

No. 798,552.

PATENTED AUG. 29, 1905.

H. WILSON.
GRINDING MACHINE.
APPLICATION FILED MAY 17, 1904.

4 SHEETS—SHEET 1.

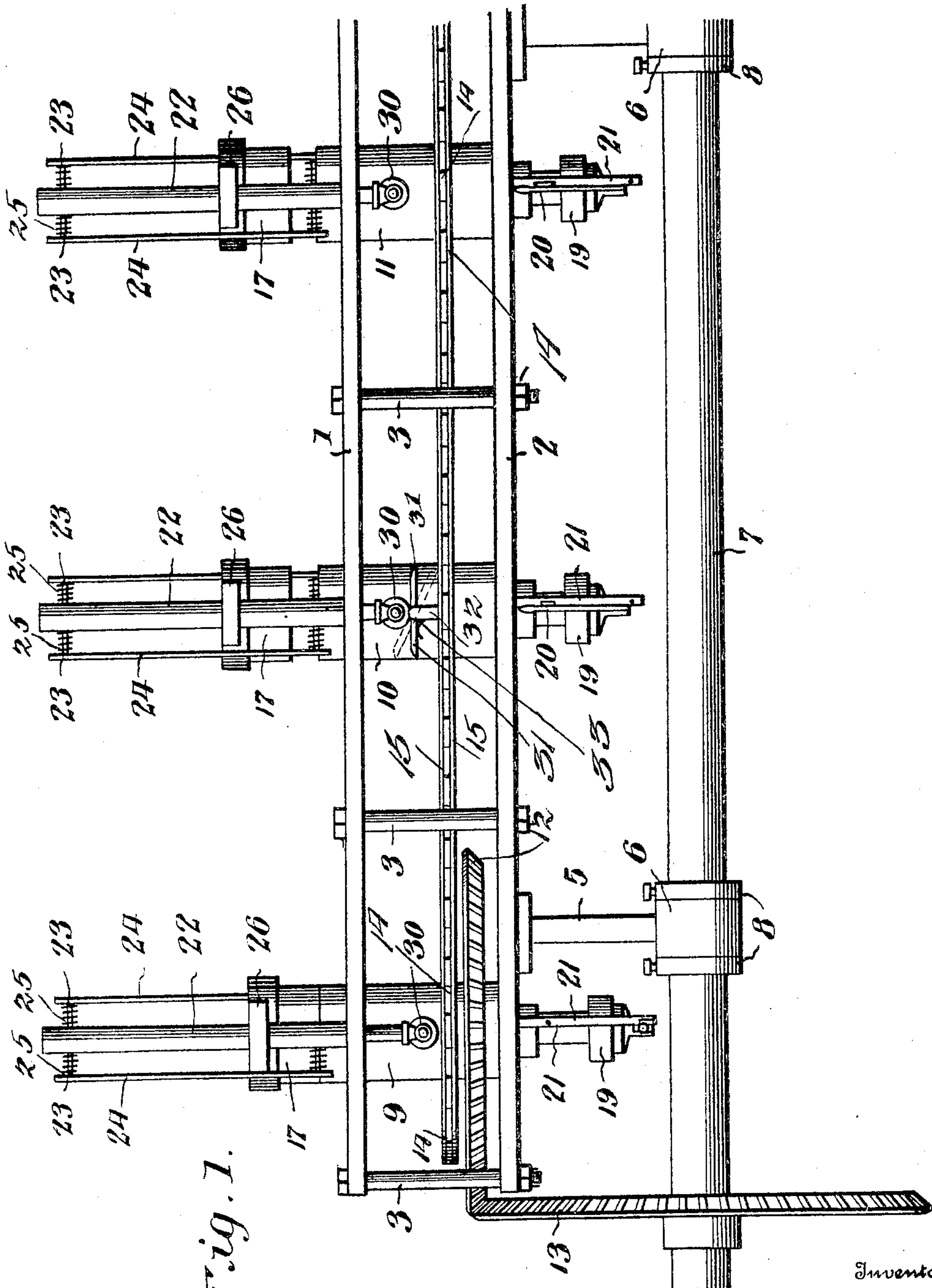


Fig. 1.

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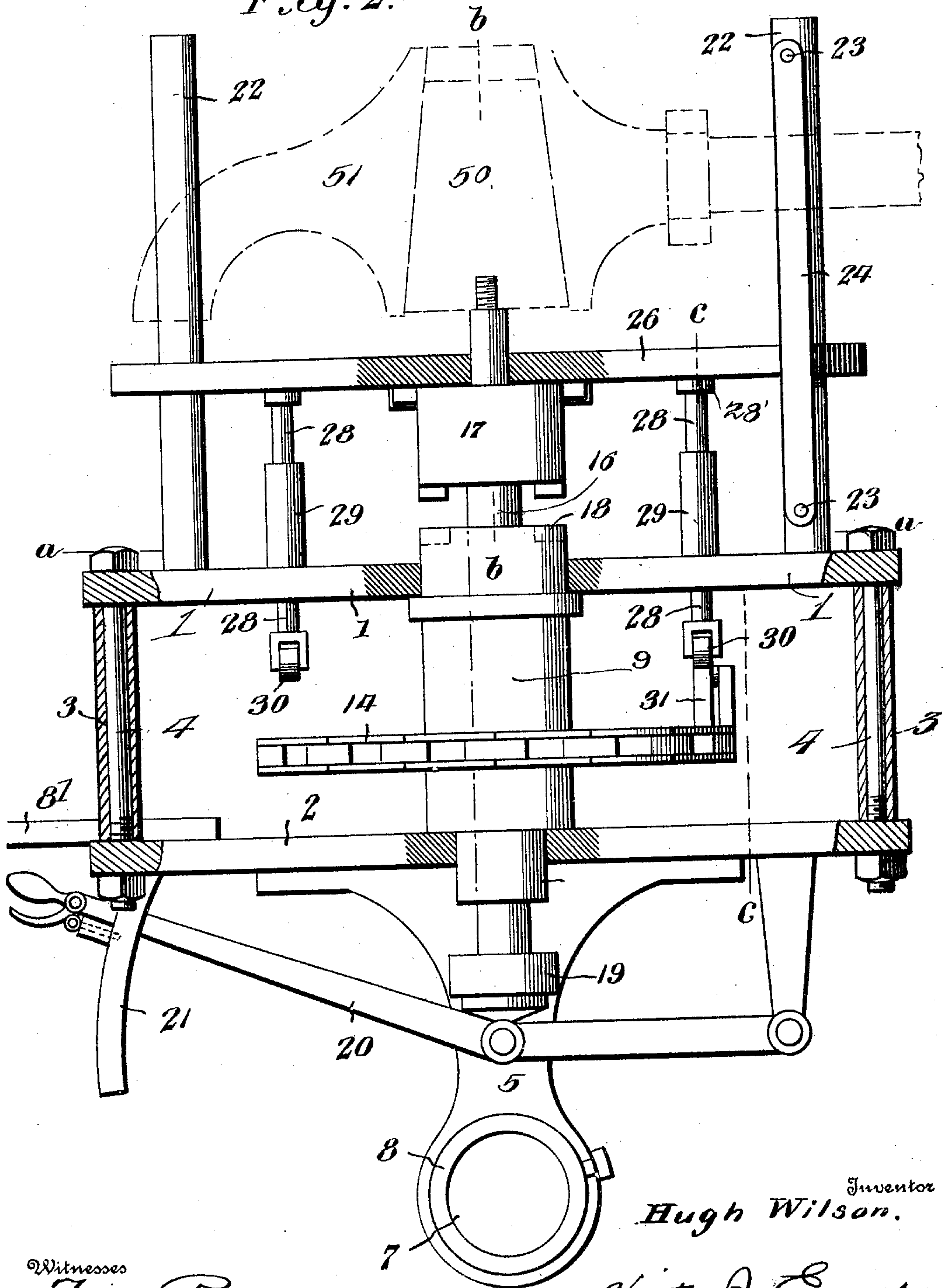
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 4.

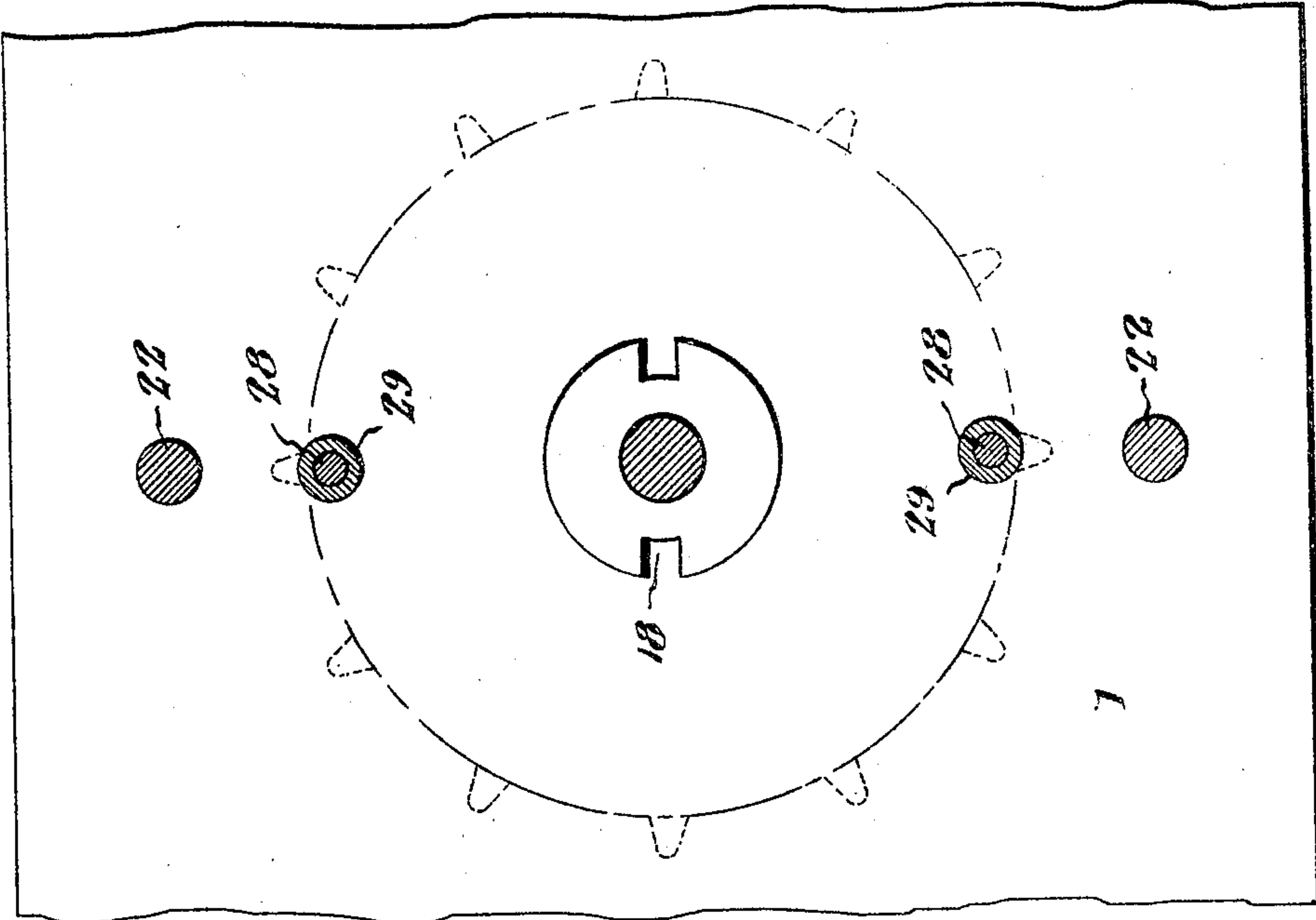
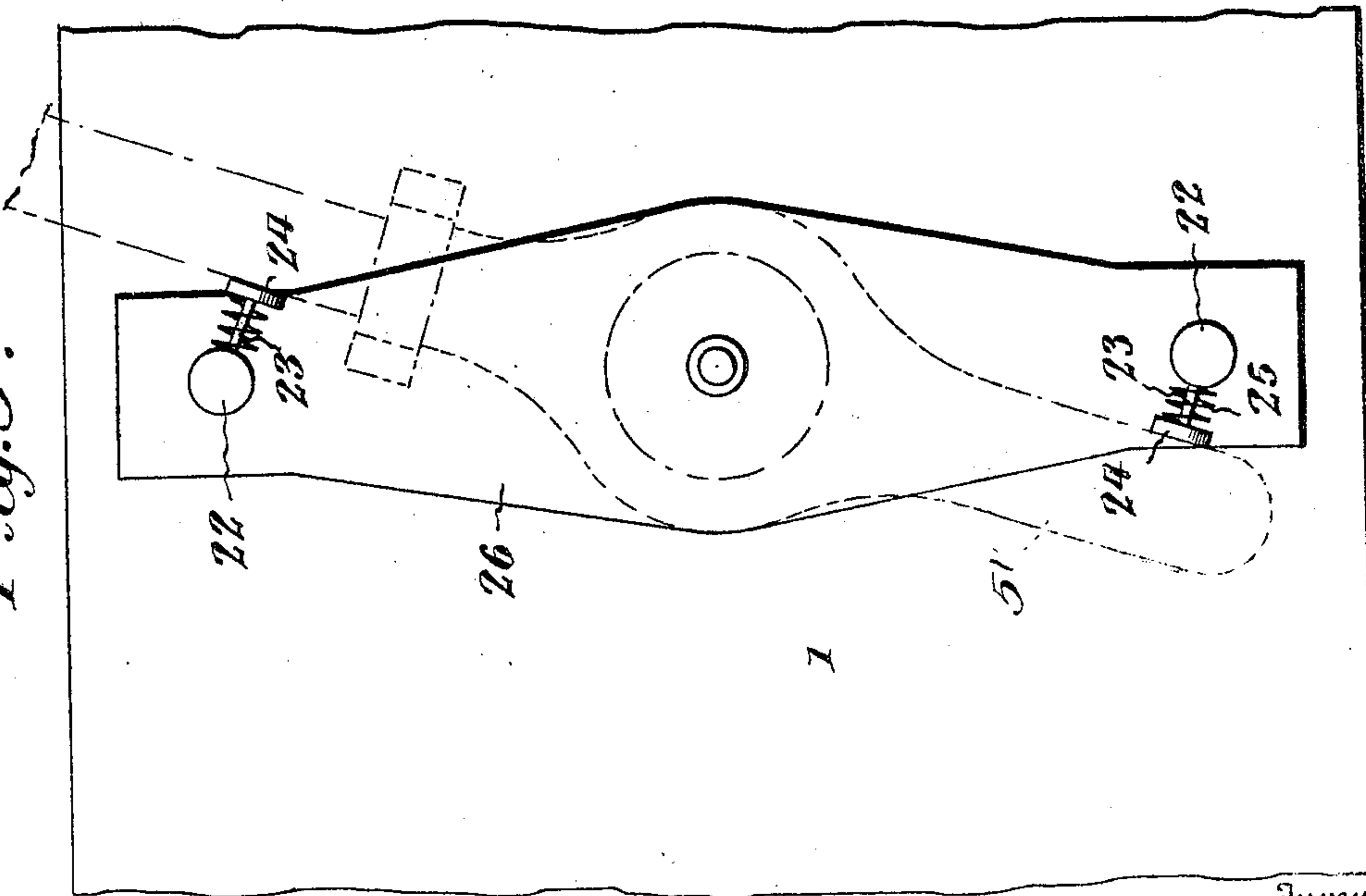


Fig. 3.



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4 SHEETS—SHEET 4.

Fig. 5.

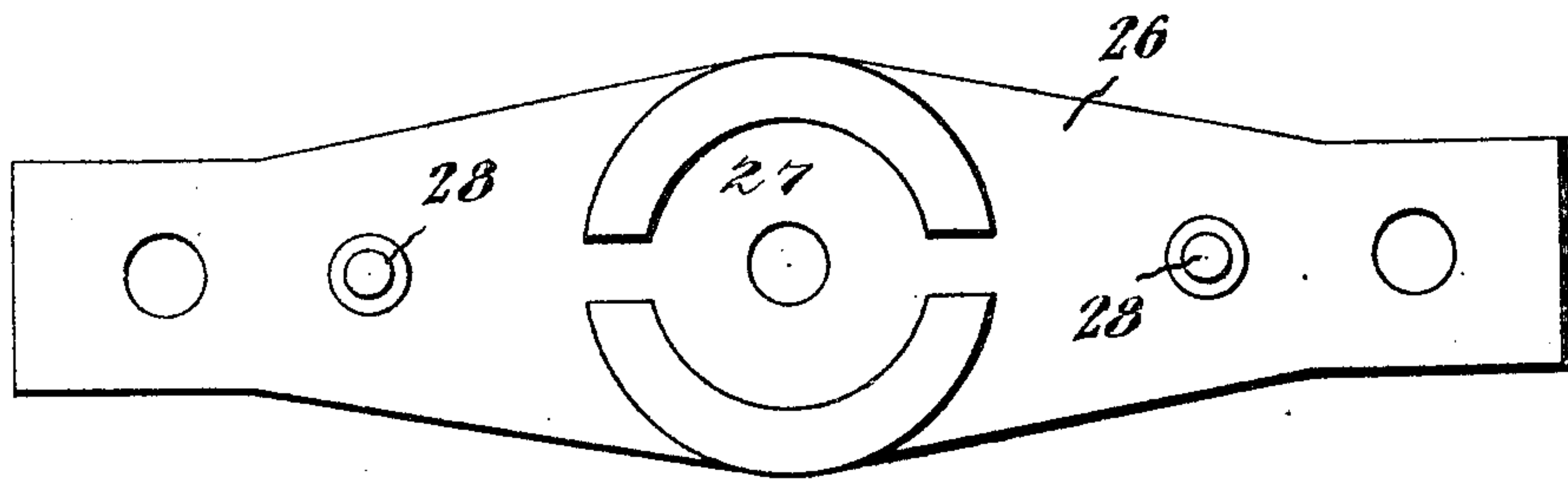


Fig. 6.

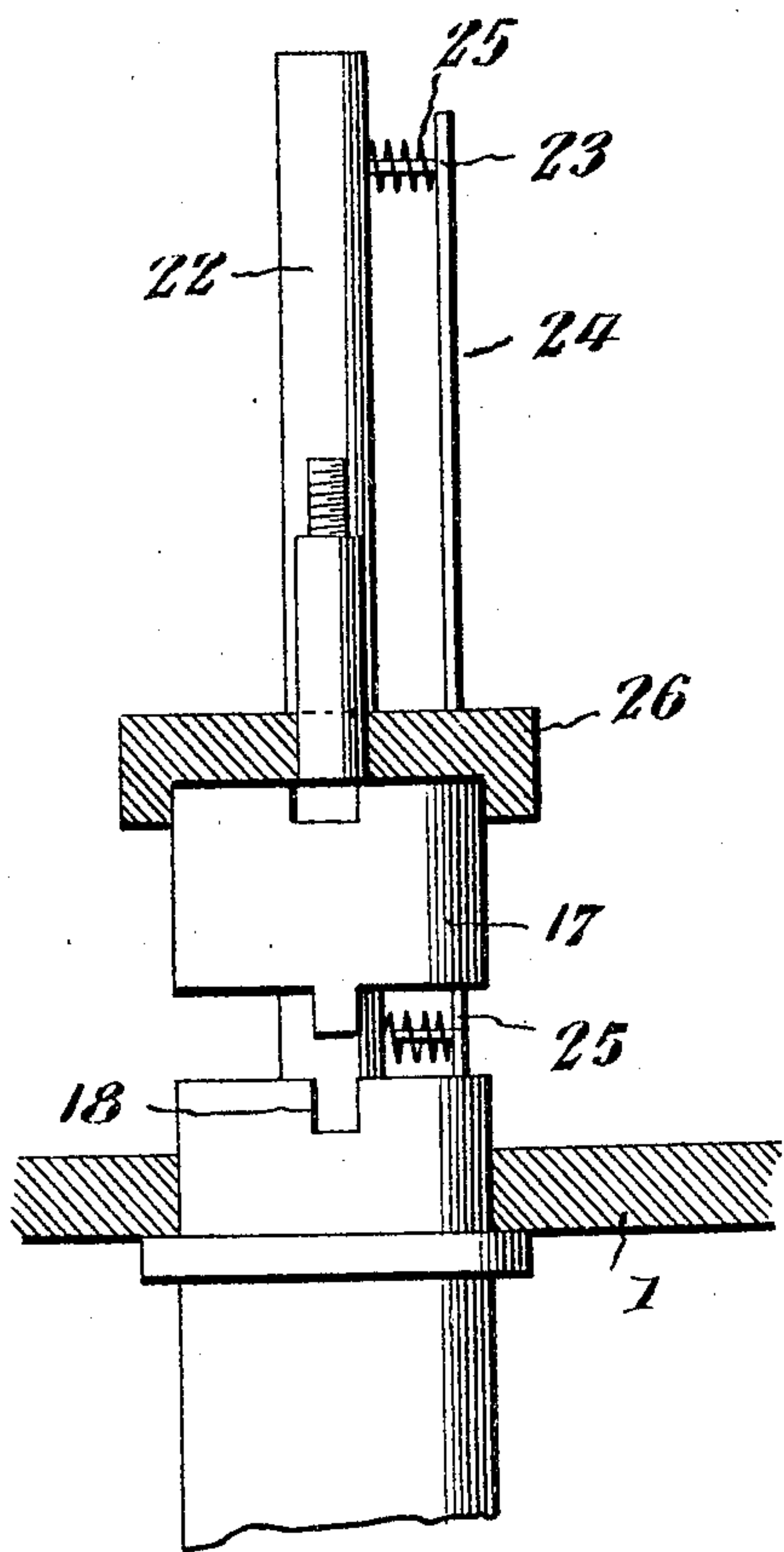
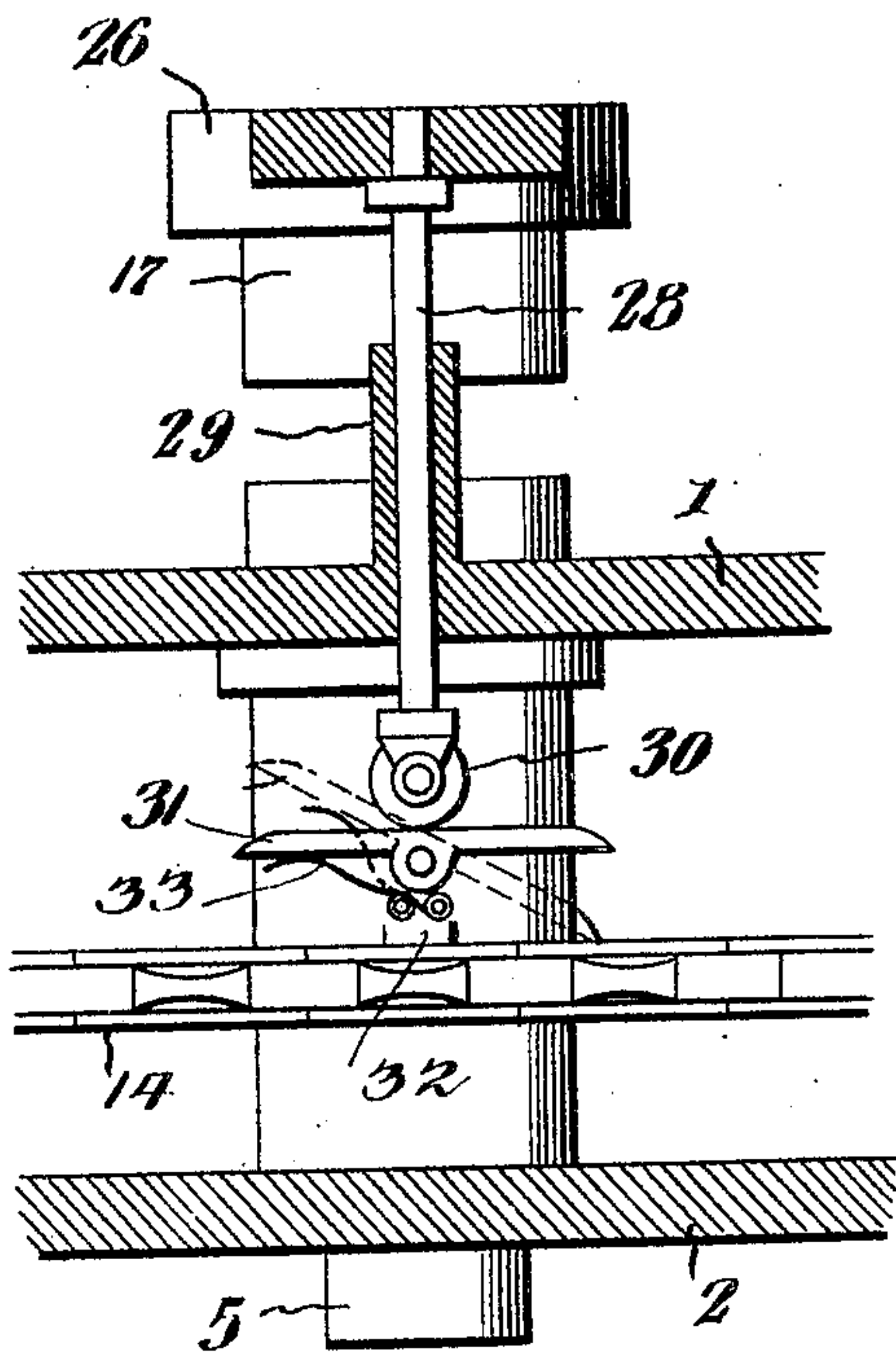


Fig. 7.



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UNITED STATES PATENT OFFICE.

HUGH WILSON, OF KNOXVILLE, TENNESSEE.

GRINDING-MACHINE.

No. 798,552.

Specification of Letters Patent.

Patented Aug. 29, 1905.

Application filed May 17, 1904. Serial No. 208,435.

To all whom it may concern:

Be it known that I, HUGH WILSON, a citizen of the United States, residing at Knoxville, in the county of Knox and State of Tennessee, have invented new and useful Improvements in Grinding-Machines, of which the following is a specification.

This invention relates to a grinding-machine of that type used more especially for grinding valves and their seats; and it consists briefly of a frame carrying a number of independent grinding devices adapted to be driven simultaneously by a main shaft. Each grinding device has a clutch whereby it may be readily disengaged from the motive power at the will of the operator and means in connection with the driving power for automatically and momentarily disengaging the parts being ground. The main shaft is intended to be hung on the centers of an ordinary lathe and be driven by a dog on the shaft or in any other well-known manner. Besides imparting motion to the grinding devices the main shaft serves as the sole support of the frame and all parts thereon.

In the accompanying drawings, Figure 1 represents a front elevation of my grinding-machine set up to grind the valves and seats of three cocks simultaneously. Fig. 2 represents an end elevation of the same in operative position, certain parts being shown in section. Fig. 3 is a top plan view of one of the grinding devices. Fig. 4 is a horizontal sectional view on the line *aa* of Fig. 2. Fig. 5 is a bottom plan view of the cock-supporting plate. Fig. 6 is a view in cross-section on the line *bb*, Fig. 2. Fig. 7 is a cross-sectional view on the line *cc*, Fig. 2.

Similar numerals of reference indicate the same parts in all the figures.

1 and 2 indicate two parallel horizontal plates, spaced by tubular posts 3 and connected together by bolts and nuts 4, passing through the plates and posts, as shown. The length of the plates 1 and 2 will depend on the number of cocks to be ground at one time. Brackets 5 depend from the bottom plate 2 and carry bearings 6 for a horizontal main shaft 7. Collars 8 on the shaft 7 are fastened thereto on each side of the bearings 6 to prevent any axial movement on the shaft. The main shaft 7 is to be hung on lathe-centers (not shown) and rotated from the lathe-head by means well known to those skilled in the art. The frame, formed of the plates, posts, and bearings, is held in fixed position by

means of an arm 8', projecting laterally from the lower plate 2 and fastened to the tool-post of the lathe, (not shown,) as will be readily understood.

Hollow shafts 9, 10, and 11 are vertically disposed between the plates 1 and 2 and have their bearings in said plates. On the lower end of the shaft 9 is a bevel gear-wheel 12, intermeshing with a similar wheel 13, keyed to the main shaft 7. Above the bevel-gear 12 the hollow shaft 9 carries a sprocket-wheel 14, like wheels being fastened to the hollow shafts 10 and 11. A sprocket-chain 15 passes partly around the end sprocket-wheels 14 and engages the teeth of the intermediate wheel. Some well-known means will be employed to hold the chain in engagement with the intermediate sprocket; but such means being common, it has been omitted from the drawings for the sake of clearness.

Through the rotation of the hollow shafts 9, 10, and 11 motion is imparted to the work supporting and rotating devices, three such devices being shown. Their number, however, is being limited only by the power of the lathe and length of its bed. As these devices are similar, a description of one will serve for all.

Through the hollow vertical shaft 9 is passed a spindle 16, which can turn freely therein. A double clutch member 17, having clutch projections 17' 17^a at its base and upper end and fixed to the spindle 16 above the plate 1, is adapted to be coupled by its bottom projection 17', when said spindle is lowered, to a second clutch member 18 on the hollow shaft 9 and partake of its rotation. The spindle extends below the plate 2 and carries on its end a swivel 19, pivoted to an operating-lever 20, movable in a vertical plane and adapted to slide the spindle axially in the hollow shaft 9 for coupling and uncoupling the clutch members 17 18. A notched plate 21 is fastened to the lower plate 2 to hold the lever 20 in whatever position it may be placed.

Rising vertically from the plate 1 transversely thereof and in a plane passing through the axis of the hollow shaft 9 are two posts 22 22, from which pins 23 project on opposite sides near their upper and lower ends. A plate 24 reaches from pin to pin on each side of each post and is slidable on said pins. Springs 25 surround the pins and hold the plates normally away from the said posts for a purpose to be described hereinafter.

26 indicates a table parallel to and above

the plate 1, perforated at its center for the spindle 16 and at each end for the posts 22 to pass freely through. On the under side of the table 26 is a clutch member 27, adapted to be engaged by the clutch member 17^a on the spindle 16 when the clutch 17 is lifted out of engagement with the clutch member 18 by the upward movement of the spindle 16, the clutch portions or projections 17 and 27 serving the function of a brake or stop to arrest the momentum of the spindle 16 and stop the rotation of said spindle when the clutch 17 is disengaged from the hollow shaft 9, and thereby enabling the grinding operation to be quickly terminated when occasion requires. Also fixed to the under side of the table 26 are two rods 28, which extend downwardly in a vertical line and pass through the plate 1 and bearing-sleeves 29 thereon. A roller 30 is journaled on the lower end of each rod 28 in position to be acted on by a tilting finger 31 on the sprocket-chain 15 or, if preferred, on the sprocket-wheel 14.

The upper end of the spindle 16, which passes through the table 26, is threaded (see Fig. 2) for the attachment of the valve to be ground, the cock or other valve-seat being placed on the table 26 over the spindle 16. Projections on the valve-seat, either integral therewith or attached thereto, extend beyond the posts 22 and bear against the spring-supported plates 24 during the grinding operation to prevent the valve-seat turning. The spring-plates 24 afford a yielding abutment for the projections and equalize any strain which may be caused by irregularities thereon.

The tilting fingers 31, previously mentioned, are here shown as pivoted on studs 32, secured to the sprocket-chain 15 at equal distances apart throughout its length, their number varying as circumstances may demand. Springs 33, attached to the studs, hold the fingers at a proper angle to act on the rollers 30.

The machine constructed with a number of grinding devices, as hereinabove described, is mounted on a lathe and the main shaft 7 connected to the lathe-head or face-plate, that it may revolve therewith. If a spindle 16 be then raised, as in Fig. 2, the clutch members 17 and 18 will be uncoupled, while those 17 and 27 be coupled, thereby stopping the rotation of the spindle. The table 26 will also be lifted with the spindle. A valve to be ground, as 50, is then screwed on the end of the spindle 16, which is afterward lowered, the table 26 moving with it until arrested by the engagement of shoulders 28' on the rods 28 with the bearing-sleeves 29. The spindle 16 continues its downward movement until the clutch members 17 and 27 separate and members 17 and 18 once more engage. The spindle and valve will then begin to rotate, the speed of rotation being governed by the well-known lathe-gearing. A cock or other valve-

seat 51 is now to be placed on the table over the valve and oil and other abrasive ingredients applied to the surfaces to be ground. The valve-seat will be held against rotation by projections thereon bearing against spring-plates 24, as before described. When the tilting fingers 31 are brought by the travel of the chain into contact with the rollers 30, the rods 28 lift the table 26, attached to the said rods, thereby raising the valve-seat from the valve. This permits the oil and other grinding ingredients to flow anew over the parts being ground. It will thus be observed that each work supporting and rotating device is independent of all the others and that one or two may be operated without disturbing the remainder. Valves of various sizes may be simultaneously ground on this machine without change or additions of any kind.

The machine is simple in construction and the product thereof turned out with great rapidity and economy of power and attention.

Having thus described the invention, what is claimed is—

1. In a machine of the character described, a drive-shaft adapted to be hung upon the centers of an ordinary lathe and to be rotated from the lathe-head, a frame supported by said shaft, means for connecting said frame with a stationary part of the lathe, work supporting and rotating means carried by said frame, and means for driving said rotating means from the shaft.

2. In a grinding-machine, a main shaft, a frame supported wholly thereon, a plurality of hollow shafts journaled in said frame, driving means between the main shaft and the hollow shafts, a spindle vertically movable in each of said hollow shafts adapted to carry a part to be ground, and means for coupling each of said spindles to the shaft through which it passes.

3. In a grinding-machine, a main shaft, a frame supported wholly thereon, a plurality of hollow shafts journaled in said frame, each shaft having a clutch member, driving means between the main shaft and the hollow shafts, and a spindle vertically movable in each of said hollow shafts also provided with a clutch member.

4. In a grinding-machine, a main shaft, a frame supported wholly thereon, a plurality of hollow shafts having clutch members and journaled in said frame, driving means between the main shaft and the hollow shafts, a spindle vertically movable in each of said hollow shafts and provided with a clutch member, and a work-table for each spindle having a clutch member on its under side.

5. In a grinding-machine, a frame, a shaft wholly supporting said frame, a hollow shaft journaled in said frame and having a clutch member on its upper end, driving means between the two shafts, a spindle vertically movable in said hollow shaft, a clutch mem-

ber on said spindle having coupling parts on either end, a work-table with a clutch member adapted to be coupled to the clutch member on the shaft, and posts on the frame passing freely through the table.

6. In a grinding-machine, a main shaft, a frame, wholly supported on said shaft, vertical posts on said frame, yielding plates on said posts, a grinding device on said frame having a vertically-movable spindle, a work-table, driving means between the main shaft and the grinding device, and means for manually and automatically raising and lowering said table.

7. In a grinding-machine, a driving-shaft, a supporting-frame, a work supporting and rotating device on said frame, means for driving said device from the shaft, a work-table, and movable tripping-fingers on said driving means for periodically raising the work-table.

8. In a grinding-machine, a frame, vertical posts thereon having cushioning devices attached thereto, a grinding-spindle, a work-table through which the spindle and grinding-posts freely pass, and means for vertically moving said work-table.

9. In a machine of the character described, a rotary spindle, a reciprocating table, means for reciprocating said table periodically in the operation of the spindle, means for imparting motion to the spindle, and a cushioning work-stop or abutment carried by the table.

10. In a machine of the character described, a rotary spindle, a reciprocating frame, means for periodically reciprocating said frame, and a cushioning work-stop or abutment on the frame, substantially as described.

11. In a machine of the character described, a revoluble spindle, a reciprocating table, and means for imparting a cushioning resistance to the rotation of a member to be ground during the revolution of the spindle.

12. In a machine of the character described, a revoluble spindle, a frame supporting the same, a reciprocating table mounted on said frame, said spindle being adapted to support one member of the article to be ground, and means carried by the frame for imparting a yielding or cushioning resistance to the rotation of a complementary member of the article to be ground while the latter is in engagement with the first-named member movable with the rotating spindle.

13. In a machine of the character described, a supporting-frame, a spindle mounted to revolve therein, means for operating the spindle, a work-table mounted to reciprocate upon the frame, means for periodically reciprocating said table, and abutments carried by the frame and projecting above the table and having cushioning devices attached thereto.

14. In a machine of the character described, a frame, a revolving spindle, a periodically-

reciprocating work-table, supports projecting upward from the frame and above the work-table, abutments carried by said supports, and springs imparting yielding resistance to the inward movement of said abutments.

15. In a machine of the character described, the combination of a frame, a hollow shaft journaled therein, a reciprocating work-table, a spindle extending through said hollow shaft, means for operating the hollow shaft, and means for throwing the spindle into and out of connection therewith, substantially as described.

16. In a machine of the character described, the combination of a frame, a hollow shaft mounted thereon, a spindle slidable in said shaft, a reciprocating work-table, means operated by the hollow shaft for periodically reciprocating said table, clutch members for connecting the spindle with the hollow shaft, and means for sliding the spindle to throw said clutch members into and out of engagement.

17. In a machine of the character described, a hollow driving-shaft, a work-supporting spindle slidably mounted therein, and means operable by the sliding movement of said spindle to connect the same with or disconnect it from said driving-shaft.

18. In a machine of the character described, a rotary work-support, a reciprocating table, driving mechanism for rotating said work-support, and means embodying a tilting trip device carried by the driving means for periodically reciprocating said table.

19. In a grinding-machine, a rotary work-support, a coacting reciprocatory work-support, means for rotating said rotary support and periodically reciprocating said reciprocatory support, and means for arresting the motion of the rotary and reciprocatory supports at will without arresting the motion of the operating means.

20. In a machine of the character described, the combination of a rotary spindle, a reciprocatory table, driving means for rotating said spindle and reciprocating said table, and clutch mechanism for throwing the spindle and table out of operation without stopping the driving means.

21. In a machine of the character described, a rotary spindle, a reciprocatory work-table, a hollow driving-shaft, driving means for operating said shaft to rotate the spindle and reciprocate the table, a clutch for connecting the spindle with the shaft, and means for sliding the spindle to throw the clutch into and out of operation.

22. In a machine of the character described, a rotary spindle, a reciprocatory work-table, a hollow shaft through which the spindle passes, gearing including a drive-chain for rotating said shaft, means coacting with said chain for periodically raising the table, a clutch mechanism for connecting said spindle with

the rotary shaft, and means for operating the clutch to disconnect the spindle from the shaft and hold the table elevated so that it will not be actuated by its raising means.

5 23. In a machine of the character described, the combination of a frame, a rotary spindle mounted in the frame, a reciprocating work-table carried by the frame, said table being adapted to move downward by gravity, driv-
10 ing means for simultaneously rotating the spindle and periodically raising the work-table, and means for moving the spindle and table to an inoperative position so that they will not be operated by said driving means.

15 24. In a machine of the character described, work-supporting devices comprising a rotary spindle and a reciprocating table, driving means therefor, means for throwing the spindle and table out of operative connection with
20 the driving means, and means for bringing the spindle when disconnected from the driving means to a stop.

25. In a machine of the character described,

a supporting-frame, a spindle mounted to re-
volve therein, means for operating the spin- 25
dle, a work-table mounted to reciprocate upon
the frame, means for driving the spindle and
periodically reciprocating said table, means
for throwing the spindle into and out of con-
nection with the driving means, and abut- 30
ments carried by the frame and projecting
above the table and having cushioning devices
attached thereto.

26. In a machine of the character described,
a hollow driving-shaft, a work-supporting 35
spindle slidably mounted therein, a reciprocating table, means for periodically reciprocating said table, and means operable by the sliding movement of said spindle to connect
with or disconnect it from said driving-shaft. 40

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

HUGH WILSON.

Witnesses:

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JOHN W. CRUZE, Jr.