

No. 646,698.

Patented Apr. 3, 1900.

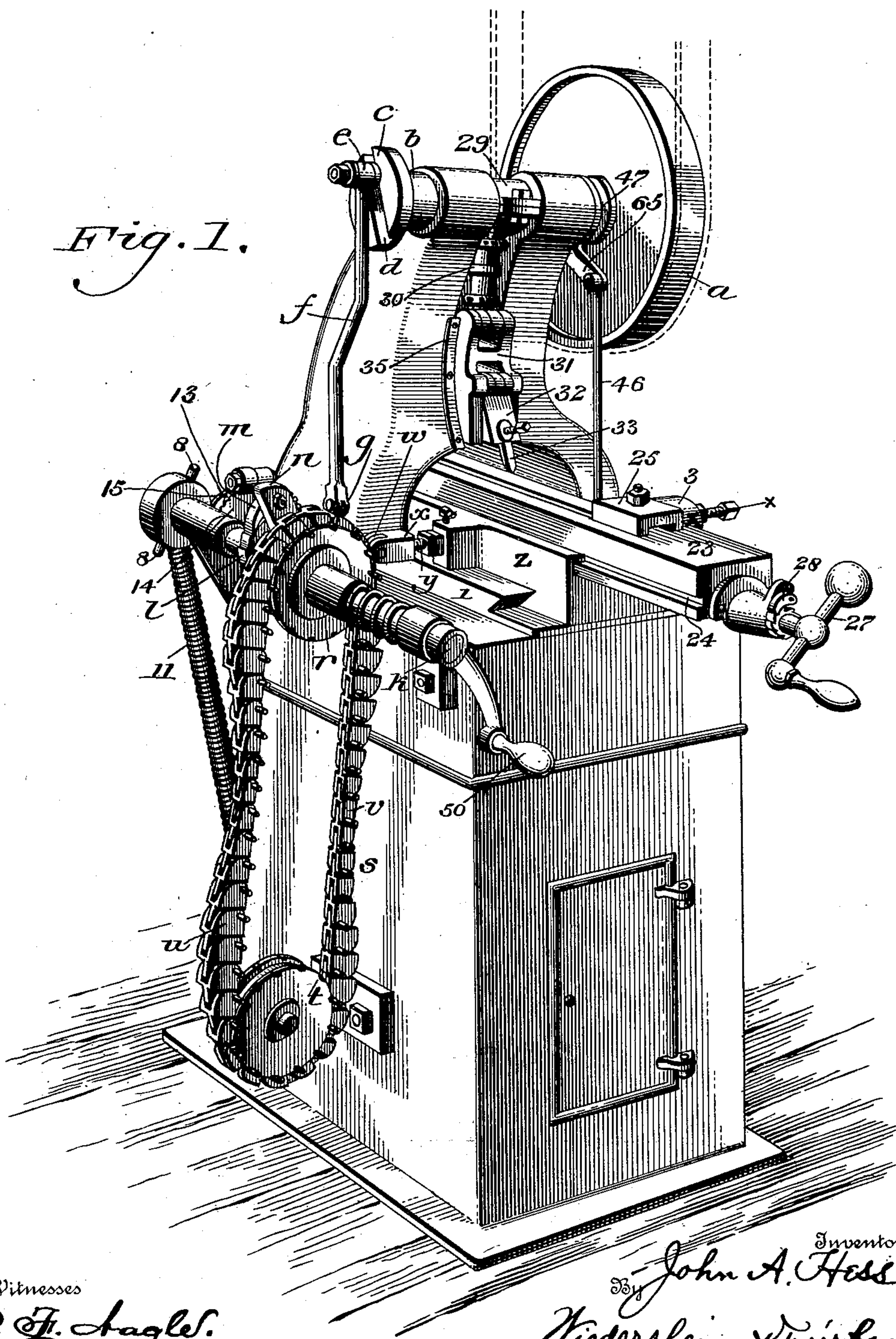
J. A. HESS.

FILE OR RASP CUTTING MACHINE.

(Application filed Aug. 30, 1899.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses
P. F. Bagley.
Samuel Kennedy.

Inventor
John A. Hess.
Niedersheim & Fairbanks
Attorneys

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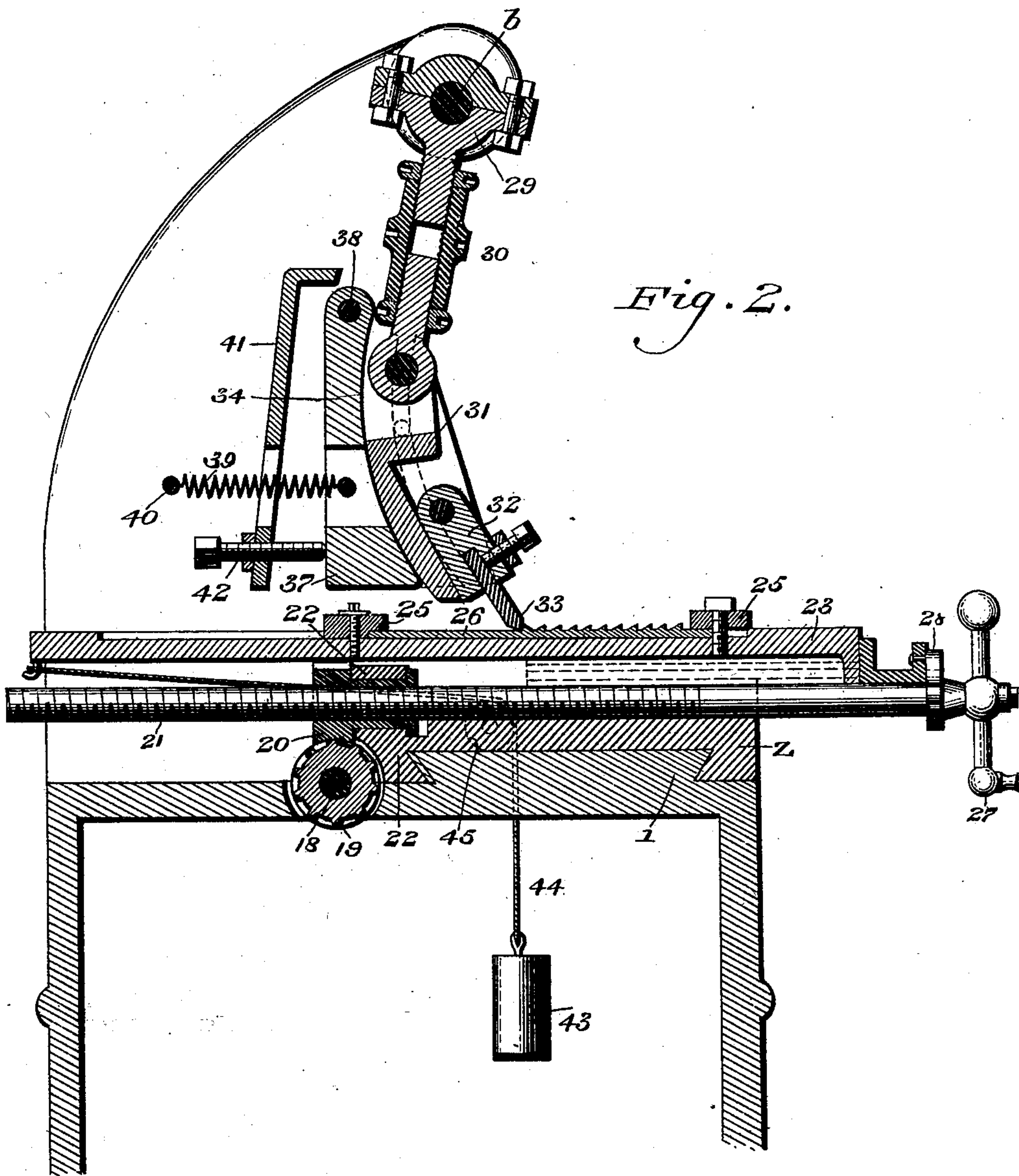
J. A. HESS.

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4 Sheets—Sheet 2.



Witnesses

O. F. Lagle.
Harry B. Kennedy.

Inventor
John A. Hess.

Wiedersheim & Fairbanks
Attorneys

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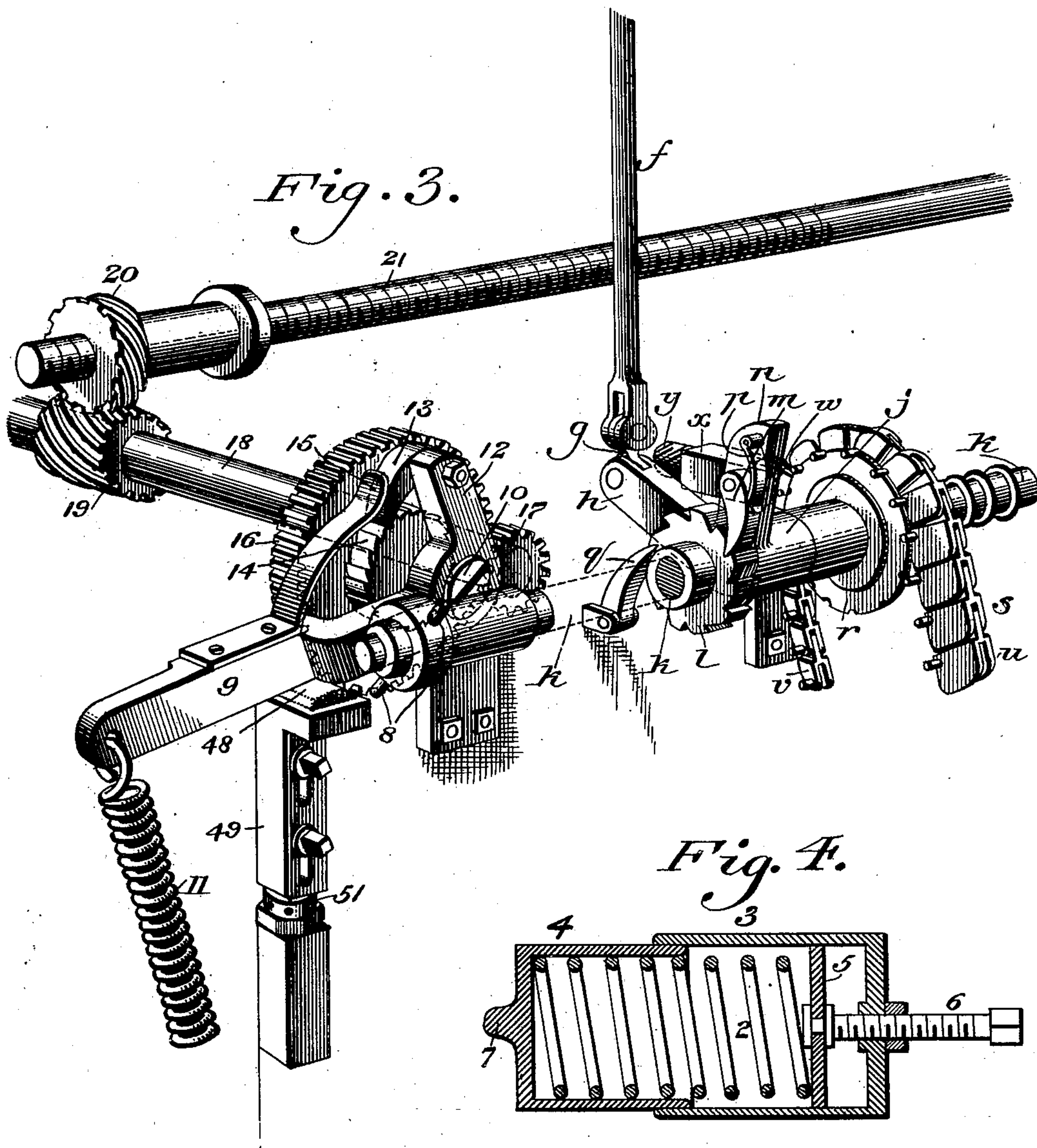
J. A. HESS.

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4 Sheets—Sheet 3.



Witnesses

P. F. Taggart.
Samuel Kennedy.

Inventor
John A. Hess.

Wiedersheim & Fairbanks
Attorneys

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J. A. HESS.

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4 Sheets—Sheet 4.

Fig. 5.

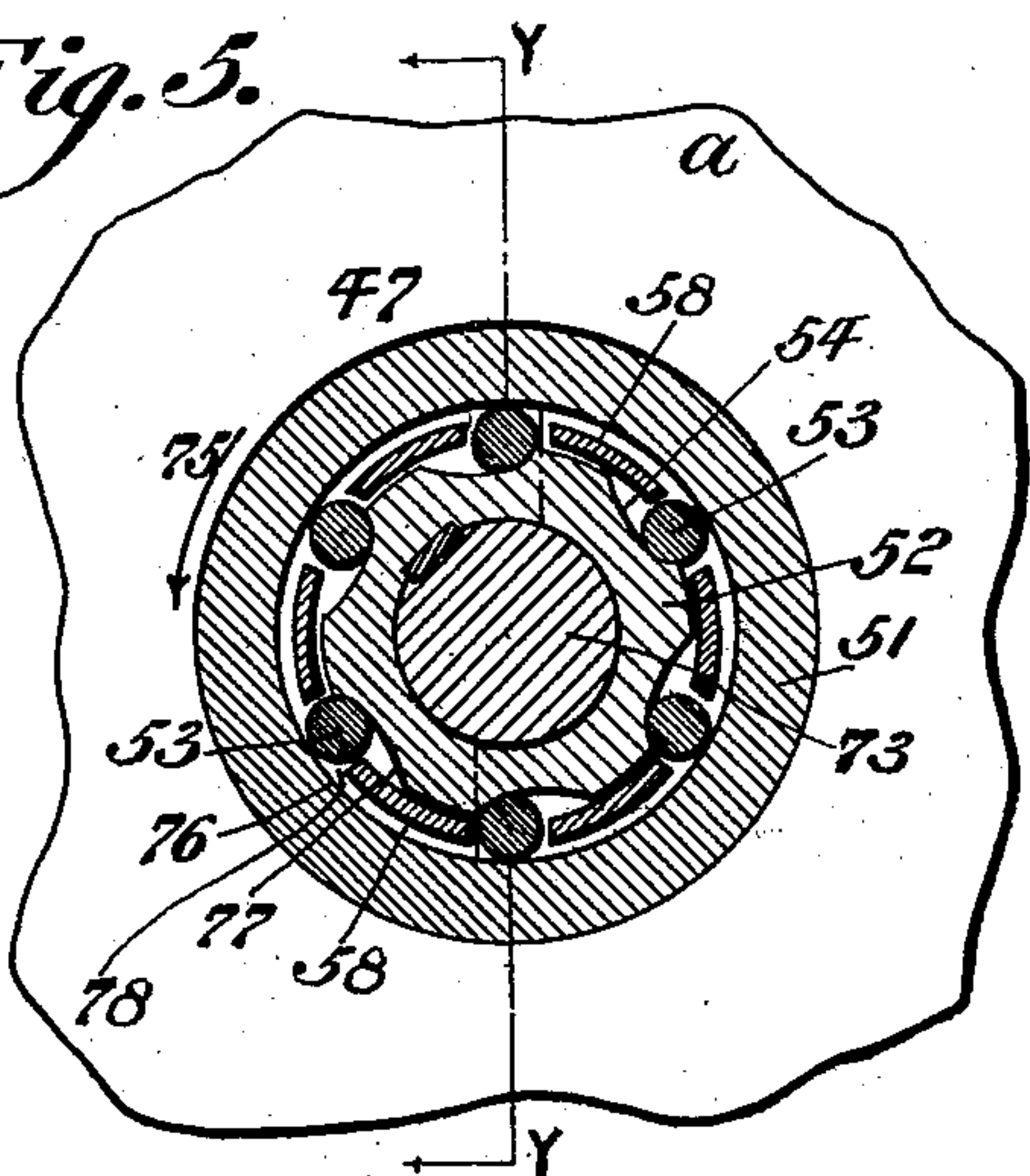


Fig. 6.

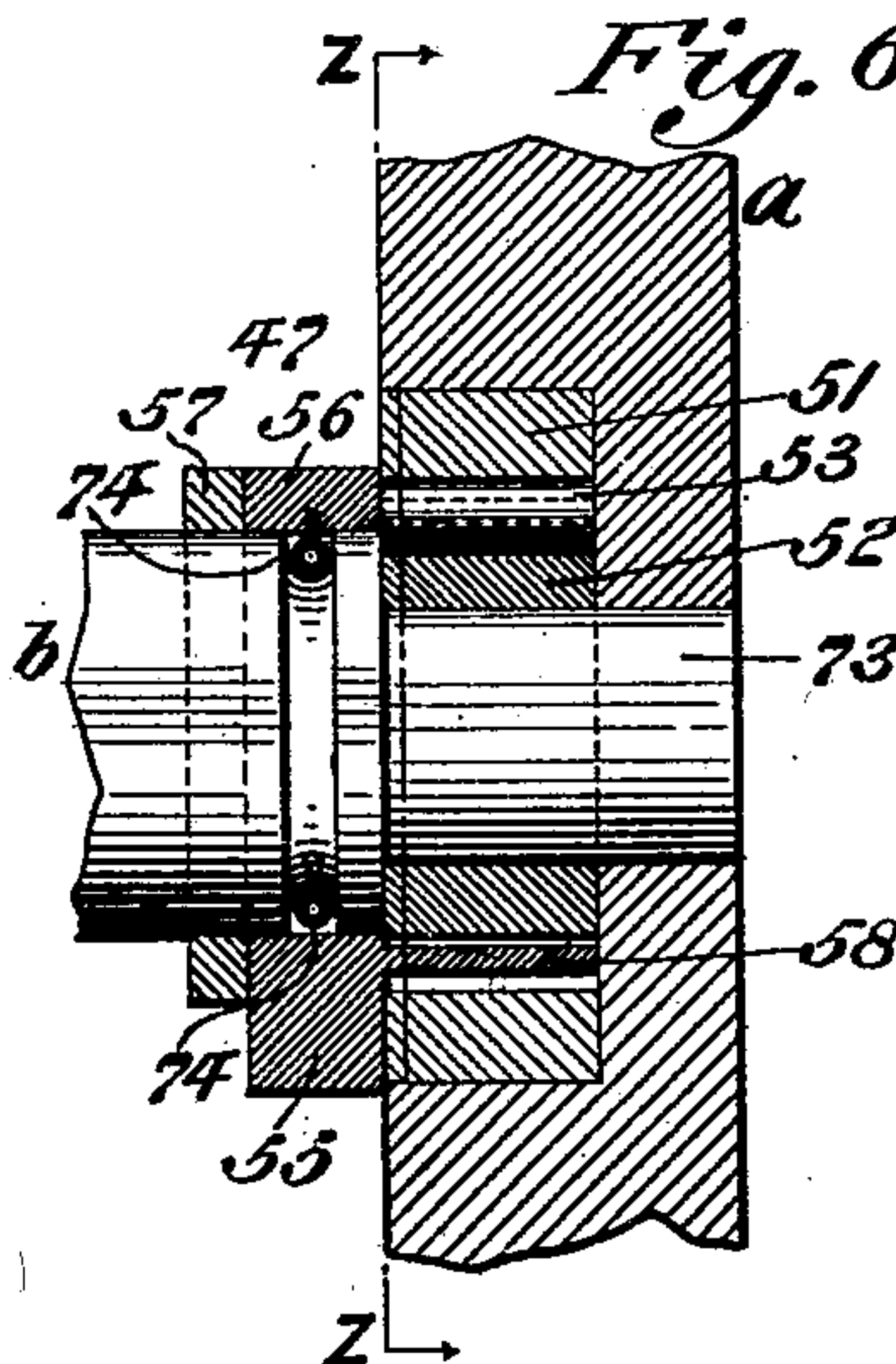


Fig. 7.

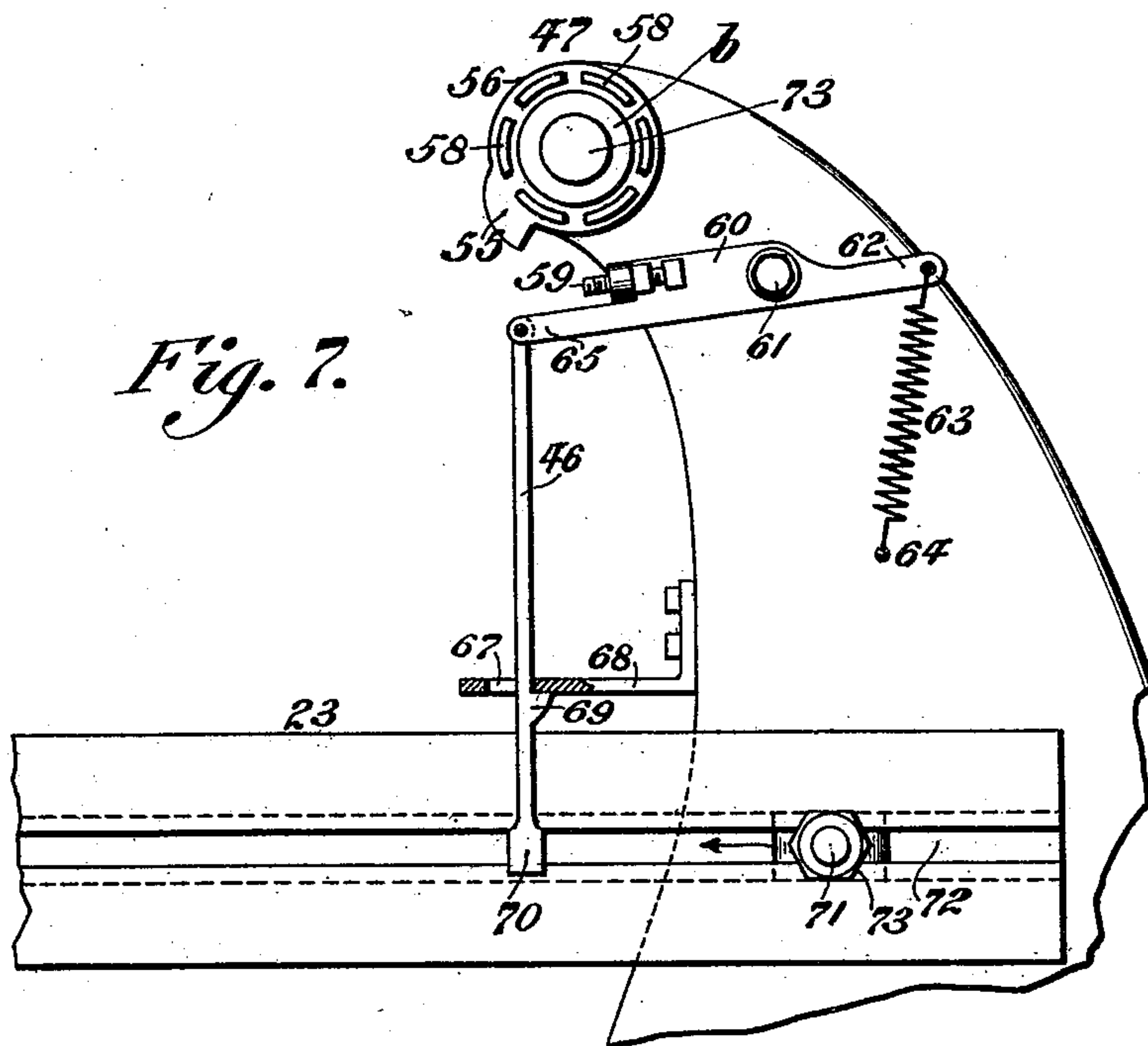
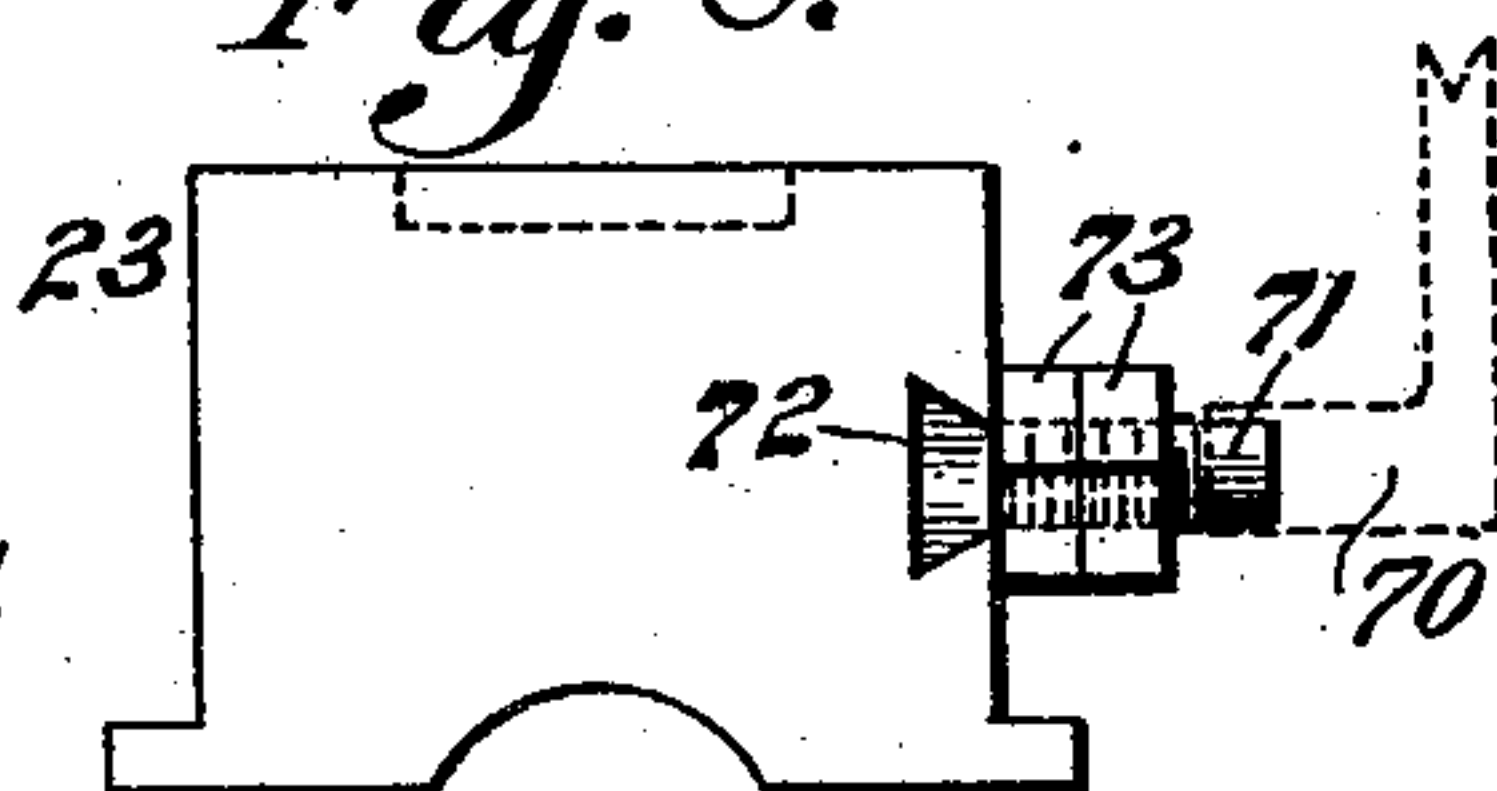


Fig. 8.



Witnesses
L. Douville,
H. Kennedy.

Inventor
John A. Hess.
Wiedersheim-Pairbauf
Attorneys

UNITED STATES PATENT OFFICE.

JOHN A. HESS, OF PHILADELPHIA, PENNSYLVANIA.

FILE OR RASP CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 646,698, dated April 3, 1900.

Application filed August 30, 1899. Serial No. 728,937. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. HESS, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in File or Rasp Cutting Machines, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to improvements in a file or rasp cutting machine; and it consists of a novel manner of supporting and actuating the tool-carrying head, said head and its adjuncts reciprocating or moving in a curvilinear or arc-shaped path.

It also consists of novel means for adjusting the depth of the cut and the extent of curvilinear motion imparted to the cutting-tool.

It also consists of a novel construction of pawl-and-ratchet mechanism for imparting transverse and longitudinal movements at the proper intervals to the blank, means being also provided for cutting files of different sizes, according to requirements.

It also consists of novel clutch and tripping mechanism for arresting the movement of the file-blank.

Figure 1 represents a perspective view of a file or rasp cutting machine. Fig. 2 represents a vertical sectional view showing the means for imparting a curvilinear motion to the cutting-tool. Fig. 3 represents, on an enlarged scale, an isometric perspective view of the pawl-and-ratchet mechanism seen at the side of Fig. 1, but viewed from the rear of the latter. Fig. 4 represents, on an enlarged scale, a sectional view on line *xx*, Fig. 1. Fig. 5 represents a section of the clutch mechanism on line *zz*, Fig. 6. Fig. 6 represents a section on line *yy*, Fig. 5. Figs. 7 and 8 represent side and front elevations, respectively, of the tripping mechanism.

Similar letters and numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, *a* designates a pulley to which power is applied, said pulley being mounted upon the crank-shaft *b*, which carries the disk *c*, provided with a slot *d*, wherein is secured the upper end of the connecting-rod *f*, its lower end being secured to one end of the knuckle *g*, whose other end is secured to the member *h* of the bell-crank *j*,

loosely mounted upon the shaft *k*, to which latter is secured the ratchet-wheel *l*, actuated by the pawl *m*, carried upon the arm *n* of the bell-crank lever *j*, which carries the spring *p*, whereby said pawl is caused to engage said ratchet-wheel, any improper movement thereof being prevented by the dog *q*.

r designates a sprocket-wheel secured to the shaft *k* and rotating in unison therewith.

s designates a sprocket-chain passing around the wheel *r* and the lower sprocket-wheel *t*, said chain being composed of links of varying thickness, resulting in the alternate thick and thin portions *u* and *v*, respectively, said chain contacting with the roller *w*, carried by the head *x* of the threaded rod *y*, screwed into the transversely-movable bed *z*, which is mounted upon the ways *l*. The roller on the head *x* always contacts with the sprocket-chain by reason of the tension of spring 2, contained within the casing 3, one end of said spring contacting with the adjacent wall of the plunger 4, while its opposite end contacts with the follower 5, which is adjusted by the threaded stem 6, said plunger 4 having the portion 7 attached to or integral with the bed *z*, whereby the latter will be yieldingly retained in position.

The shaft *k* carries a sleeve provided with the oppositely-located pins 8, which are adapted to lift at the proper intervals the lever 9, fulcrumed at 10, said lever having one end of the spring 11 attached thereto, which pulls downwardly thereon.

12 designates an arm of said lever carrying the pawl 13, adapted to engage the teeth of the ratchet-wheel 14, said pawl being held in position by the spring 15. The ratchet-wheel 14 is secured to the gear 16 and revolves therewith in bearings attached to a suitable portion of the machine, the bearings of said gear being omitted from Fig. 3 for clearness of illustration.

17 designates a pinion meshing with the gear 16 and mounted upon the shaft 18, whose bearings are not shown.

19 designates a worm or spiral gear carried by the shaft 18 and meshing with the pinion or spiral gear 20, which is internally threaded and engages the feed-screw 21, said pinion being held in fixed position by its engagement with the portion 22 of the bed *z*.

23 designates an upper bed which is longitudinally movable on the bed *z* and provided with ways 24.

25 designates clamping devices on the bed 23, whereby the file-blank 26 is held. The feed-screw 21 is provided with the handle 27 and pawl-and-ratchet mechanism 28, whereby it can be manually rotated when desired.

29 designates boxes mounted on the cranked portion of the shaft *b* and pivotally connected through adjusting devices 30 with the head 31, in which is pivotally mounted the holder 32, which carries the punch 33, whereby the rotation of the crank-shaft *b* raises and lowers said head, which moves in a curvilinear path by reason of the curved ways 34, said head being held in position by curved strips 34, secured to the block 37, hereinafter referred to, one of the said strips being seen in Fig. 1, and it being apparent that the housing is suitably recessed to provide for the necessary movements of said block and strip.

37 designates a guide-block pivotally mounted at 38 in a suitable portion of the housing of the machine, said guide-block having formed thereon curvilinear slideways 34, in which reciprocates the head 31, said guide-block being firmly held against an adjusting-screw 42 by means of a spring 39.

41 designates a portion of the machine through which passes the adjusting-screw 42, whereby the position of the bed 37 can be adjusted.

43 designates a weight attached to the connection 44, which passes over a pulley or roller 45, whereby the back lash or play of the feed-screw 21 is taken up.

46 designates a rod operating the clutch mechanism 47, whereby the machine can be automatically stopped.

48 designates a cushion supported on the post 49, which is adjustable vertically by means of screw 51, said cushion taking up the shock of the lever 9 in its descent.

50 designates a crank-handle for turning the shaft *k* and wheel *r*, whereby the position of the bed *z* and the blank 26 thereon can be adjusted according to requirements by the rotation of the chain *s* to the proper extent.

Figs. 5 to 8, inclusive, illustrate the automatic tripping and clutch mechanism, pulley *a* having the ring 51 seated therein, between which and the sleeve 52 are the cylinders 53, which latter are seated in the recesses 54 of said sleeve, which is secured to the reduced portion 73 of the shaft *b*.

55 designates a nose on the sleeve 56, which is rotatably mounted on the enlarged portion of the shaft *b* and held in position by the ring 57, said sleeve 56 having the inwardly-projecting members 58, whose location with respect to the cylinders 53 will be understood from Fig. 5.

59 designates an adjustable screw on lever 60, fulcrumed at 61, which has secured to the end 62 one end of spring 63, the other end

thereof being secured at 64. The end 65 of lever 60 has the arm 46 pivoted thereto and passing through slot 67 of the bracket 68, said arm having a tooth 69, which engages the bracket 68, the lower end of said arm being adapted to be struck by the abutment 71, which is adjustable in the ways 72 and held by means of nuts 73.

The parts normally appear as seen in Fig. 7, and it will be apparent that power having been applied to the pulley *a* will cause it and shaft *b* to rotate, said rotation continuing until abutment 71 contacts with the end 70 and disengages the tooth 69 from bracket 68, whereupon spring 63 will pull the bolt 59 into contact with the nose 55, whereby the cylinders will be moved by the members 58 from the position seen in Fig. 5, and the rotation of pulley *a* will continue, but the rotation of shaft *b* will cease.

74 designates a spring having one end secured to the sleeve 56, while its other end engages the shaft *b*, said spring 74 exerting a pull upon the sleeve 56 and causing the same to rotate with the shaft *b* in the direction indicated by the arrow 75 in Fig. 5, the projecting members 58 being caused to move in a similar direction and force the cylinders 53 firmly against the walls 76 and 77 of the ring 51 and sleeve 52, respectively, thereby producing a friction between said cylinders and walls sufficient to cause the pulley *a* to rotate the shaft *b*. When the nose 55 is brought in contact with the screw 59, the latter causes the sleeve 56 and members 58 to come to a sudden stop, which will force the cylinders 53 from their wedged positions between the walls 76 and 77 in the enlarged spaces 78 between said walls, and the friction between the latter and the cylinders 53 no longer existing the shaft *b* ceases to be rotated by the pulley *a*. When it is desired for the pulley *a* to transmit motion to the shaft *b*, the rod 46 is pulled downwardly by hand, so as to cause the nose 69 to again engage the bracket 68, as seen in Fig. 7.

It will be apparent that my invention is equally well adapted for the cutting of files by substituting the proper tools therefor, as will be familiar to those skilled in the art. It will also be apparent that changes may be made by those skilled in the art which will come within the scope of my invention, and I do not, therefore, desire to be limited in every instance to the exact construction I have herein shown and described.

The operation is as follows: The rotation of the crank-shaft *b* through the intermediate connections imparts a reciprocating movement to the punch 33 and connecting-rod *f*, the latter rocking the bell-crank *j*, which carries the pawl *m*, whereby the ratchet-wheel *l* and the sprocket-wheel *r* will rotate. The movement of the parts is so timed that while the punch 33 is moving upwardly the file-blank moves transversely a distance equal to the space between a pair of teeth, whereby

the transverse row of punches or teeth is produced, the transverse movement of the bed z being effected by the varying thicknesses of the links composing the chain s , as is evident, the operation of the ratchet l being sufficient to bring the center of a link against the wheel w after each movement of said chain, said bed z being held in position by the spring 2, which holds the roller w in contact with said chain.

While the bed z is being moved transversely to one extreme position, the pins 8 revolve, the movement being so timed that one of said pins will raise the lever 9, and thereby actuate the arm 12 and pawl 13, whereby the gear 16 and pinion 17 will be rotated, thereby rotating the worm 19 and pinion 20, which actuates the feed-screw 21 to the required extent. By this time the sprocket-chain has traveled sufficiently to permit the transverse movement of the bed z and the bed 23, carried thereby, in the opposite direction to the desired extent, so that another transverse row of punches is produced, and so on. The operation of the ratchet-and-pawl mechanisms whereby the requisite transverse and longitudinal movements of the file-blank are produced during punching will be best understood from Fig. 3, the movement of the parts being so timed that the forward movement of the file-blank does not occur until the transverse movement thereof is completed.

The extent of movement or travel of the head 31 can be varied by manipulating the adjusting devices 30. By supporting the bed 37 as indicated and providing the adjusting-screw 42 the exact angle at which the punch 33 strikes the file-blank can be regulated.

By employing the spring 2 and chains s , having links of varying thicknesses, I am enabled to impart a positive and an unvarying transverse movement to the bed z . The rod 46, which actuates the clutch mechanism 47, can be located so as to be operated automatically when the bed 23 has moved to the desired extent. By the handle 50 the shaft k , sprocket-wheel r , and chain s can be actuated so as to adjust the position of the bed z and the file-blank according to requirements, the various parts being adjusted, according to requirements, so that file-blanks of different sizes can be cut with equal facility.

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

1. In a machine for cutting rasps and the like, a bed, a sprocket-chain of varying thickness, connections intermediate said bed and sprocket-chain, and means for actuating the latter.

2. In a machine for cutting rasps and the like, a support for a blank, a punch-holder, means for reciprocating said holder, means for actuating said support longitudinally, and a sprocket-chain of varying thickness for moving said support transversely.

3. In a machine for cutting rasps and the like, a transversely-movable bed, a sprocket-

chain having links of varying thicknesses for actuating said bed transversely, and means for operating said sprocket-chain.

4. In a machine for cutting rasps and the like, a transversely-movable bed, a spring to actuate said bed in one direction, a sprocket-chain of varying thickness for moving said bed against the pressure of said spring, means for operating said chain, and means for actuating said bed longitudinally.

5. In a machine for cutting rasps and the like, a transversely-movable bed, a sprocket-chain of varying thickness for actuating said bed, an upper bed supported on the latter, and means for actuating said upper bed longitudinally.

6. In a machine for cutting rasps and the like, a crank-shaft, a connecting-rod actuated thereby, a shaft carrying a sprocket-wheel, pawl-and-ratchet mechanisms operated by said connecting-rod and adapted to operate said sprocket-wheel, a sprocket-chain engaging said wheel, a transversely-movable bed actuated by said chain, and a longitudinally-movable bed supported upon said first-mentioned bed.

7. In a machine for cutting rasps and the like, a shaft, a sprocket-wheel carried thereby, a sprocket-chain engaging said wheel, said chain having links of varying thickness, a ratchet-wheel secured to said shaft, a lever loose on the latter, a pawl carried by an arm of said lever and engaging said wheel, said ratchet-wheel, sprocket wheel and chain moving in unison, and a bed actuated by said sprocket-chain.

8. In a machine for cutting rasps and the like, a lower bed, a sprocket-chain constructed substantially as described for actuating the same transversely, an upper bed, pawl-and-ratchet mechanisms actuating a feed-screw, and connections common to said feed-screw and upper bed, whereby the latter is actuated longitudinally.

9. In a machine for cutting rasps and the like, an upright block pivotally supported, means for adjusting said block, the latter having a curved face against which the curved back of a movable head is adapted to contact, a punch-holder carried by said head, and means for reciprocating said head and holder.

10. In a machine for cutting rasps and the like, the combination of a crank-shaft, boxes carried thereby, a head, adjusting devices common to the latter and to said boxes, said head having a curved rear surface, a curved or concave block against which said head contacts, a spring engaging said block, and an adjusting-screw for varying the position of the latter.

11. The combination of a crank-shaft, a head operated thereby, said head having a curved back adapted to coact with a block having a curved or concave face, a tool-holder pivotally mounted in said head, and means for adjusting the arc of movement of said head and tool-holder.

12. The combination of a crank-shaft, a punch actuated thereby, a crank-disk carried by said shaft, a connecting-rod actuated by said crank-disk, a longitudinally-extending shaft, a bell-crank loose on said shaft and actuated by said connecting-rod, a ratchet-wheel fastened to said shaft, a pawl on one arm of said bell-crank engaging said ratchet-wheel, a sprocket-wheel tight on said shaft, a sprocket-chain of varying thickness engaged by said sprocket-wheel, a transversely-movable bed actuated by said sprocket-chain, a spring-pressed lever suitably fulcrumed, a pawl carried by an arm of said lever, pins carried by said shaft for actuating said lever, a gear having a ratchet-wheel attached thereto, said ratchet-wheel being engaged by said last-mentioned pawl, a shaft carrying a pinion in mesh with said gear, a worm on said shaft, an upper longitudinally-movable bed supported upon said transversely-movable bed, a feed-screw for actuating said upper bed, and a pinion engaging said worm and operating said feed-screw.

13. The combination of upper and lower sprocket-wheels, a chain common thereto of varying thickness, a transversely-movable bed, devices intermediate said bed and chain, and a spring located on the opposite side of said bed.

14. In a machine for cutting rasps and the like, a shaft carrying a sprocket-wheel, a sprocket-chain of varying thickness engaging said wheel, pawl-and-ratchet mechanisms operating said wheel, a bed, devices intermediate said bed and chain, a spring adapted to move said bed in the direction of said chain, and means for normally rotating said shaft, so as to adjust the position of said bed.

15. In a machine for punching rasps and the like, the combination of a laterally-moving bed, a longitudinally-moving bed, the latter supporting the blank, means for actuating said beds, a clutch mechanism, and a tripping device actuated by said longitudinally-moving bed, and operating said clutch mechanism.

16. In a machine for punching rasps and the like, a movable bed, adapted to carry a blank, a reciprocating punch, means for actuating said bed and punch, a clutch mechanism and tripping devices operated by said bed for actuating said clutch mechanism.

17. In a machine for punching rasps and the like, a rotatable shaft, a clutch mechanism carried thereby, a longitudinally-movable bed adapted to carry a blank, and a tripping device operated by said bed and adapted to actuate said clutch mechanism.

18. In a machine for punching rasps and the like, a longitudinally-movable bed, a reciprocating punch movable in an adjustable curvilinear path, a clutch, and tripping mechanism actuated by said bed for operating said clutch.

19. In a machine for punching rasps and the like, a reciprocating punch, a longitudi-

nally-movable bed, a transversely-movable bed, a sprocket-chain of varying thickness for actuating the latter, a clutch mechanism, and a tripping device actuated by said bed for actuating said clutch mechanism.

20. In a machine for making rasps and the like, a reciprocating punch, a longitudinally-movable bed, clutch mechanism controlling the movement of said punch, and tripping devices operated by said bed and adapted to actuate said clutch mechanism.

21. In a machine for cutting rasps and the like, a bed, a sprocket-chain of varying thickness located at one side of said bed, connections intermediate said bed and sprocket-chain, and means for actuating the latter.

22. In a machine for cutting rasps and the like, a support for a blank, a punch-holder, means for reciprocating said holder, means for actuating said support longitudinally, and a sprocket-chain having links of varying thickness and located at one side of said support, said chain being adapted to move the blank and its support transversely.

23. In a machine for cutting rasps and the like, a transversely-movable bed, a sprocket-chain having links of varying thickness for actuating said bed transversely, said chain being located at one side of said bed, and means for operating said chain.

24. In a machine for cutting rasps and the like, a transversely-movable bed, a spring, a sprocket-chain of varying thickness for moving said bed transversely, said chain being located at one side of said bed, means for moving said chain, and means for actuating said bed longitudinally.

25. In a machine for cutting rasps and the like, a bed, a chain of varying thickness, connections intermediate said bed and chain, means for actuating the latter, means for moving said bed transversely, a punch-holder, means for reciprocating said holder, and an adjustable curvilinear path for said punch-holder.

26. In a machine for cutting rasps and the like, the combination of beds movable at right angles to each other for supporting a blank, means for actuating one of said beds in a longitudinal direction, a chain of varying thickness for actuating the other of said beds, a clutch mechanism, and a tripping device actuated by one of said beds and adapted to operate said clutch mechanism.

27. In a machine for cutting rasps and the like, a bed, a chain of varying thickness located in proximity to said bed, connections intermediate said bed and chain, means for actuating said chain, a reciprocating punch and means for operating said punch.

28. In a machine for cutting rasps and the like, beds for supporting a blank, means for actuating said beds, a clutch mechanism, a nose on a portion of said mechanism, a lever suitably fulcrumed, an abutment on said lever adapted to contact with said nose, means for holding said abutment out of the path of

said nose and a tripping device actuated by one of said beds and adapted to operate said clutch mechanism.

29. In a machine for cutting rasps and the
5 like, a support for a blank, means for actuating said support, a clutch mechanism having a nose thereon, a lever, a tension device for said lever, an adjustable screw on the latter, a bracket, an arm having a tooth thereon adapted to engage said bracket, and means
10 carried by said support for engaging said arm.

30. In a machine for cutting rasps and the

like, a support for a blank, means for actuating said support, a clutch mechanism having a nose thereon, a lever, a tension device for said lever, an adjustable screw on the latter, a bracket, an arm having a tooth thereon adapted to engage said bracket, and means carried by said support for engaging said
15 arm, in combination with a reciprocating punch and means for actuating said punch.

JOHN A. HESS.

Witnesses:

JOHN A. WIEDERSHEIM,
E. HAYWARD FAIRBANKS.