(No Model.) 3 Sheets—Sheet 1.

F. B. SHUSTER.

DEVICE FOR METAL STRAIGHTENING AND CUTTING-OFF MACHINES.

No. 605,928. Patented June 21, 1898.

Fig. 1

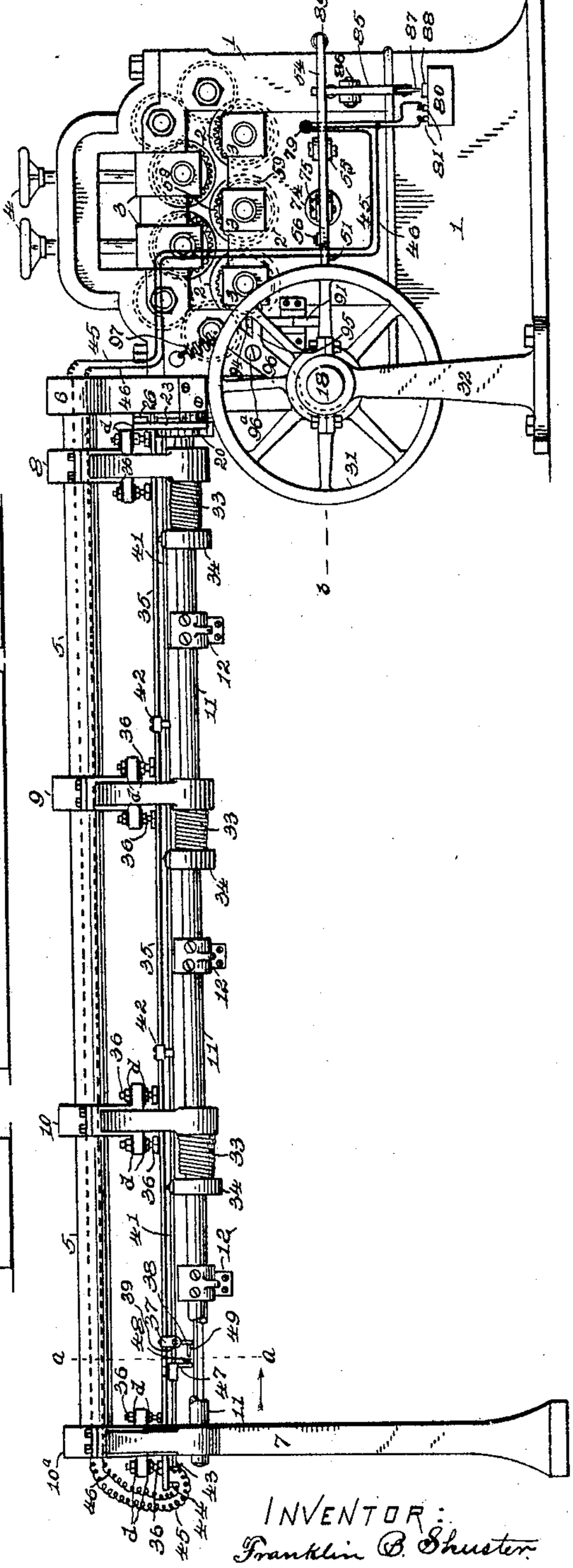
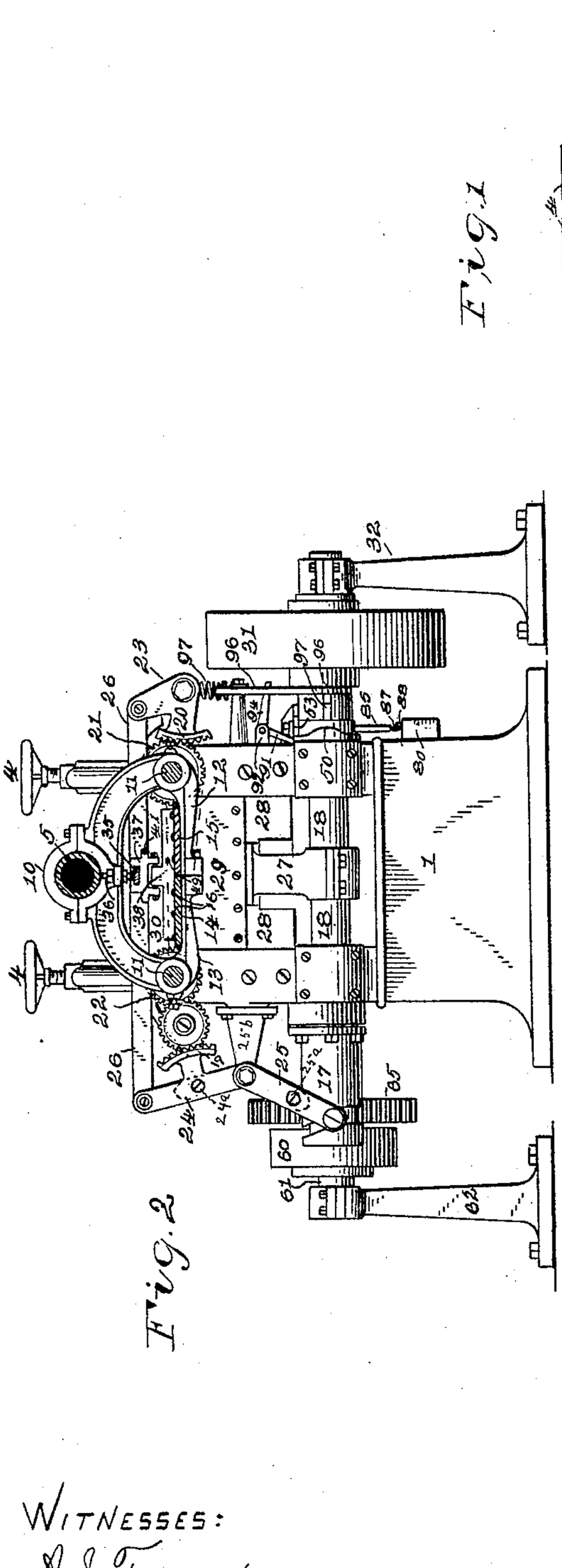


Fig. 2



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(No Model.) 3 Sheets—Sheet 2.

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DEVICE FOR METAL STRAIGHTENING AND CUTTING-OFF MACHINES.

No. 605,928. Patented June 21, 1898.

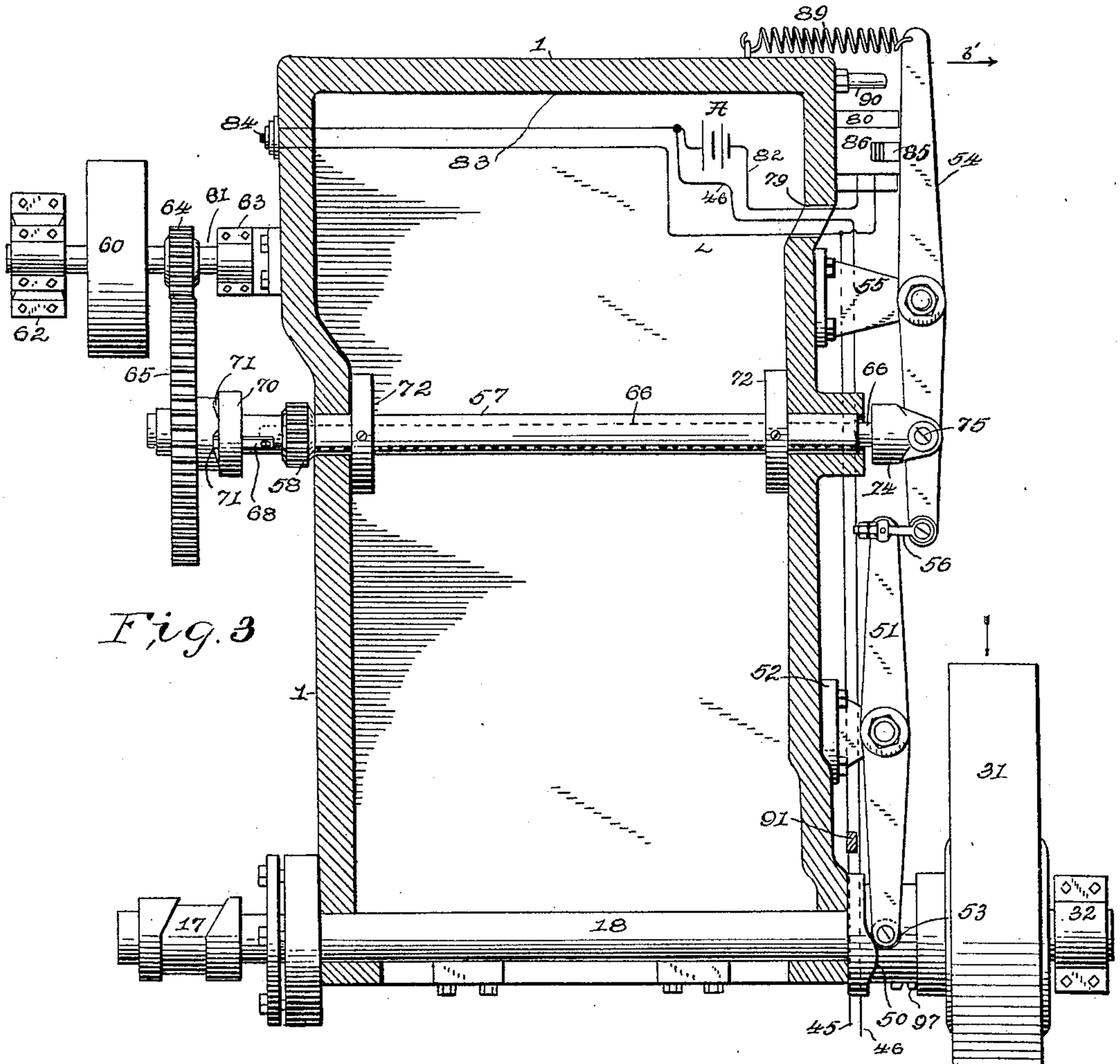

Fig. 3

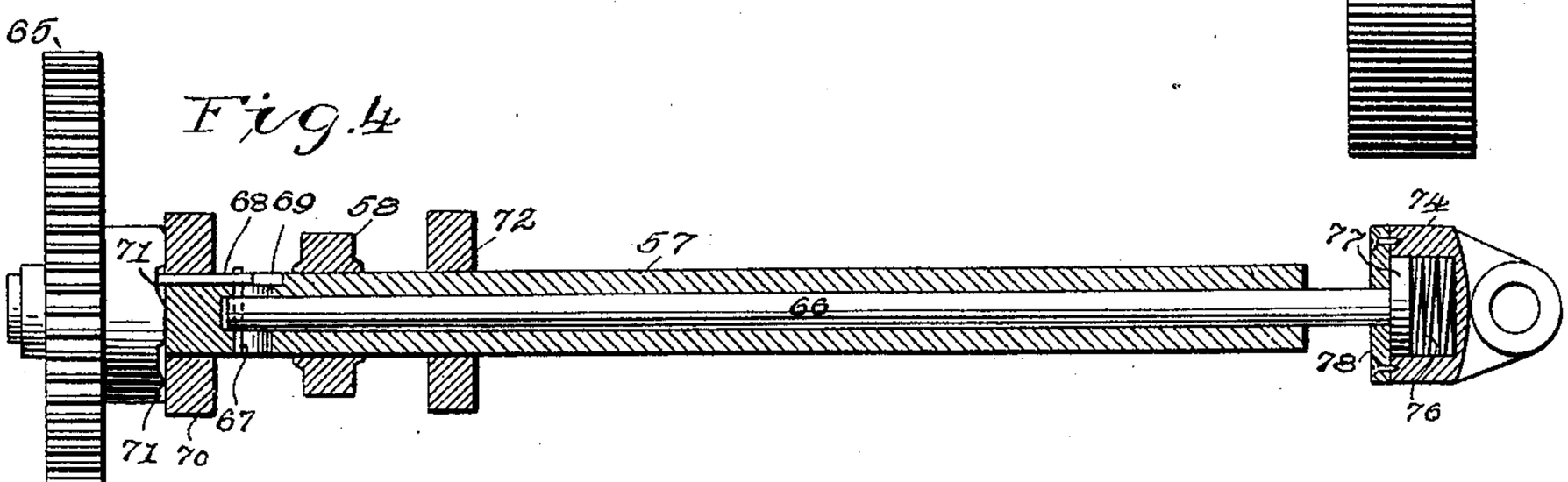

Fig. 4

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(No Model.) 3 Sheets—Sheet 3.

F. B. SHUSTER.

DEVICE FOR METAL STRAIGHTENING AND CUTTING-OFF MACHINES.

No. 605,928. Patented June 21, 1898.

Fig. 5

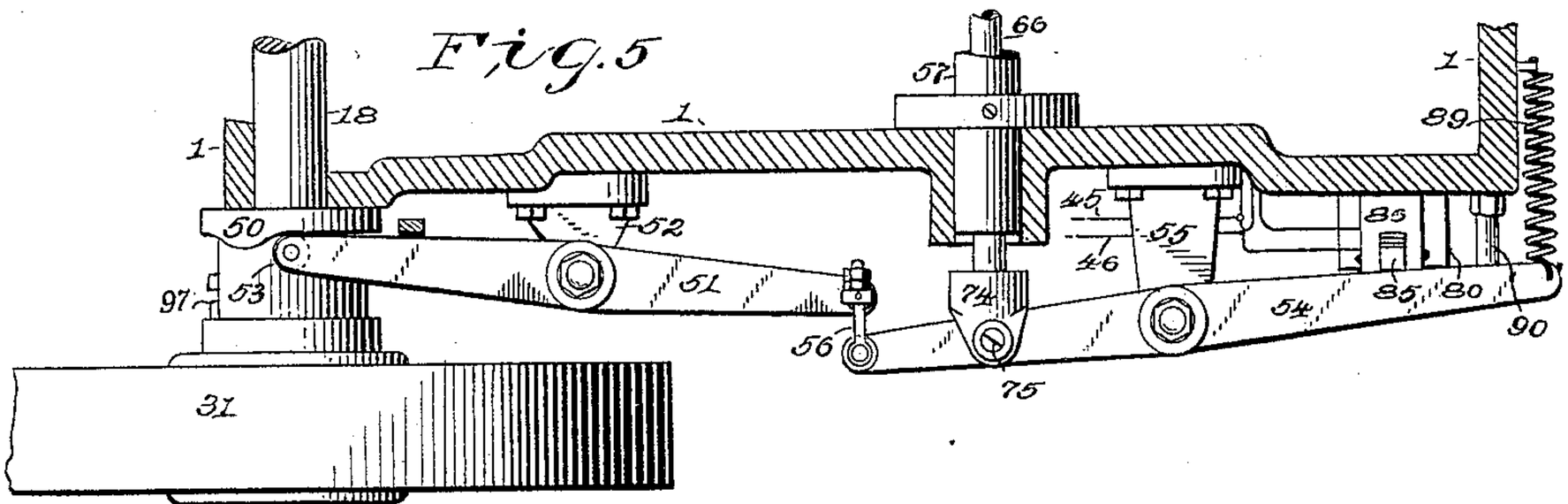


Fig. 6

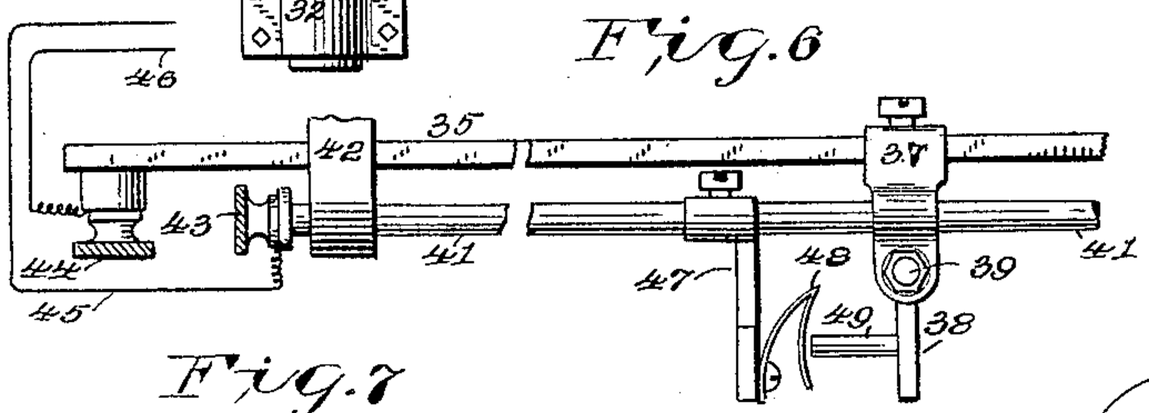


Fig. 7

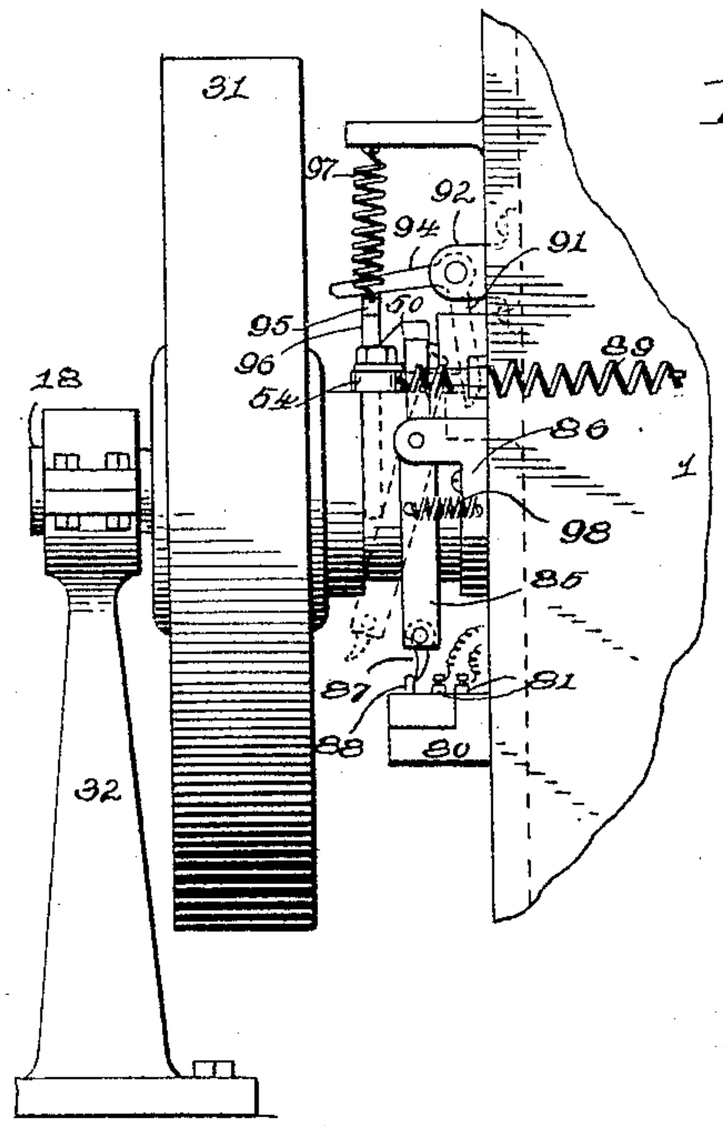


Fig. 8

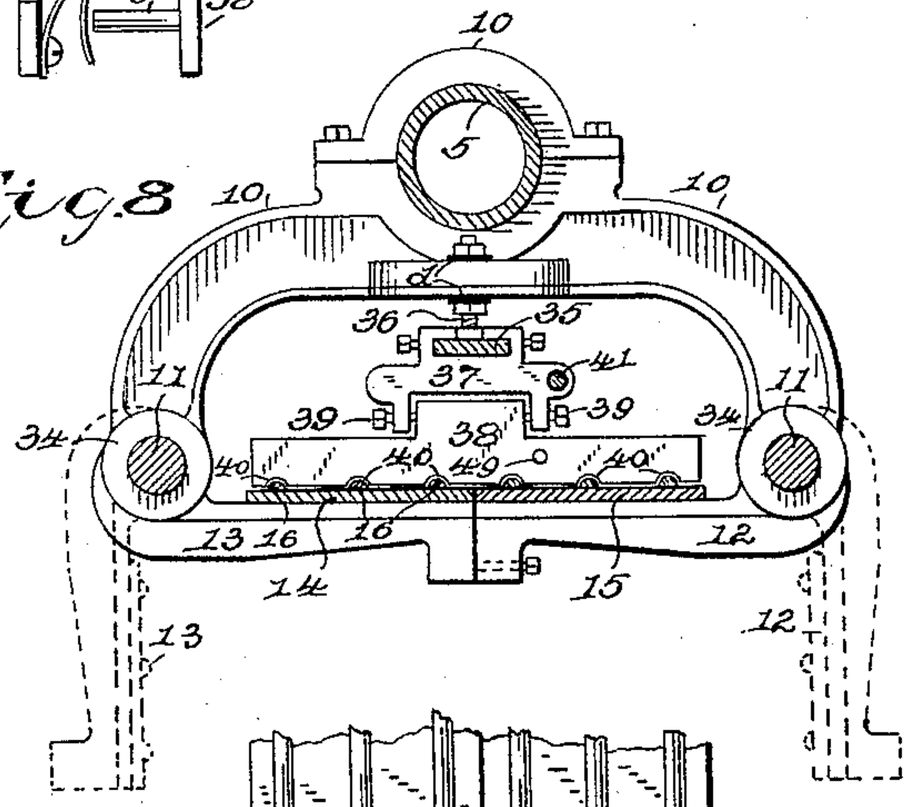
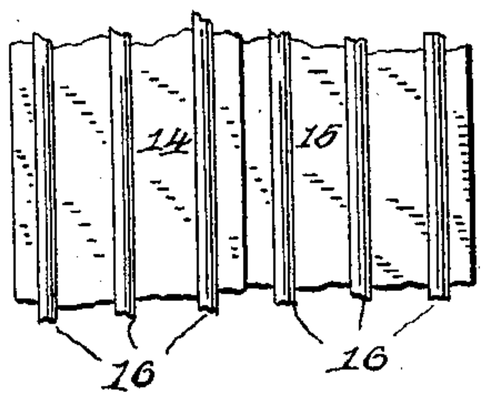


Fig. 9



WITNESSES:
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UNITED STATES PATENT OFFICE.

FRANKLIN B. SHUSTER, OF NEW HAVEN, CONNECTICUT.

DEVICE FOR METAL STRAIGHTENING AND CUTTING-OFF MACHINES.

SPECIFICATION forming part of Letters Patent No. 605,923, dated June 21, 1898.

Application filed May 21, 1897. Serial No. 637,503. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN B. SHUSTER, a citizen of the United States, and a resident of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in an Electric Operating Device for Metal Straightening and Cutting-Off Machines, of which the following is a specification.

My invention relates to metal straightening and cutting-off machines whereby the metal is straightened and cut off to a predetermined length; and it consists, essentially, in automatically governing the actions of the feeding and cutting-off mechanism by electricity, so that when the metal has been fed a certain distance or predetermined length the electric circuit will be closed by the forward end of the metal and instantly bring the feed-rolls to a standstill and the cutting-off mechanism into operation.

In this present application the electric appliance is connected with a sheet-metal straightening and cutting-off machine for which an application for Letters Patent was filed by me June 15, 1896, Serial No. 595,518.

My invention further consists in certain improvements on the said machine, to be more fully set forth in the following specification.

To enable others to understand my invention, reference is had to the accompanying drawings, in which—

Figure 1 represents a side elevation of the sheet-metal straightening and cutting-off machine with the electric device for operating the feeding and cutting-off mechanism attached thereto, showing also broken view of one of the table-rods. Fig. 2 is an end elevation of the machine, broken view of the table-rods, trip-plate-supporting bar, and overhead tubular supporting-shaft for the table mechanism through *a a*, Fig. 1. Fig. 3 is an enlarged longitudinal sectional view of the machine frame or head through line *b b* of Fig. 1, showing more clearly the operation of the electric mechanism for operating the cutting-off and feeding mechanism. Fig. 4 is a detail enlarged view, partly in section, of the mechanism for operating the feed-rolls. Fig. 5 is an enlarged detail plan view of the mechanism for operating the feeding and cutting-off mechanism, broken sectional view of the machine-head, and broken view of the operating-shafts and the cutter balance-wheel or driving-pulley. Fig. 6 is an enlarged detail broken view of the trip-supporting rod, electrically-connected rod below the same, and broken view of the electric wires connecting the two rods. Fig. 7 is an enlarged broken detail rear end view of the machine-head and rear end elevation of the electric shipping mechanism, the cutter balance-wheel or driving-pulley, and standard supporting the driving-shaft of the cutting-off mechanism. Fig. 8 is an enlarged detail end elevation of one of the table-rod supports, table-supporting arms, trip-plate, supporting-hanger for same, sectional view of the rod supporting such hanger, sectional view of the two-part table, table-supporting rods, and overhead tubular shaft. Fig. 9 is an enlarged broken detail view of the two-part table, showing rods laid longitudinally along the upper surface to decrease the friction incidental to the passage of the metal sheets along such table.

While, as before mentioned, the electrically-operating feature for controlling the movements of the feeding and cutting-off mechanism is connected with a machine adapted for operating upon sheet metal, it will be understood that it is equally well adapted for other kinds of metal wherein it is necessary to cut the same into predetermined lengths. Therefore the gist of my present invention resides in the electrical controlling feature for operating upon all such classes of machines. There are also certain improvements relating to my former application which are shown in the drawings and will be described and claimed in this present application. The other features of construction that were fully shown and described in my former application will be again reverted to in this present case merely to show the application of the electrical device to this particular machine. Its construction and operation are as follows:

1 represents the machine-head; 2, the five feeding and straightening rolls, journaled in the boxes 3, located in each side of the machine-head; 4, tightening-screws therefor; 5, a tubular supporting-shaft, supporting the table-operating mechanism, one end of which is rigidly mounted in the top of the cutting-off-press frame 6, integral with the machine-

head, while the other end is mounted in the standard 7.

8, 9, 10, and 10^a are the table-rod supports, suspended from shaft 5. 11 (see also Fig. 8) are the two table-rods, journaled in the branches or arms of these several table-rod supports, and mounted rigidly on these rods are the several pairs of table-supporting arms 12 and 13.

The several table-supporting arms have each attached to their upper surface longitudinal wooden strips 14 and 15, and overlying these strips are the longitudinally-placed rods 16 for reducing frictional contact between the metal sheets fed along the table.

The table-rods are caused to rotate in their arm-supports through the medium of the cam-sleeve 17 on the end of the cutting-off shaft 18 and the intermediary mechanism, consisting of the segmental gears 19 and 20, registering with the gears 21 and 22 of the table-rods. The segmental gear 20 forms part of the bell-crank lever 23, pivotally supported to the machine-head, while the other segmental gear forms part of the lever 24. The link 25 carries a roll on one end to engage with the cam on the shaft 18, while its other end is pivotally connected with the segment-lever 24. 26 is a cross-bar pivotally connected to the levers of the segmental gear.

27 is a pitman on the shaft 18, attached to the vertically-operating slide 28 and carrying the movable knife 29, and 30 is the upper or stationary knife.

31 is the driving-wheel pulley, mounted on the shaft 18, and 32 is a supporting-stand for the said shaft.

About each of the table-operating rods 11 and close to each of the table-supporting arms are the coiled springs 33, to assist in closing the two-part table. The free ends of these springs are anchored in the table-supporting arms and the collars 34.

35 is the trip-supporting rod or flat bar, Figs. 1, 2, 6, and 8, held suspended over the table by means of the bolts 36 to the several table-rod-supporting arms 8, 9, 10, and 10^a, and which trip-supporting rod is properly insulated at the points *d* from the rest of the machine.

37 is the trip-supporting block, adapted to be moved along the rod 35 or be firmly secured in any position thereon.

38 is the trip-plate, pivotally supported to the block 37 by means of the cone-pointed screws 39. The lower edge of this trip-plate is provided with the semicircular grooves 40, whereby the trip-plate is permitted to lie close to the table and the rods 16 thereon, so that very thin sheet metal may be fed along such table without any possibility of passing beneath the trip-plate, as the end of the metal must engage therewith to effect the electrical connections, presently to be more fully described.

41 is a circuit-closing rod held suspended from the trip-supporting rod 35 by the removable brackets 42 and also in the block 37, Fig. 8. In all of these supports the said rod is properly insulated.

43 and 44 are binding-posts on the ends of rods 35 and 41, to which the wires 45 and 46 are attached.

47 is an arm adjustably mounted on rod 41 and carrying at its lower end the circuit-closing spring-contact 48, and 49 is the other contact-point projecting from the trip-plate 38.

The construction and operation of the electrical mechanism are as follows:

50 (see Figs. 3 and 5) is a face-cam on the cutter-shaft 18.

51 is a lever fulcrumed on the bracket 52 of the head 1. The forward end of this lever carries the roll 53 to engage with the said cam. The opposite end of said lever is connected to the lever 54, fulcrumed to the bracket 55 by the swivel-bolt 56.

57 is a shaft journaled in the head 1. (See Fig. 3.) 58 is a gear on the outer projecting end of this shaft that registers with the gear 59 (shown partly in dotted lines at Fig. 1) of the lower central feeding and straightening roll. It will be understood that the other rolls are also provided with gears by which they are driven through the medium of the gear 59, and the same are shown partly in dotted lines, and therefore no further reference need be made to them.

60 is a driving-pulley for transmitting power to the feeding and straightening rolls, and it is mounted upon the short shaft 61. 62 is a standard supporting the outer end of this shaft, while its inner end is journaled in the bracket 63 of the machine-head. 64 is a small gear on said shaft registering with the large gear 65 on the shaft 57. 66 is a rod passing through the center of this shaft and adapted to have a longitudinal movement therein. On the inner end of this rod (see also Fig. 4) is the transverse pin 67, which engages with the key 68, adapted to move in the keyway 69 of the shaft 57. 70 is a collar fixed on said shaft through which the said key passes, and it operates both as a housing for the key and as a support for the hub of the gear 65. On the inner face of this gear is shown a series of notches 71, adapted to receive the end of the movable key 68, whereby movement is communicated to shaft 57. 72 are collars on said shaft to prevent end thrust of the same.

74 is a forked spring-head adapted to embrace the lever 54 and is pivotally connected thereto by the screw 75. Within the head 74 is a spring 76, against which rests the circular head 77 of the rod 66. 78 is a cap for retaining the head 74 in place. The object of this rod and spring will presently be more fully described.

The wires 45 and 46, before mentioned, pass through the large tubular shaft 5 and through the hole 79, Figs. 1 and 3, in the side of the machine-head to the battery A inside of the frame.

80 is an electric gate-latch attached to the

outside of the machine, having binding-posts 81, to which the battery-wire 82 and the push-button wire 83 are attached.

The latch-trip lever 85 (see Figs. 1, 5, and 7) is pivotally supported in the bracket 86 and has the spring-actuated pawl 87 at its lower end to engage with projection 88 of the electric latch. This electric latch being a familiar and well-known device for locking and unlocking a bolt engaged with a pivotally-supported catch controlled by a magnet a detailed description of such latch is not necessary, especially as it forms no part of my present invention. The upper end of the said trip-lever projects above the horizontal lever 54 and between which there is a firm engagement when the said trip-lever is engaged with the electric gate-latch.

The operation of the electrical device in connection with feeding and cutting-off mechanism is as follows: When the mechanism is in the position shown at Fig. 3, the feeding and straightening rolls are in operation to feed the metal along the two-part or folding table until the end thereof engages with the trip-plate 38, causing the same to swing and bring the contact-points 48 and 49 in contact to close the circuit, whereupon the trip-lever will be instantly released from the electric latch, and the power of the retractile spring 89, attached to the end of lever 54, will draw the end of such lever around against the stop-pin 90. This action will throw the trip-lever 85 into the angular dotted position shown at Fig. 7 and will also throw the opposite end of lever 54 outward, so as to withdraw the rod 66 sufficiently to disengage the key 68 from its engagement with the toothed face of the hub of gear 65. The withdrawal of this key will instantly bring the rolls to a standstill. The tilting movement of lever 54, before mentioned, will also throw the lever 51 in the opposite direction, causing the forward end of such lever to strike the vertical arm 91, Fig. 5, of the bell-crank lever 92, pivotally supported to bracket 93, as shown at Fig. 7. The horizontal arm 94 of this bell-crank lever will (by the action just described) strike against the arm 95 (see also Fig. 1) of the key-lever 96, pivoted to the stud 96ª. The lower end of this lever being engaged with the spring-actuated key 97, Fig. 2, will be raised sufficiently to release such key and permit it to move forward to engage with the driving-pulley 31, thereby imparting motion to the shaft 18, causing the knife 29 to move up and sever the stock. The instant this is done the cam 17 on shaft 18 will actuate the segment-gears 19 and 20 and open the table (see dotted lines of such open table at Fig. 8) and deliver the severed sections below the machine.

As it will require one revolution of the shaft 18 to effect the cutting of the stock and return the knife to its normal lower position in readiness for another upward stroke, the cam 50 is so placed that when the said knife is descending the said cam will engage with roll 53 of the lever 51 and force the end of such lever away from the vertical arm 91 of the bell-crank lever 92. This operation will release the key-lever 96, and its retractile spring 97 will bring the said lever into engagement with the driving-pulley key of the cutting-off mechanism and instantly bring such mechanism to a standstill.

The tilting movement of the lever 51 (just described) will also tilt the lever 54 and through the medium of rod 66 force the key 68 into engagement with the hub of the gear 65 of the roll mechanism and set the feeding-rolls again in operation. When the outer end of the lever 54 is moved in the direction of arrow *b'*, Fig. 3, the retractile spring 98 (see also Fig. 7) will cause the trip-lever 85 to reëngage with the electric latch 88 and its opposite end brought against the said lever 54. In this manner the operation of feeding and cutting off is made continuous and automatic, it being understood that the driving-pulleys 31 and 60 will always be in motion, while the gear 65 and the shaft 18 will run or remain at a standstill as required.

In my former application the feeding and straightening rolls and the cutting-off mechanism were automatically shifted from one to the other entirely through the medium of cams and levers, and it was impossible to stop the rotation of the feed-rolls quick enough to cut off sections to an exact length, as when the lever was released to engage with the key and withdraw it from the driving-wheel of the feed-roll mechanism the driving-wheel would continue through an unfinished part of its revolution until the key was engaged by the said lever and drawn back. Thus the feeding of the metal would continue, and in case of very thin stock would buckle and form longer sections than required, and would also make such sections more or less uneven in length.

In the present arrangement the face of the hub of gear 65 is provided with any number of clutch-recesses, so that the instant the circuit is closed the key is withdrawn and the rolls stop instantly.

The object of the spring 76, Fig. 4, in the head 74 is to furnish a relief for the pressure on the levers 51 and 54 when the rod 66 is moved in to engage the key on its end with the clutch-face of the gear 65. Should the end of this key strike on the top of one of the teeth on the face of this hub and no relief be furnished, something must needs break. Therefore the spring 76 will give just enough to save the time required for the said key to fall into a groove. As before stated, this feature of controlling the movements of the feed-roll and cutting-off mechanism is applicable to any and all classes of machines where the metal is to be cut up into predetermined lengths, whether wire or sheet metal, and I hold myself at liberty to apply it to any and all such machines.

The push-button 84 is arranged so that the

feed-rolls can be stopped by hand whenever it is observed that there is a bad spot in the metal being fed along, whereupon the cutter will be brought into operation to sever the defective strip, when the machine can continue as before. It will be understood that push-buttons can be placed at any convenient part of the machine when required.

It will be readily understood that while I show certain feeding and straightening mechanism and mechanism for cutting off sections of the stock I do not wish to be confined to the exact details of construction shown and described. Neither do I wish to be strictly confined to the exact details of construction shown for operating the feeding, straightening, and cutting-off mechanism through the medium of electricity, as these constructions could be varied to suit the different machines to which they may be applied. If desired, the straightening-rolls may be dispensed with and rolls used simply for feeding.

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

1. In a machine for feeding and cutting off metal strips or rods, into predetermined lengths, of independently-operating feeding and cutting-off mechanism adapted to operate alternately, a system of electric wires connected with a battery or other source of electrical energy, a circuit-closer adapted to be engaged by the end of the metal strip or rod and thereby close the circuit and bring the feeding mechanism to a standstill, while the cutting-off mechanism is operating to sever a section from such strip or rod for the purpose set forth.

2. In a machine for feeding and cutting off metal into predetermined lengths, of independently-operating feeding and cutting-off mechanism adapted to operate alternately, a circuit-closer adapted to close an electric circuit when the metal has been fed a predetermined distance and instantly bring the feeding mechanism to a standstill, mechanism for bringing the cutter into operation to sever a section from such metal, and mechanism for restarting the feed-rolls, for the purpose set forth.

3. In an automatic machine for alternately feeding and cutting off sections from a metal strip or rod, of feeding-rolls and cutting-off mechanism, a circuit-closer adapted to close an electric circuit when the metal has been fed a predetermined distance and instantly bring the feed-rolls to a standstill, mechanism for bringing the cutter into operation to sever a section from such metal, a delivery-table over which such metal is fed, said table adapted to deliver such severed section, means for restarting the feed-rolls, for the purpose set forth.

4. In an automatic machine for alternately feeding and cutting off sections from a metal strip or rod, of feeding-rolls and their operating mechanism, a cutter and its operating mechanism, a delivery-table and its operating mechanism, a system of electric wires connected with a source of electrical energy, a circuit-closer adapted to close the electric circuit when the metal has been fed a predetermined distance and instantly bring the feed-rolls to a standstill, means for instantly bringing the cutter into operation to sever a section therefrom, means for restarting the feeding-roll mechanism so as to feed forward another section, for the purpose set forth.

5. In an automatic machine for alternately feeding and cutting off sections from the end of a metal strip or rod, of feeding-rolls and their operating mechanism, a cutter and its operating mechanism, a delivery-table and its operating mechanism, a system of electric wires connected with a battery or other source of electrical energy, a circuit-closer adapted to be engaged by the end of the metal strip or rod and close the electrical circuit and bring the feed-rolls to a standstill, means for bringing the cutter into operation to sever a section from such strip or rod, means for resetting and restarting said feed-rolls so as to feed forward another section, for the purpose set forth.

6. In an automatic machine for alternately feeding and cutting off sections from the end of a metal strip or rod, of feeding-rolls and their operating mechanism, a cutter and its operating mechanism, a delivery-table and its operating mechanism, a system of wires connected with a source of electrical energy, fulcrumed levers pivotally and adjustably connected together, the end of one of said levers adapted to engage with a cam on the cutter-driving shaft, the other lever adapted to engage with means connected with an electric latch or other like device, means, substantially as shown, for connecting one of said levers with the feed-roll-driving mechanism, a circuit-closer adapted to close the circuit when the metal has been fed a predetermined distance and thereby release the levers held by the said latch and bring the feed-rolls to a standstill, and means for releasing the cutting-off mechanism to sever a section from the metal strip, and means for stopping said cutting-off mechanism and restarting the feed-rolls, for the purpose set forth.

7. In an automatic machine for alternately feeding a metal strip or rod and cutting off sections therefrom, of feeding-rolls and their operating mechanism, a cutter and its operative mechanism, a delivery-table and its operative mechanism, shipping mechanism for alternately bringing the feeding-rolls and cutting-off mechanism into operation, combined with a system of wires connected with a battery or other source of electrical energy, a circuit-closer adapted to close the circuit when the metal strip or rod has been fed a predetermined distance and stop the feed-rolls through the medium of the said shipping mechanism and bring the cutter into operation, said shipping mechanism adapted to re-

start the feed-rolls for the feeding of another section, for the purpose set forth.

8. In an automatic machine for alternately feeding a metal strip or rod and cutting off sections therefrom, of feeding-rolls and their operating mechanism, a cutter and its operating mechanism, shipping mechanism for alternately bringing the feeding-rolls and cutting-off mechanism into operation, a shaft carrying on its outer end a loose clutch-face driving-gear, a pinion-gear to register with one of the feed-roll gears, a shipping-rod passing through said shaft and connected with the shipping mechanism—one end of said rod adapted to engage the said clutch-face of the loose driving-gear, a spring-buffer on such rod, for the purpose set forth.

9. The combination, in a two-part table, of a feeding and cutting-off machine for sheet-metal, of longitudinal narrow strips or rods attached to the upper surface of such table to reduce the friction of the metal sheets, and a trip-plate whose lower edge is shaped to conform to such strips, so that very thin metal sheets may be fed without getting between the lower edge of such trip-plate and said strips, substantially as set forth.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 20th day of May, A. D. 1897.

FRANKLIN B. SHUSTER.

Witnesses:

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JOHN B. CLAPP.