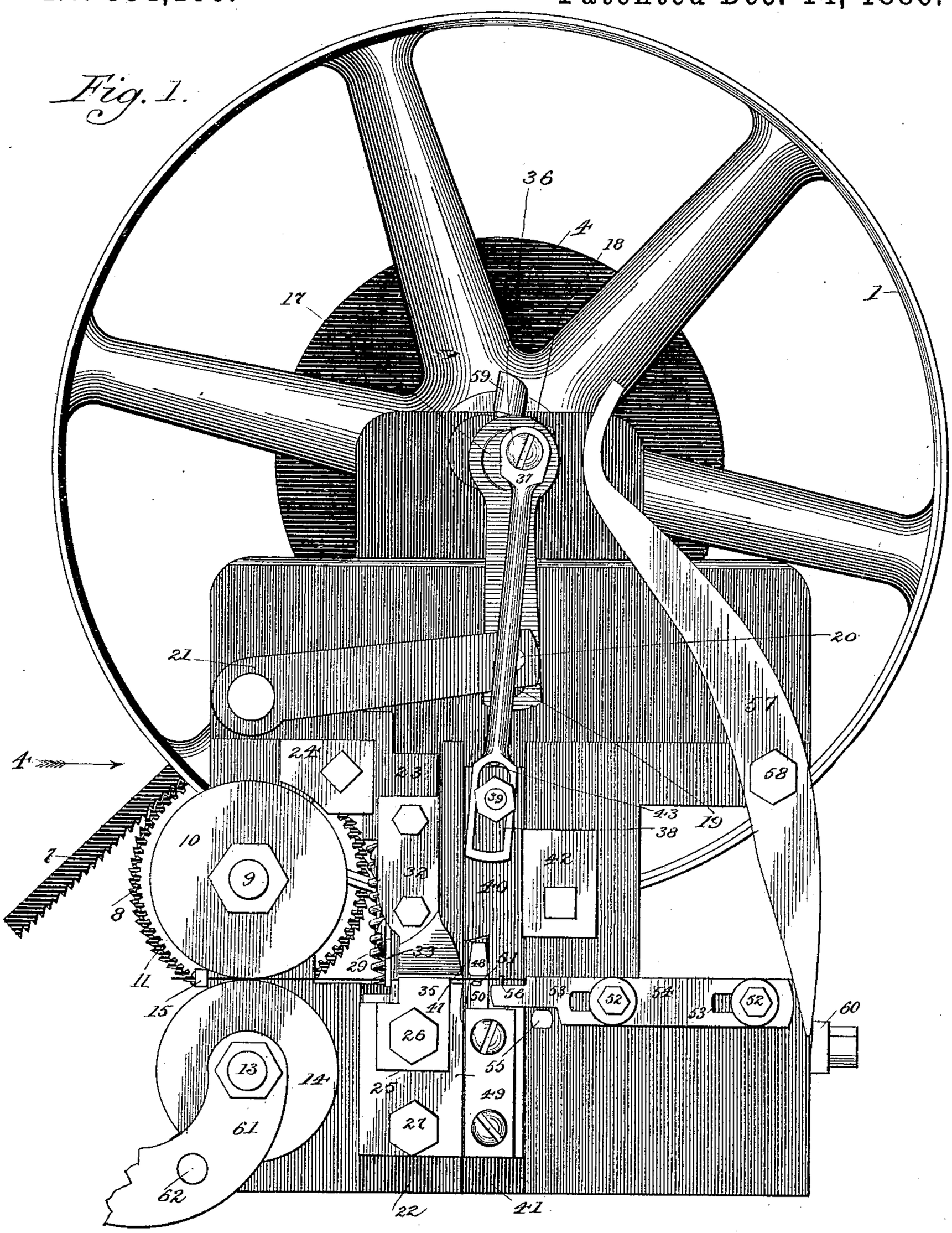
(No Model.) 5 Sheets—Sheet 1.

W. F. MOODY.

STAPLE TACK MACHINE.

No. 354,166. Patented Dec. 14, 1886.

Fig. 1.



Witnesses,
L. F. Mann.
Frederick f. Goodwin

Inventor,
William F. Moody
By, Offield Towle & Phelps
Attys.

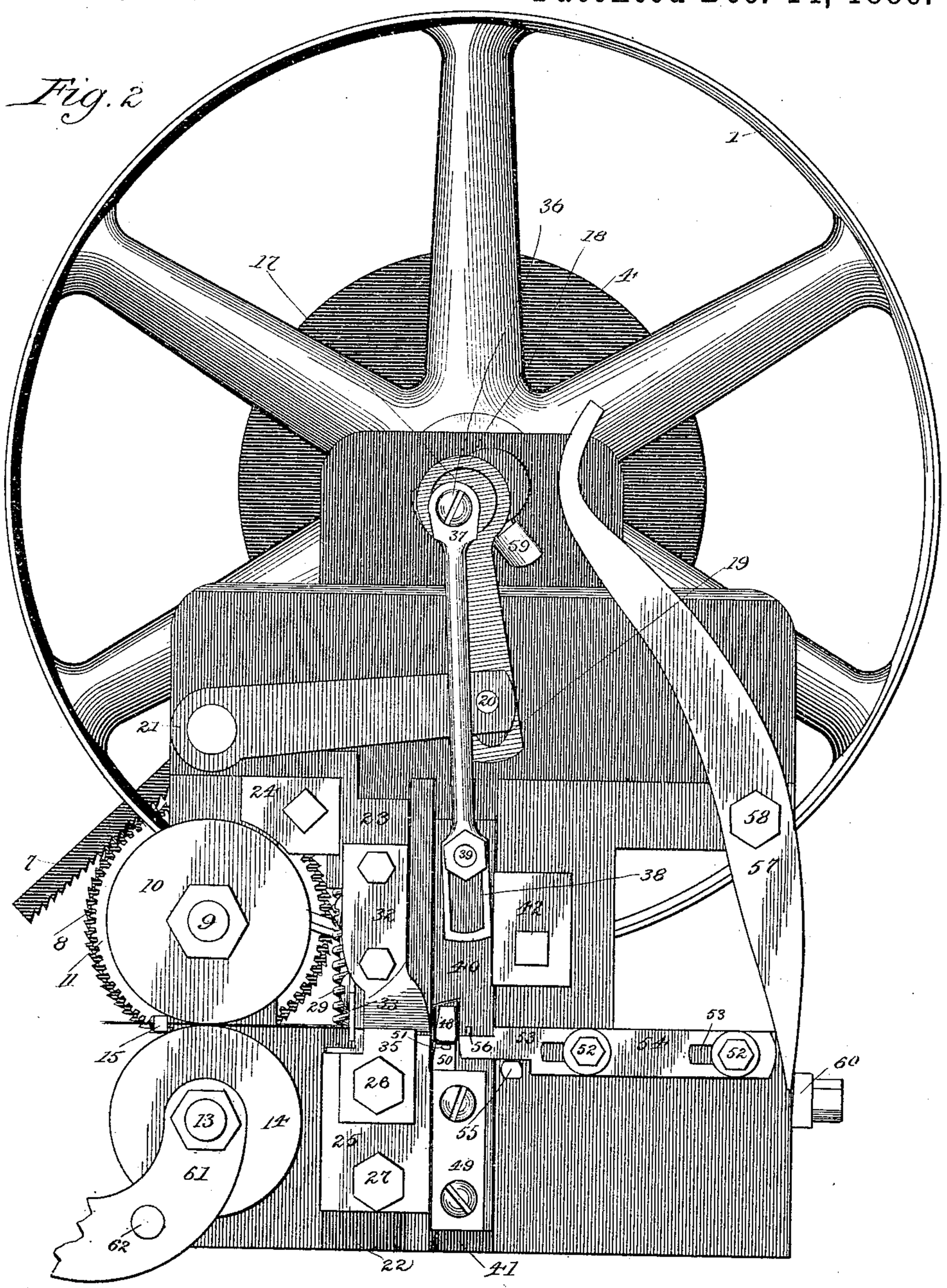
(No Model.) 5 Sheets—Sheet 2.

W. F. MOODY.

STAPLE TACK MACHINE.

No. 354,166. Patented Dec. 14, 1886.

Fig. 2



Witnesses,
L. F. Mann,
Frederick B. Goodwin

Inventor,
William F. Moody
By Offield Towle & Phelps
Attys.

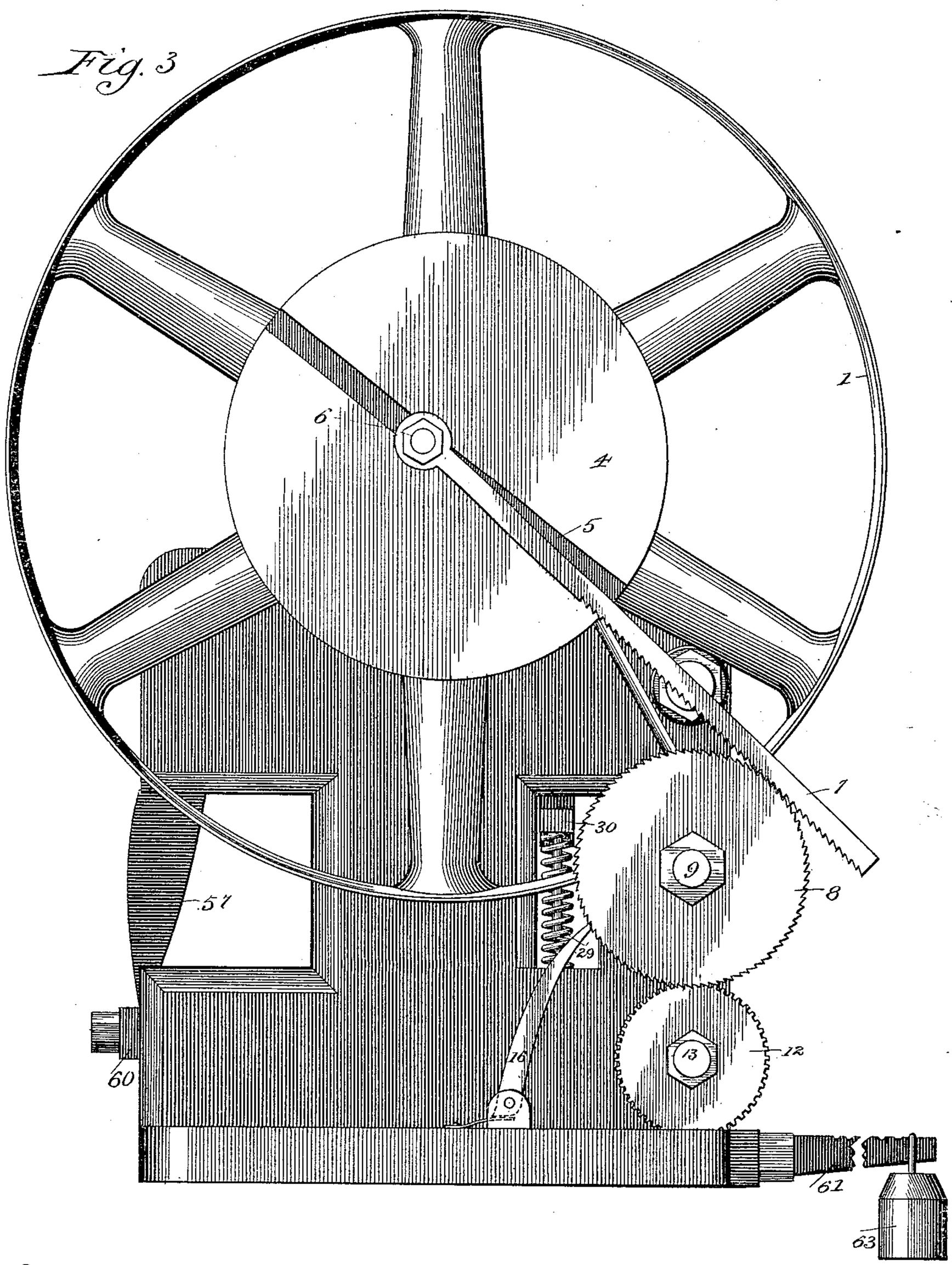
(No Model.) 5 Sheets—Sheet 3.

W. F. MOODY.

STAPLE TACK MACHINE.

No. 354,166. Patented Dec. 14, 1886.

Fig. 3



Witnesses,
L. Smart,
Frederick f. Goodwin

Inventor,
William F. Moody
By. Offield Towle & Phelps
Attys.

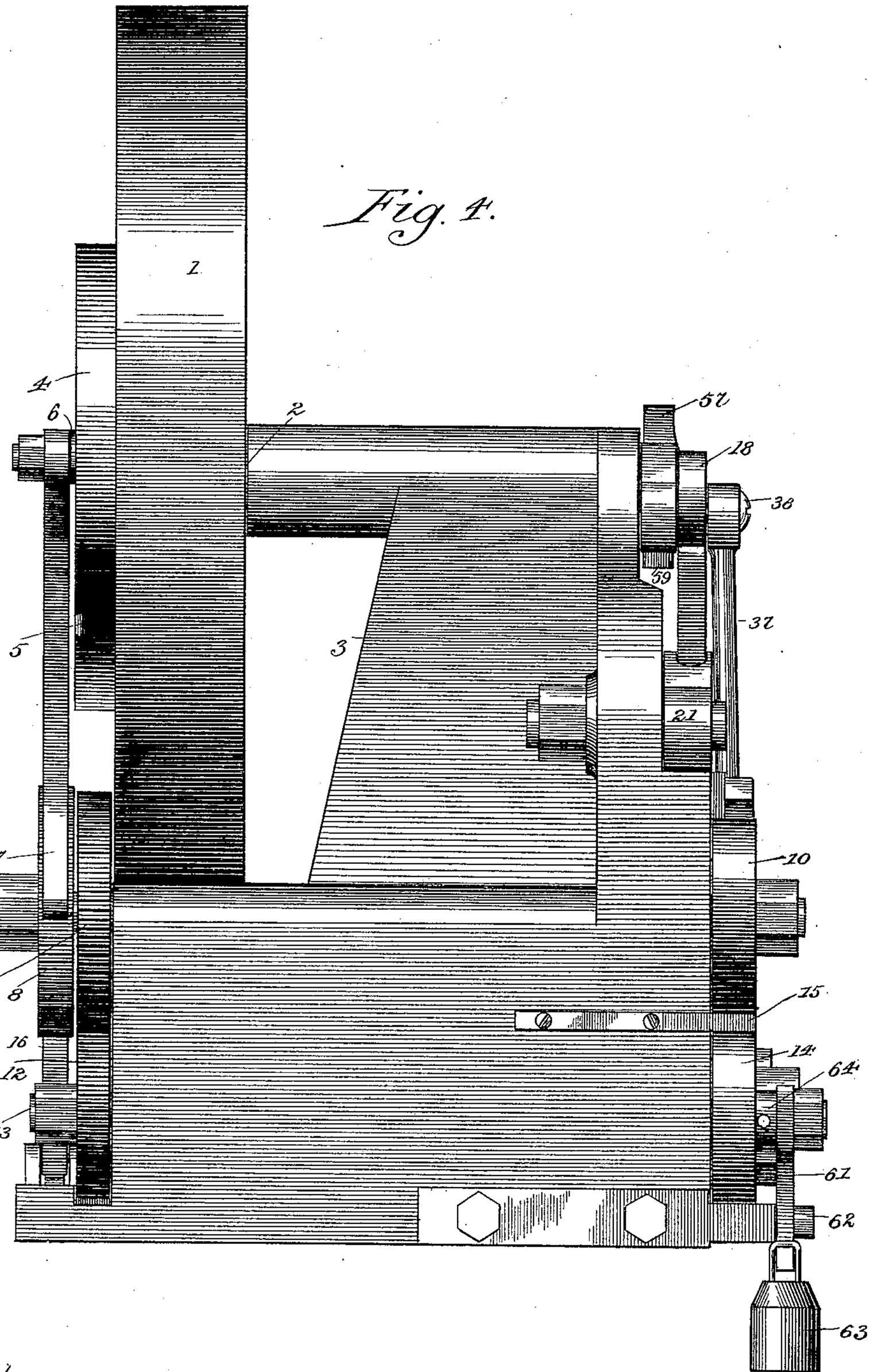
(No Model.) 5 Sheets—Sheet 4.

W. F. MOODY.

STAPLE TACK MACHINE.

No. 354,166. Patented Dec. 14, 1886.

Fig. 4.



Witnesses,
L. F. Mann,
Frederick F. Goodwin

Inventor,
William F. Moody
By, Offield Towle & Phelps.
Attys,

(No Model.) 5 Sheets—Sheet 5.

W. F. MOODY.

STAPLE TACK MACHINE.

No. 354,166. Patented Dec. 14, 1886.

Fig. 5.

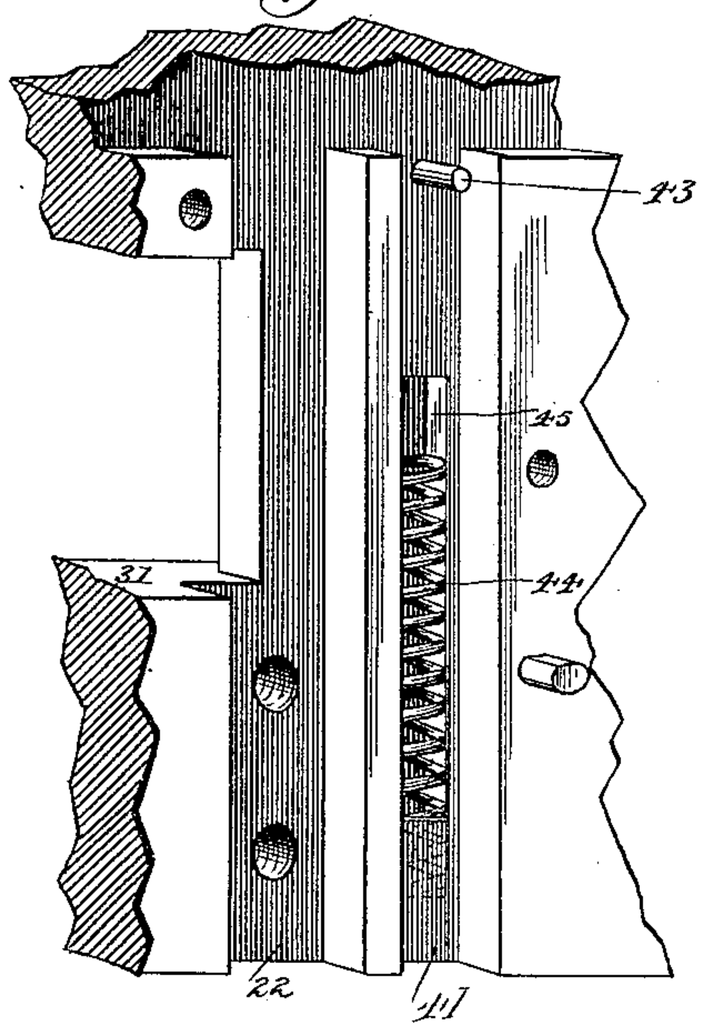


Fig. 6.

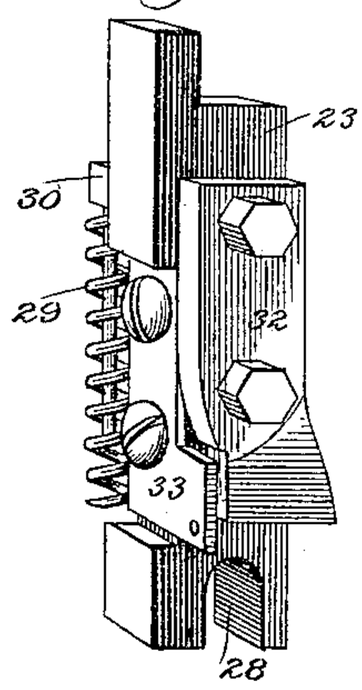


Fig. 10

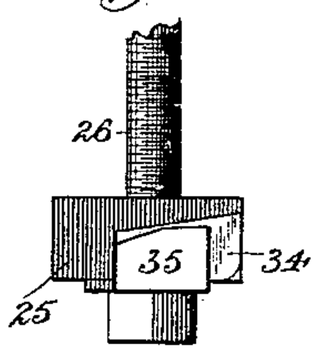


Fig. 7

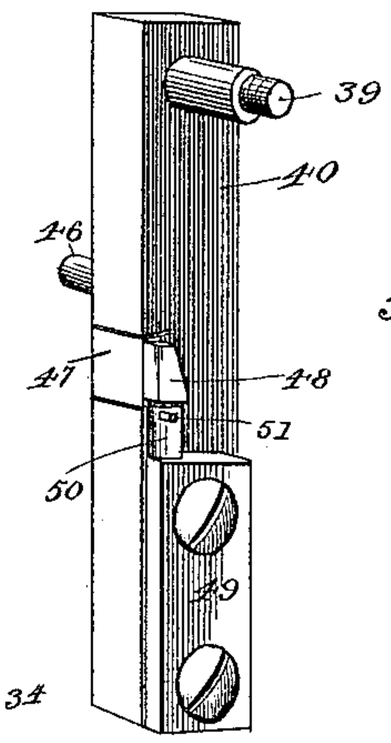


Fig. 9.

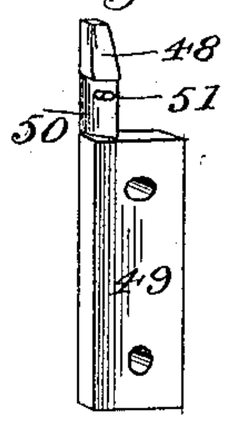
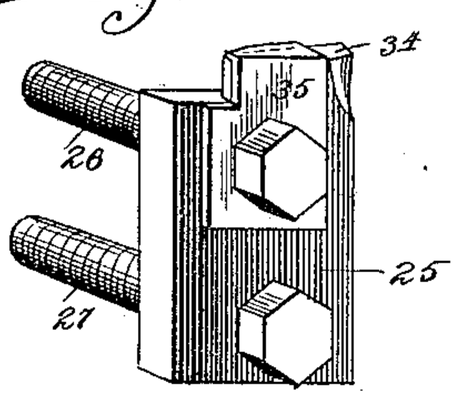


Fig. 8.



Witnesses,
L. G. Mann.
Frederick F. Goodwin

Inventor
William F. Moody
By, Offield Towle & Phelps
Attys.

UNITED STATES PATENT OFFICE.

WILLIAM F. MOODY, OF CHICAGO, ASSIGNOR OF ONE-HALF TO WILLIAM D. GIBSON AND CHARLES P. PARISH, OF COOK COUNTY, ILLINOIS.

STAPLE-TACK MACHINE.

SPECIFICATION forming part of Letters Patent No. 354,166, dated December 14, 1886.

Application filed May 22, 1886. Serial No. 203,052. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. MOODY, a 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 Tack-Machines, which I desire to protect by Letters Patent of the United States, of which the following is a specification.

The object of my invention is to construct a machine of small size and cost, which shall cut and bend a staple-tack rapidly and perfectly; and to that end my invention consists in a construction and combination of parts hereinafter fully described, and pointed out in the claims.

In the drawings annexed, which form a part of this specification, Figure 1 is a front elevation of my machine as it appears just after the wire for the tack has been cut and as the tack is about to be bent. Fig. 2 is a similar elevation showing the machine as it appears just after the tack has been bent and as it is about to be thrown out. Fig. 3 is a rear elevation of the machine; Fig. 4, a side elevation taken from the direction of the arrow 4 in Fig. 1; and Figs. 5, 6, 7, 8, and 9 are detail views of various parts. Fig. 10 shows a modification.

The drive-wheel of the machine, 1, is mounted upon a shaft, 2, journaled in the principal casting 3, and has on its rear face a circular plate, 4, provided with a groove, 5, passing through its center of motion, and in which fits a sliding carrier, 6, to which is pivoted a toothed arm, 7, resting upon a ratchet-wheel, 8, fixed to a shaft, 9, passing through the casting from front to rear, and having on its front end a feed-roller, 10.

On the rear end of the shaft, just inside the ratchet-wheel, is a cog-wheel, 11, which gears with another cog-wheel, 12, below it, mounted on a shaft, 13, also passing through the machine from rear to front, and having on its front end another feed-roller, 14, placed just under the feed-roller 10. Shaft 13 has a vertical play in the casting, and its front end is journaled in a lever, 61, mounted on an axis, 62, attached to the casting, and provided with a weight, 63, by means of which, as its position is shifted on the long arm of the lever, the pressure of the lower feed-roller, 14, against the upper feed-roller, 10, is regulated, a sufficient pressure being provided to grip the wire between the rollers and cause it to feed forward. The roller 14 is separated from the lever 61 by a cam, 64, fixed to the shaft by a pin. The wire comes in between the feed-rollers through a hole in the guide-piece 15.

The feed of the wire may be effected by the rotation of the roller 10 alone, and the wheels 11 and 12 dispensed with, if desired. The rate of feed is regulated by the amount of eccentricity given to the position of the carrier 6 in the slot 5. Reverse rotation of the ratchet-wheel 8 as the tooth-rod 7 is drawn back is prevented by a stop-pawl, 16.

On the front end of shaft 2 is an eccentric hub, 17, to which is fitted an arm, 18, having in its lower end a slot, 19, into which projects a pin, 20, fixed in the arm 21, pivoted to the main casting. Below this arm, in a groove, 22, formed on the face of the casting, (see Fig. 5,) is a block, 23, held in place by a plate, 24, bolted to the casting near the top of the groove, and the anvil 25, held to the face of the casting near the bottom of the groove by the bolts 26 and 27. (See Figs. 5 and 8.) The lower end of the block 23 is provided with a slot, 28, which straddles the bolt 26, and the block slides freely in the groove, except as limited by the bolt 26 and the arm 21, and is pressed up against the arm by a spring, 29, held between the lug 30 on the rear of the block and the shoulder 31, formed on the casting.

To the front face of the block is attached by bolts the knife 32, for severing the wire, and in a recess on its side is a plate, 33, provided with a guide-hole, for directing the wire under the knife. The knife is set at such an angle as to give the proper needle-point to the wire as it is sheared, and has beneath it on the anvil 25 a corresponding face or shear edge, 34, on which the wire rests, and along which the knife passes as it descends. To the front of the anvil is held by bolt 26 plate 35, bent over at its top, the edge of that part which is bent over being beveled, as shown in Fig. 10, so as to act as a guide-piece to the wire as it is pushed forward and prevent the wire from falling out after being cut off.

On the hub 17 is fixed a second eccentric pin, 36, on which is pivoted an arm, 37, having at its lower end an eye, 38, through which projects a bolt, 39, fixed upon a block, 40, sliding in a groove, 41, (see Figs. 5 and 7,) formed in the face of the casting, and held therein by plate 42, bolted onto the front surface of the casting and projecting slightly across the groove. The upward movement of this block in the groove is limited by the pin 43, against which it is normally pressed by spring 44, resting in chamber 45, formed in the casting just back of and opening into the groove 41, this spring acting upon a lug, 46, attached to the block and projecting into the chamber 45. The block has set into it a piece, 47, which carries on its front face a projecting die, 48, which I designate as the "bending-die," the face of which is of the shape of a truncated cone, as shown in Figs. 1 and 2.

To the lower part of the block is bolted a plate, 49, which carries at its upper end a projection, 50, which is beveled toward the feed mechanism, as shown in Fig. 7, and which abuts against the under side of the die 48. This projection 50 carries a pin, 51, which serves as a guide to the wire, and also keeps the center of the staple straight while the staple is being bent, holding it against the face of the die. As the block 40 is moved down by the movement of its eccentric, the bending-die 48 strikes the wire which has been cut off by the knife at its center and bends it into a staple, the form and size of the staple depending upon the shape and size of the die.

To the face of the casting is attached by means of bolts 52, passing loosely through slots 53 in its shank, a presser-die, 54, the vertical position of which is accurately determined by pin 55, upon which it rests. The upper surface of this die is on a level with the top of the anvil, and serves as a support for one end of the wire while it is being operated upon by the bending-die, and it carries a pin, 56, which serves as a guide for the wire as it is thrust forward and to retain it in position after it has been sheared. The principal function of this die is to force one of the limbs of the staple against the inclined face of the bending-die after the latter die has performed its function, that the staple may come out of the machine with its two limbs parallel, instead of diverging, as would be the case if the bending-die operated alone, it being evident that the bending-die can give to the wire only a right-angled bend and that the natural inclination of the wire to straighten after it is released would reduce this to an acute angle. The presser-die is actuated by a lever, 57, pivoted to the casting by bolt 58, and which has its lower end in proximity to the rear end of the shank of the die, its upper end being so placed as to be pushed out by a cam, 59, fixed to the front end of the main shaft 2 at a certain period in the revolution of the shaft. When actuated by this cam, the lever 57 forces the die forward until the latter presses the limb of the staple against the inclined face of the bending-die, which at this moment is in its lowest position. The face of the die being beveled, as shown, and projecting over the top of the projection 50, the die is returned to its normal position by the action of projection 50 upon its beveled face as the former rises. Attached to the main casting on its side is a lug, 60, against which the lower end of the lever 57 normally rests.

It is found practically sufficient to correct one limb only of the staple by means of the presser-die; but, if desired, the bending-die may be given a little lateral play in its block, so that it will be forced over toward the anvil by the stroke of the presser-die, and the other limb of the staple will be forced against the other inclined face of the bending-die by the inclined face of the anvil. A perfectly symmetrical staple will be made in this way, though a staple made with the correction applied to one limb only is practically as good.

A tack is made by the machine at every revolution of the main shaft, and the operation is as follows: Immediately after the completion of a tack, and while the eccentric arms 18 and 37 are on their upward path and the cutting and bending mechanisms therefore inactive, the feed-rollers are caused to rotate by the ratchet-wheel 8, and the wire is pushed forward, being guided by the edge of plate 35 and the bevel of projection 50 and by the upper surface of the anvil into its proper position inside of pin 56 and between die 48 and pin 51. As the shaft continues to rotate the cutting mechanism is first brought into operation by the engagement of arm 18 with the pin of arm 21, the knife is forced down upon the anvil, and a portion of the wire severed for the next tack. As the wheel continues to rotate, the arm 37 engages with pin 39 on block 40 and forces it down against its spring, causing the die 48 to strike the severed piece of wire at its center and bend it, the ends being supported by the anvil and the upper surface of presser-die 54. As the lug 48 descends, the die 54 is forced forward by the action of cam 59 on the lever 57 and forces the end of the wire against the inclined face of the bending-die. As the rotation of the shaft proceeds, the block 40 rises, the projection 50 engages with the bevel of bar 54 and pushes it back, and the completed tack is pushed out by the wire as it is fed forward. The shape and size of the tack may be varied by changing the shape and size of the lug 48, a corresponding change being made in the position of the bar 54.

A feature of my invention to which I desire to call particular attention, and which adds greatly to the simplicity of the machine and the rapidity of its operation, consists in the construction whereby the four several operations performed upon the wire are effected during successive portions of one revolution of the shaft. This is effected by the use of the slots in the eccentric arms 18 and 37, which permit the cutting and bending mechanisms

to be idle during the greater part of the revolution of the shaft, and by the employment of means independent of the shaft for returning the dies and the knife to their normal positions after their several functions have been performed. If the operating parts were returned to their normal positions by the action of the shaft, their circuits of motion would necessarily be much greater, and both the complexity of the machine and the time employed in the several operations would be indefinitely increased. The use of means independent of the shaft enables me to limit the movement of the operating parts strictly to the least range within which they can perform their functions.

In Fig. 9 I have shown a modification in which the bending-die is formed in one piece with the projection 50, and the hole on the upper bolt of plate 49 is made oblong instead of round in order to permit a slight lateral play of the bending-die under the stroke of the finishing-die. If no lateral movement of the bending-die is desired, this hole is made round.

In the construction shown in this figure, in which the bending-die is made in one piece with the block 49, it will be observed that the use of the bending-die in connection with the pin 51 is virtually equivalent to running the wire into a groove, and, indeed, the effect is practically the same in the other construction shown, since the pin 51 in all cases moves with the bending-die 48. I wish it understood that I claim, broadly, all equivalent constructions for the pin 51—that is, all forms of support for the tack-wire beneath the face of the bending-die to prevent the wire from curving outward.

I claim—

1. In a tack-machine, the combination, with the main shaft and suitable wire-feeding mechanism, of an eccentrically-mounted driving-connection therefor arranged to operate during the first portion of the revolution of the main shaft, cutting and bending dies, and slotted arms 18 and 37, also eccentrically mounted on the driving-shaft and arranged to impart motion to said dies, respectively, and successively, and a presser-die arranged to be operated by an additional cam on said driving-shaft during the latter part of its revolution, substantially as described.

2. In a tack-machine, the combination of a block provided with a bending-die, said die tapering back from its operating-face, means whereby the block is caused to reciprocate, an anvil and a presser-die located on the opposite sides of the path of the bending-die, and constituting rests, one on each side of said block, between which said die passes, and means whereby the said bending-die is actuated to press the end or the ends of the tack against the beveled sides of the die, substantially as and for the purpose set forth.

3. In a tack-machine, the combination of the main shaft, the cam 59, the lever 57, the finishing-die 54, the projection 50, and the bending-die 48, substantially as and for the purpose set forth.

4. In a tack-machine, the combination of a main shaft, a feed mechanism for the wire, connections between said feed mechanism and the said shaft whereby the former is operated during the first portion of the revolution of the shaft, a knife, a block carrying the same, connections between the shaft and the block whereby the latter is caused to move during the succeeding portion of the revolution of the shaft, a block carrying a bending-die, connections whereby the last-named block is caused to move forward during the next succeeding part of the revolution of the shaft, a presser-die constituting a rest on the opposite side of the said die from the knife, and means for subsequently moving the said presser-die in the direction of the bending-die to press the tack thereagainst, substantially as and for the purpose set forth.

5. The combination, in a tack-machine, of a main shaft, feed-rollers geared thereto, a reciprocating block, 23, mechanism connecting the block with the shaft, one element of said mechanism being an eccentric arm provided with a slot, a spring for moving the block in a direction opposite to that in which it is moved by the shaft, a knife carried by said block, an anvil suitably placed with reference to said knife, a bending-die, mechanism connecting the bending-die with the shaft, one element of which is an eccentric arm provided with a slot, a forming-die, mechanism connecting the presser-die with the shaft, and a spring for returning the two dies to their normal positions after they have been moved by the shaft, substantially as and for the purpose set forth.

6. In a tack-machine, the combination of the main shaft, the eccentrically-pivoted toothed arm 7, ratchet-wheel 8, shaft 9, and feed-rollers 10 and 14, substantially as and for the purpose set forth.

7. In a tack-machine, the combination, with a reciprocating knife, of a bending-die, said die tapering back from its operating-face, means whereby the die is caused to reciprocate, two rests between which said die passes as it reciprocates, and means for pressing the ends of the tack against the beveled sides of the die, substantially as and for the purpose set forth.

8. The combination, in a tack-machine, of a main shaft, feed-rollers geared thereto, a knife, mechanism connecting said knife with the shaft, one element of said mechanism being an eccentric arm provided with a slot, a spring for moving the knife in a direction opposite from that in which it is moved by the shaft, an anvil suitably placed with reference to the knife, a bending-die reciprocating across the end of the anvil, mechanism connecting the bending-die with the shaft, one element of which is an eccentric arm provided with a slot, a presser-die located opposite to the end of the anvil and on the other side of the bending-die, mechanism connecting the forming-

die with the shaft, and springs for returning the two dies to their normal positions after they have been moved by the shaft, substantially as and for the purpose set forth.

9. In a tack-machine, the combination of a main casting provided with two grooves in its face, a block adapted to slide in one of said grooves, a knife attached to said block, an anvil suitably placed with reference to said knife, a point of support for one end of the tack-wire fixed to the casting at a suitable distance from the anvil, a block adapted to slide in the second of said grooves, provided with a bending-die, said die being so placed as to pass up and down between the anvil and the said point of support as the block reciprocates in the groove, a main shaft, and mechanisms connecting each of said blocks with said shaft, whereby they are caused to reciprocate in said grooves, one element of each of said mechanisms being an eccentric arm provided with a slot, substantially as described.

10. In a tack-machine, the combination of a bending-die and rests between which it reciprocates, one of said rests constituting the anvil upon which the tack-wire is cut, the other being a presser-die adapted to move in a plane perpendicular to the bending-die, and means for subsequently causing it to operate on the tack to reduce the distance between its limbs after it has been bent by the bending-die, substantially as described.

11. In a tack-machine, the combination of a knife, two rests, a bending-die, means for causing the latter to reciprocate between the rests, one of which is fixed and constitutes the anvil for the knife, the other being movable and constituting a presser-die, a presser, the path of motion of which is substantially perpendicular to the path of motion of the bending-die, and means for causing said presser-die to reciprocate, substantially as and for the purpose set forth.

12. In a tack-machine, the combination of a knife, a bending-die, said die formed with a flat lower surface and tapering back from its operating-face, with a presser-die having a path of motion substantially perpendicular to that of the longitudinal axis of the bending-die, for pressing the tack end against the beveled side of the bending-die, and means for causing said dies to reciprocate, substantially as described.

13. The combination of the bending-die 48, having inclined faces, anvil 25, provided with a corresponding inclined face, and presser-die 54, substantially as and for the purpose set forth.

14. In a tack-machine, the combination of a knife, an anvil suitably placed with reference to said knife, a bending-die, points of support, one on each side of the bending-die, and mechanisms for causing the knife and bending-die to reciprocate, one element of each of said mechanisms being an eccentrically-pivoted arm provided with a slot, whereby the range of movement of the knife and bending-die, respectively, can be adjusted to the size of the tack-wire, substantially as and for the purpose set forth.

15. The combination, with a bending-die, of two rests, one on each side of said bending-die, and between which it reciprocates, and a support, 51, beneath the bending-die and moving with it, to hold the wire against the face of the bending-die as it is bent, substantially as described.

16. In a tack-machine, the combination of the bending-die 48, the projection 50, provided with an inclined face, pin 51, moving with said bending-die, and supports for the tack-wire, one on each side of the die, substantially as described.

17. The combination of the bending-die 48, removably mounted in a reciprocating block, projection 50, provided with pin 51, adjustably attached to said block, and two adjustable points of support for the tack-wire, one on each side of said bending-die, substantially as and for the purpose set forth.

18. In a tack-machine, the combination of a bending-die tapering back from its operating-face, and having a limited amount of lateral play, an anvil, toward one face of which the die may be forced, a presser, and means for operating the same, said presser-die being adapted to impinge upon one limb of the tack and force the bending-die over until the other limb of the tack is pressed between the lateral face of the bending-die and the anvil, substantially as and for the purpose set forth.

19. In a tack-machine, the combination of a main shaft, a feed mechanism for the wire, connections between said feed mechanism and the said shaft whereby the former is operated during a portion of the revolution of the shaft, a knife, adjustable connections between the shaft and the knife, whereby the latter is caused to move the desired distance during the succeeding revolutions of the shaft, a bending-die, connections whereby the bending-die is caused to move forward during the next succeeding part of the revolution of the shaft, and two rests for the wire, one on each side of the path of the bending-die, substantially as and for the purpose set forth.

WILLIAM F. MOODY.

Witnesses:
FREDERICK C. GOODWIN,
E. L. HUBER.