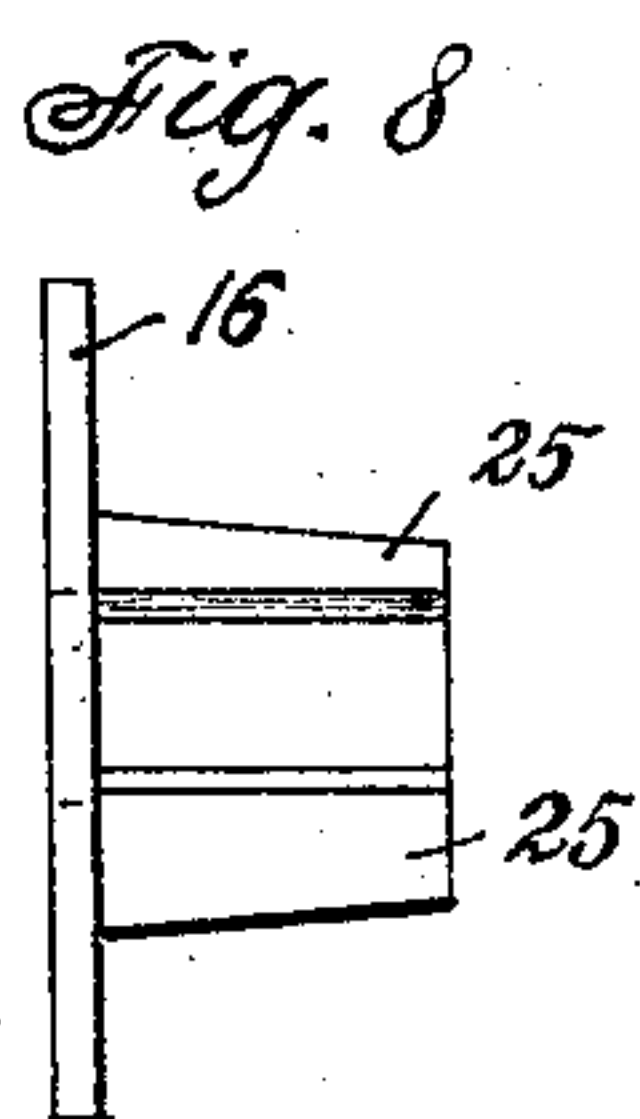
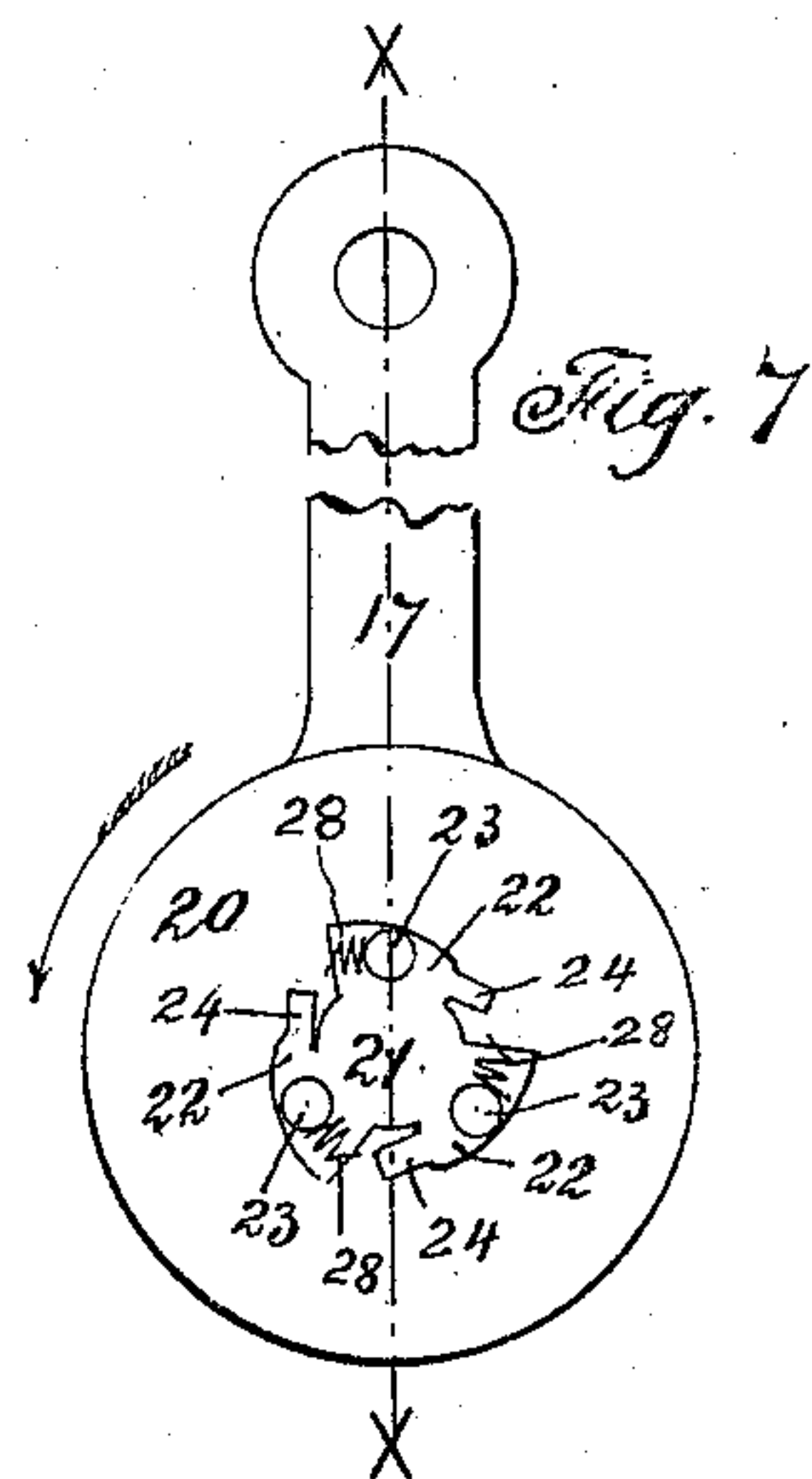
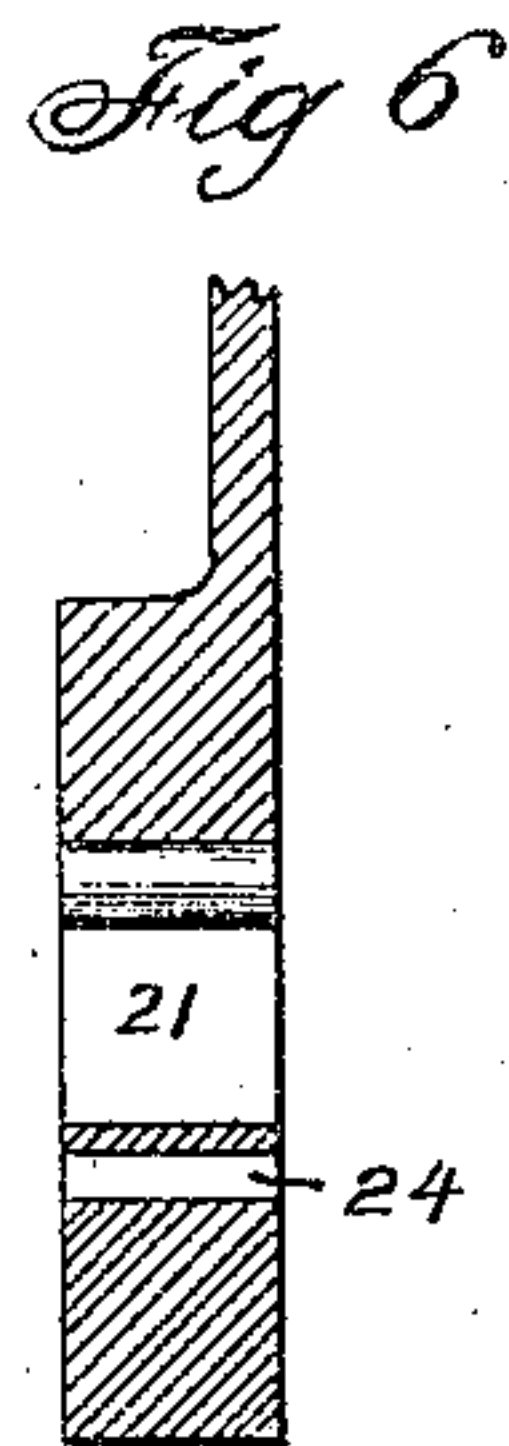
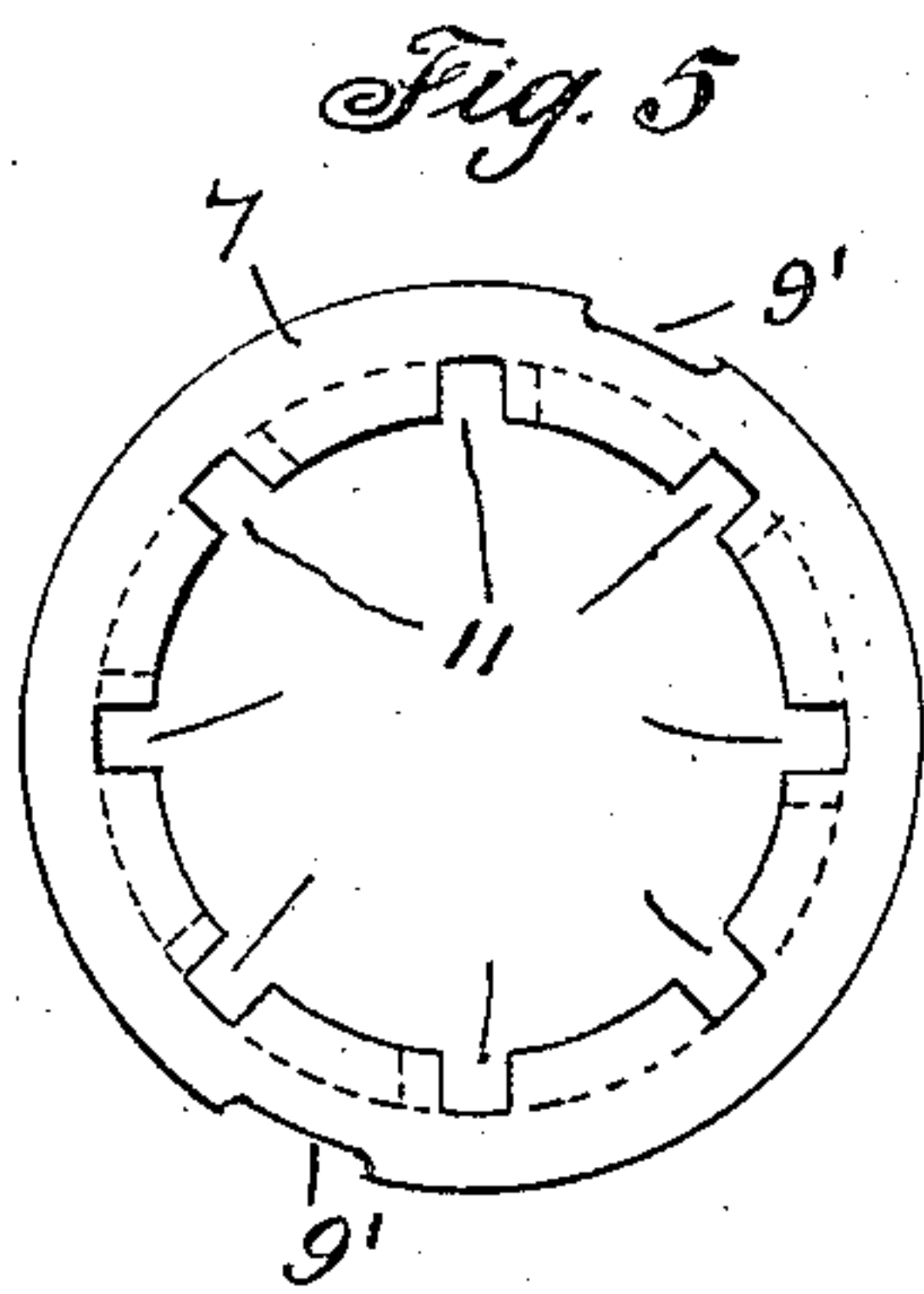
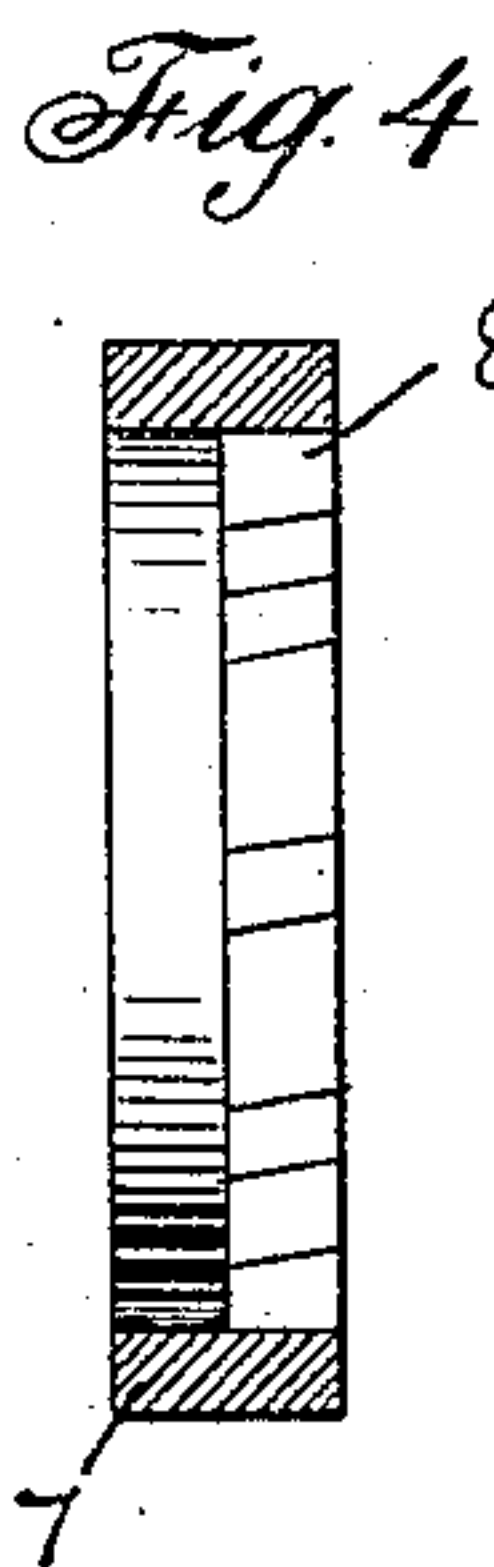
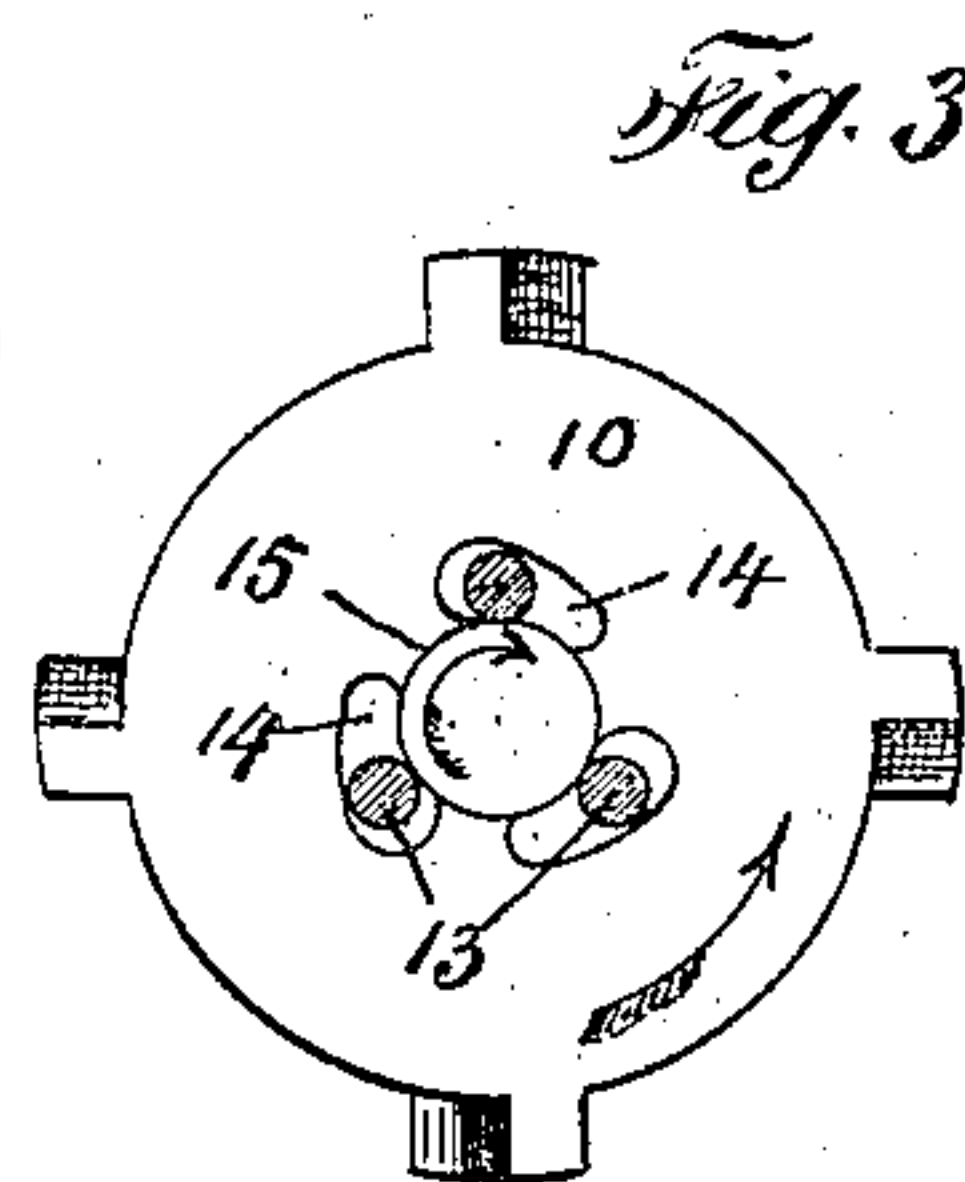
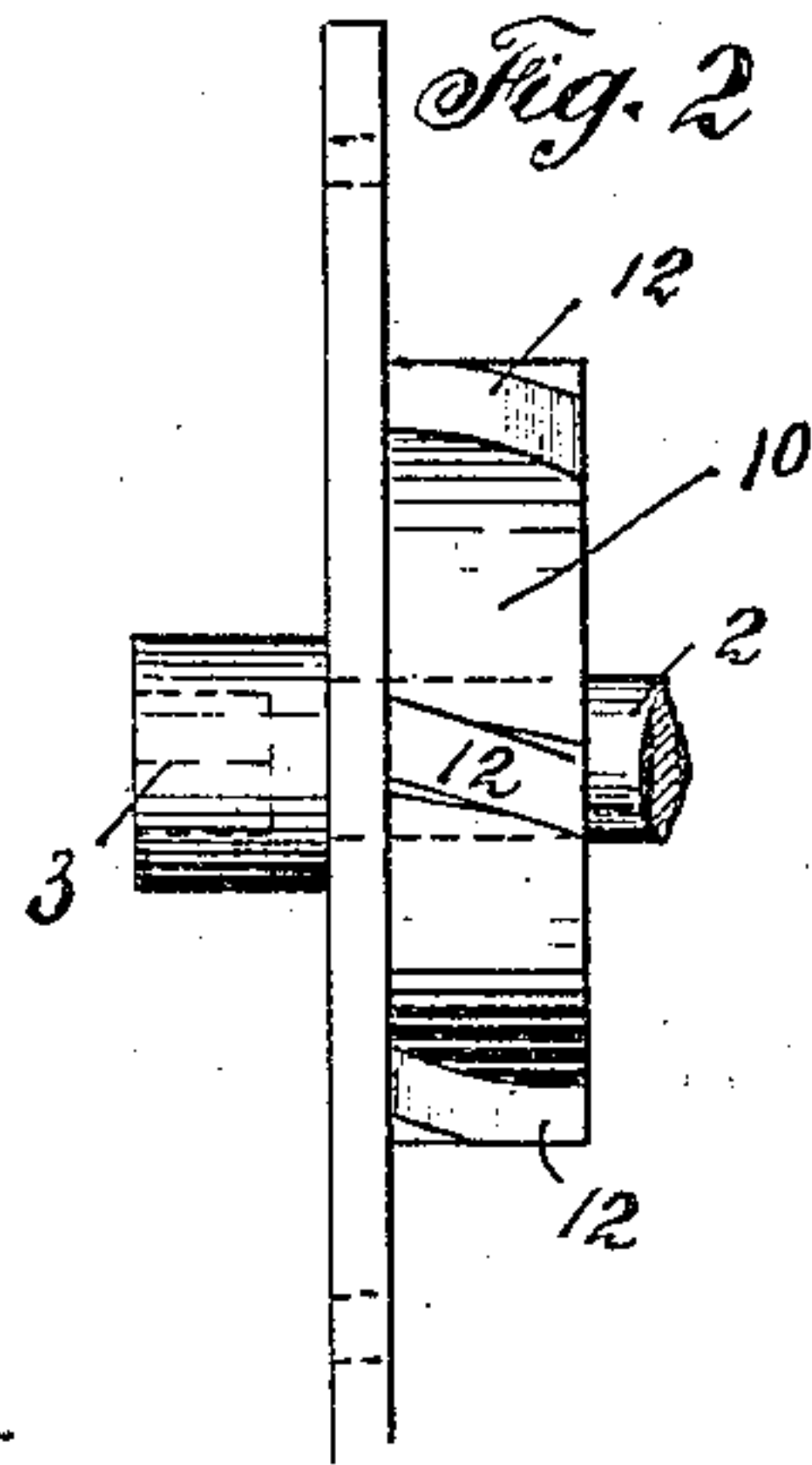
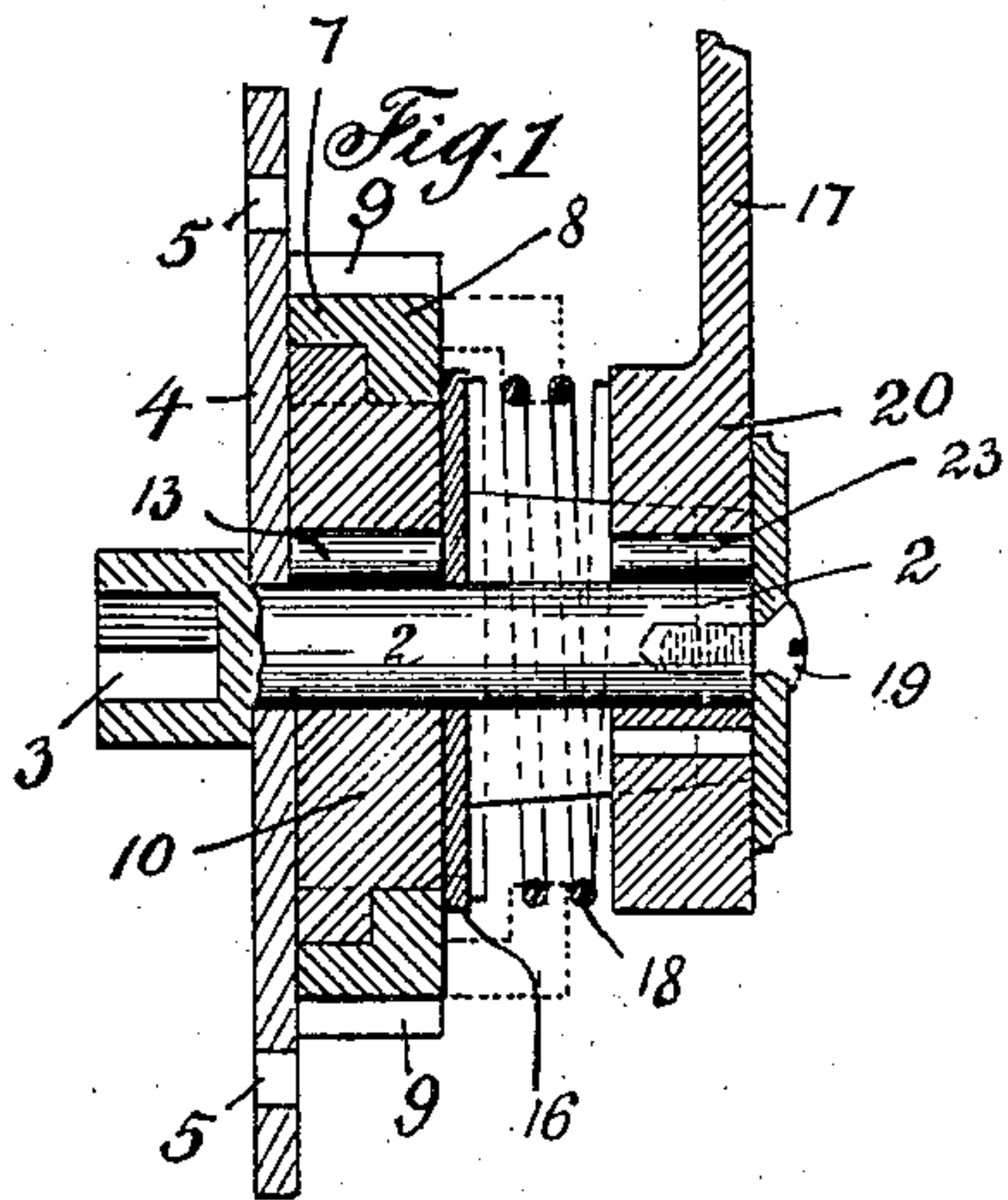
No. 843,611.

PATENTED FEB. 12, 1907.

P. W. KANE.

STARTING MECHANISM FOR EXPLOSIVE ENGINES.

APPLICATION FILED DEC. 31, 1904.



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UNITED STATES PATENT OFFICE.

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STARTING MECHANISM FOR EXPLOSIVE-ENGINES.

No. 848,611.

Specification of Letters Patent.

Patented Feb. 12, 1907.

Application filed December 31, 1904. Serial No. 239,182.

To all whom it may concern:

Be it known that I, PETER WILLIAM KANE, a citizen of the United States, residing at Mason City, in the county of Cerro Gordo and State of Iowa, have invented certain new and useful Improvements in Starting Mechanisms for Explosive-Engines, of which the following is a specification.

This invention relates to means for starting 10 ing gas-lene-engines, and has particular reference to their operation in connection with automobiles.

As is well known, the initial charging of a gas-lene-engine cylinder with carbonized vapor and the ignition thereof is usually accomplished by moving the engine-piston through a hand-lever or arm arranged to rotate the main driving-shaft and therethrough impart the necessary initial strokes of the piston 20 which create suction from the carbureter and also operate the sparking plug. When this means of starting the engine is employed, the initial explosion is liable to force back the hand-lever or operating-arm with more or less violence, thus imposing not only considerable strain upon the hand and arm of the person operating the lever, but often causing serious injury to the operator.

The object of my invention is to provide 30 means for rotating the engine-shaft by hand, at the same time automatically relieve the lever from the sudden back thrusts or "kicks" due to the explosion of initial charge. To attain this end, I provide a connection between the lever-arm and the engine-shaft which will cause the former to clutch the latter when said arm is moved forward and cause the engine-shaft to release its grip upon the lever when it rotates in position to the direction of positive movement of the lever-arm. I also provide means 40 whereby the latter is caused to release its grip upon the shaft when the arm is moved backward and caused to engage the shaft when said arm is moved forward.

My invention consists in the novel construction and arrangement of parts hereinafter described in detail, illustrated in the drawings, and incorporated in the claims.

50 In the drawings, Figure 1 is a view which represents a vertical section through a mechanism embodying my invention. Fig. 2 is an edge elevation of the bearing-plate and the inner clutch member, together with a portion of the shaft. Fig. 3 is a face view of the clutch member shown in Fig. 2. Fig. 4 is

a vertical cross-section through the ring or outer member of the clutch. Fig. 5 is another view of said member, taken on a vertical plane at right angles of the vertical plane 60 of Fig. 4. Fig. 6 is a cross-section through the boss and a portion of the handle of the lever-arm. Fig. 7 is a front view of the lever-arm, partly broken away. Figs. 8 and 9 are views of the wedge member, taken on two 65 planes at right angles to each other. Fig. 10 is a side elevation of the starting-lever of the automobile and my invention connected together.

Referring to the drawings, 2 represents a 70 shaft having a socket portion 3, which may be connected with the driving-shaft of an automobile in any suitable manner.

4 is a bearing-plate pierced by screw-holes 5 5 for screws 6, securing said bearing-plate 75 to the body of the automobile. A ring member 7 of clutch members 8 is secured to the bearing-plate 4 in any suitable manner—as, for instance, by stops 9, which engage recesses 9' in said ring. 80

Mounted normally within the member 7 and upon the shaft 2 is the inner clutch member 10. In the member 7 are a series of grooves 11 11, which are inclined to the plane of rotation of the shaft 2, and on the inner 85 member 10 are inclined flanges or ribs 12, adapted to slide in and out of the grooves 11. Between the shaft 2 and the inner member 10 are a series of friction-rolls 13, for which inclined locking-surfaces are provided in slots 90 or recesses 14 14 in the member 10 adjacent to its opening 15 for the shaft 2. The grooves or recesses 14 14 have narrow and wide portions, the latter being contracted so that rolls 13 will become wedged in between 95 the shaft and the inclined locking-surfaces of recesses 14 14 when the shaft is rotated in the direction indicated by the inner arrow in Fig. 3, and when rotated in the opposite direction the widened portions of the grooves 14 permit 100 the rolls 13 to become released from the shaft. Against one side of the clutch members 7 and 10 is a disk or wedge base-plate 16, which is loosely mounted on shaft 2. Between said base-plate 16 and lever 17 is a spiral spring 105 18, tending to hold the inner clutch member 10 in engagement with the grooves 11 and the wedges 25, carried by the plate 16, out of engagement with rolls 23 23 between lever-arm and shaft. Lever-arm 17 is held in place 110 on the outer end of the shaft 2 by means of the disk or washer, which is secured on the

end of the shaft 2 by screw 19, having threaded engagement with the end of said shaft.

In the boss 20 of lever-arm 17 is an opening 21 for the shaft 2, and arranged around said opening 21 are recesses 22 for the rolls 23. The recesses 22 are substantially similar to the recesses 14 in their function and have inclined locking-surfaces which bind rolls 23 between arm 17 and shaft 2 when rotated in one direction. Communicating with the narrow ends of recesses 22 are slots 24, adapted to contain the points of wedges 25, secured to the disk 16. The points of these wedges are of substantially the same width as recesses 24 and do not normally penetrate far enough through the slots 24 to prevent the rolls 23 from becoming wedged in between the shaft 2 and the inclined walls of recesses 22, the wider portions of the wedges being held from entering slots 22 by spring 18 bearing against the wedge-support or base-plate 16; but when the slide portions or ribs 12 of inner clutch member 10 move out of the slots 11 member 10 forces the wedges 25 farther into slots 22 and against the rolls 23, releasing the latter from the grip between shaft 2 and inclined locking-surfaces of recesses 22. Springs 28 are interposed between the wide ends of slots 22 and the rolls 23 and normally force said rolls into the narrow portions of slots 22 and interlock arm 17 and shaft 2. In Fig. 10 the lever-arm 17, connected with the usual starting-lever 26 through a connecting bar 27.

The operation of my invention is as follows: When lever 26 is oscillated to the right, Fig. 10, arm 17 is rotated in the direction indicated by the arrow, Fig. 7, causing rolls 23 to bind between shaft 2 and the inclined locking-surfaces of roll-recesses 22. This will cause rotation of shaft 2 in the direction indicated by the arrow on member 10 in Fig. 3, and thereby move rolls 13 into the wide portions of recesses 14 and releasing the clutch member 10 from the shaft 2. When the latter is rotated in the opposite direction or in the direction of the small arrow on the shaft, the rolls 13 are carried into narrow portions of the recesses and are wedged in between the shaft and the locking-surfaces of the recesses, thereby locking the shaft 2 and member 10 together. As the ribs 12 and the slots in which said ribs normally rest are inclined toward the plane of rotation of shaft 2, as shown in Fig. 2, the ribs 12 of clutch member 10 slip out of recesses 11, and as member 10 moves out of engagement with member 7 it carries with itself the base-plate 16 and moves the wider portions of wedges 25 against the rolls 23, releasing same from the grip in narrow portions of recesses, thus releasing arm 17 from shaft 2 and preventing a violent throw of said arm after the explosions of the engine have been started and shaft is in regular motion, which would be in direction of

the larger arrow in Fig. 3 or in a direction opposite to that in which the shaft is rotated by the starting-lever 26, and the clutch member 10 will be held out of engagement with the member 7 and in position indicated by dotted lines in Fig. 1 until the engine stops. The spiral spring 18 is tensioned very lightly or just sufficient to cause ribs 12 to engage at least partially the grooves 11. When the arm 17 is rotated to start the engine, it will force the ribs 12 into full engagement with the slots 11 until the reverse motion of the shaft causes said ribs to slip out again and release arm 17 from shaft 2 through the wedges 25, as previously explained.

As obviously the embodiment of my invention is capable of numerous modifications without departing from the spirit of said invention, I do not wish to confine the latter to the exact details of construction herein shown and described.

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

1. The combination with a shaft, of a lever-arm journaled on said shaft, said arm provided with locking-surfaces inclined toward said shaft in one direction of movement of said arm, locking-rolls interposed between said surfaces and shaft and movable to lock and unlock said arm upon said shaft, wedges arranged to move against said rolls, and means whereby said wedges are moved against said rolls to release same from locking engagement with said shaft when the latter is rotated in the opposite direction.

2. The combination with a rotary shaft, of an arm journaled on said shaft, a locking-roll interposed between said shaft and arm, the latter provided with a recess for said roll, having an inclined locking-surface, and a wedge-opening communicating with said recess, a wedge movable through said opening and normally out of engagement with said roll, and means for forcing said wedge against said roll moving the latter out of clutch engagement with said shaft and arm.

3. The combination with a rotary shaft, of an arm, journaled on said shaft, an outer and an inner clutch member, the outer member arranged to remain stationary relative to said inner member and shaft, the inner member journaled on said shaft, clutch-rolls interposed between said inner member and shaft, and similar rolls interposed between said arm and shaft, the rolls between the latter arranged to clutch the shaft when said arm is rotated in one direction and the rolls between said inner clutch member and shaft arranged to clutch the shaft when rotated in opposite direction, and a mechanism, actuated by said inner clutch member, for releasing said arm and shaft when the latter is rotated in opposition to the positive movement of said arm.

4. The combination with a rotary shaft, of
a bearing for said shaft, an inner and an
outer clutch member, the former normally
journaled on said shaft and the latter secured
5 to said bearing, friction-rolls interposed be-
tween said inner member and said shaft, said
rolls coöperating with said inner member and
shaft to interlock same for movement to-
gether and to release said inner member from
10 said outer member, an oscillatory arm also
journaled on said shaft and having friction-
rolls interposed between same and said shaft,
said rolls arranged to interlock said shaft and
arm when the former is rotated by the latter,
15 to free the friction-rolls between said inner
member and shaft from interlocking engage-
ment, and means whereby said inner mem-
ber, when interlocked with said shaft by said
rolls, releases the rolls between said arm and
20 shaft from engagement.

5. The combination with a rotary shaft, of
an arm journaled thereon, clutch-rolls ar-
ranged between said arm and shaft to inter-
lock same when said arm is oscillated in one
25 direction, a rotary clutch member also jour-
naled on said shaft, clutch-rolls arranged be-
tween said rotary clutch member and shaft,
a stationary clutch member arranged to co-
operate with said rotary clutch member, a
30 series of wedges, and means whereby said ro-
tary clutch member, when moved out of en-
gagement with said stationary clutch mem-
ber actuates said wedges to force the clutch-

rolls interposed between said arm and shaft
out of operative engagement therewith. 35

6. The combination with a rotary shaft of
an arm journaled on said shaft, clutch-rolls
interposed between said arm and shaft and
arranged to lock same together when the
shaft is rotated forward by said arm, said 40
rolls releasing said arm from said shaft when
the latter is rotated backward, a series of
wedges arranged around said shaft and mov-
able against said rolls, but normally held out
of engagement with same, an actuating mem- 45
ber for said wedges, journaled on said shaft,
inclined ribs on said actuating member, a
stationary ring or member having slide-
grooves therein for said ribs, clutch-rolls in-
terposed between said actuating member and 50
shaft, said rolls arranged to lock said actuat-
ing member upon said shaft and thereby
move its ribs out of engagement with said
slide-grooves when the shaft is rotated back-
ward, and a spring interposed between said 55
arm and actuating member, tending to hold
the latter in engagement with said station-
ary member.

In testimony whereof I have hereunto set
my hand in the presence of two subscribing 60
witnesses.

PETER WILLIAM KANE.

Witnesses:

D. W. TELFORD,
J. J. MOORE.