B. E. BROWN.

STAPLING MACHINE.

APPLICATION FILED NOV. 2, 1914.

1,174,965.

Patented Mar. 14, 1916.

7 SHEETS—SHEET 1.

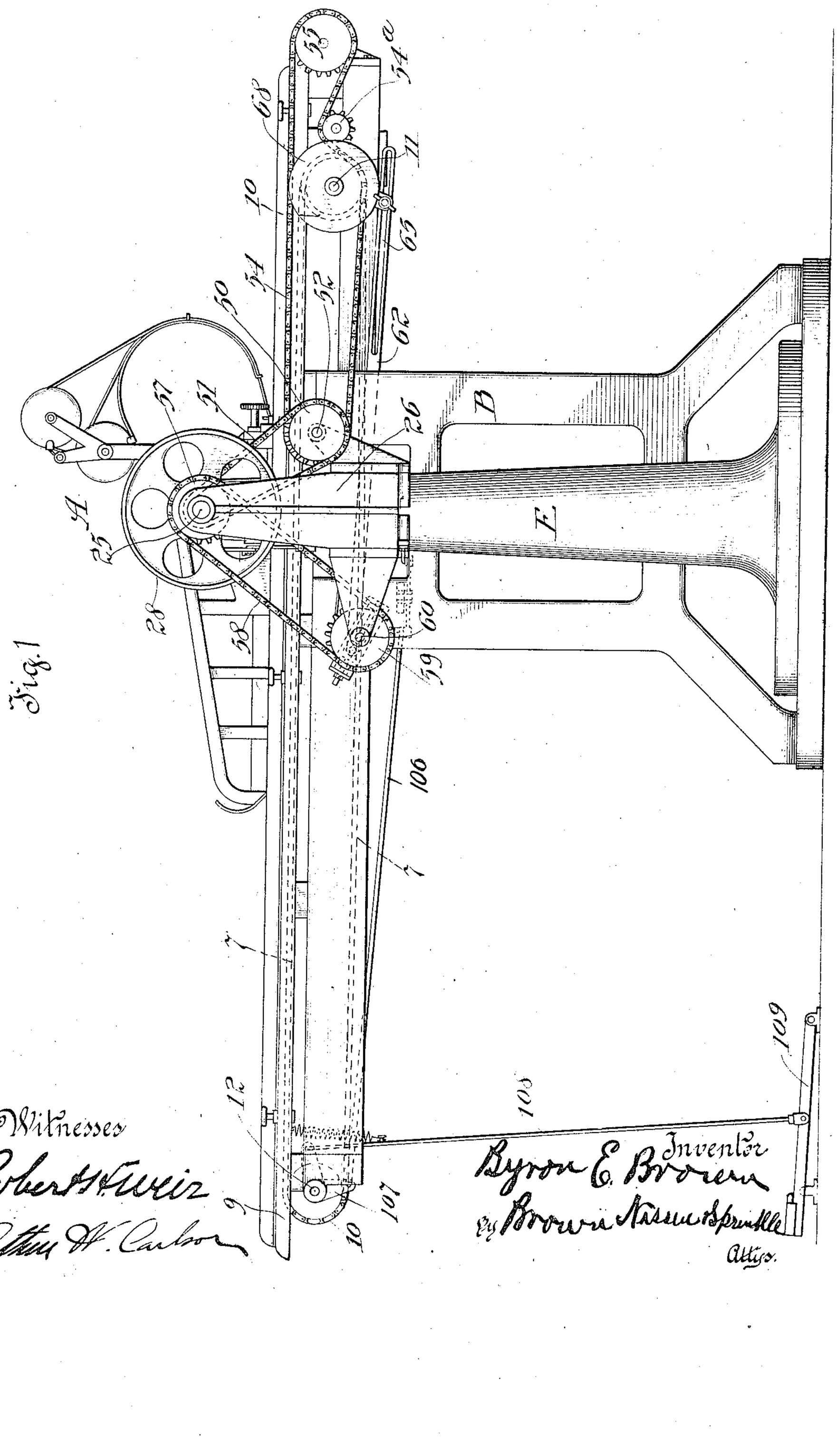

Fig. 1

Witnesses

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7 SHEETS—SHEET 2.

Fig. 2.

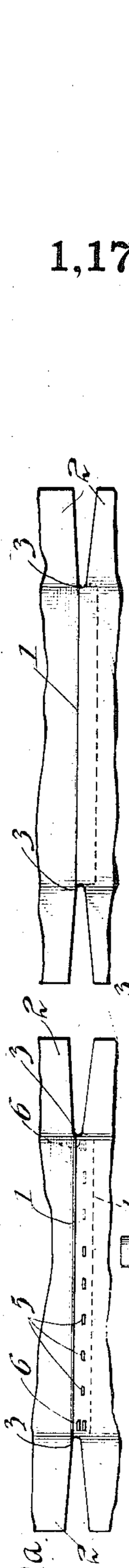
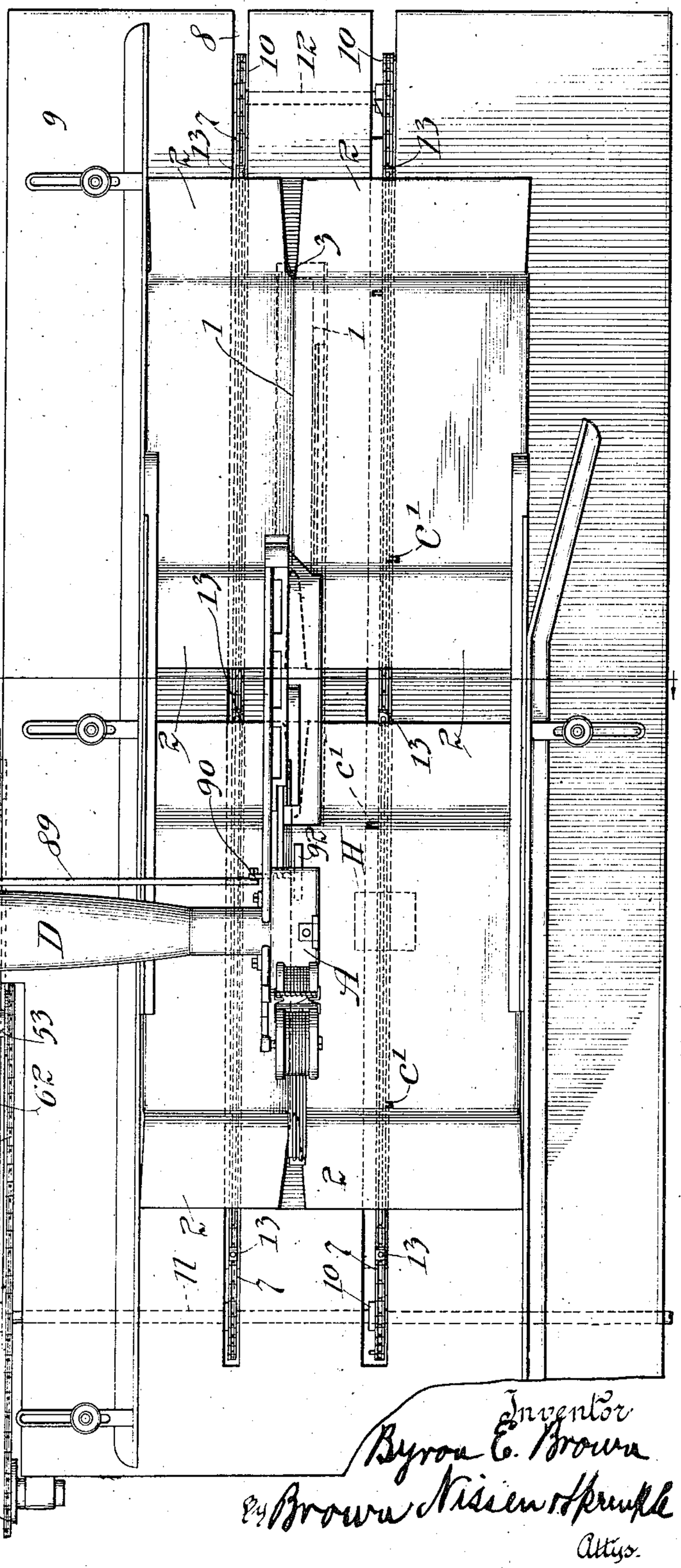


Fig. 2a.



Witnesses

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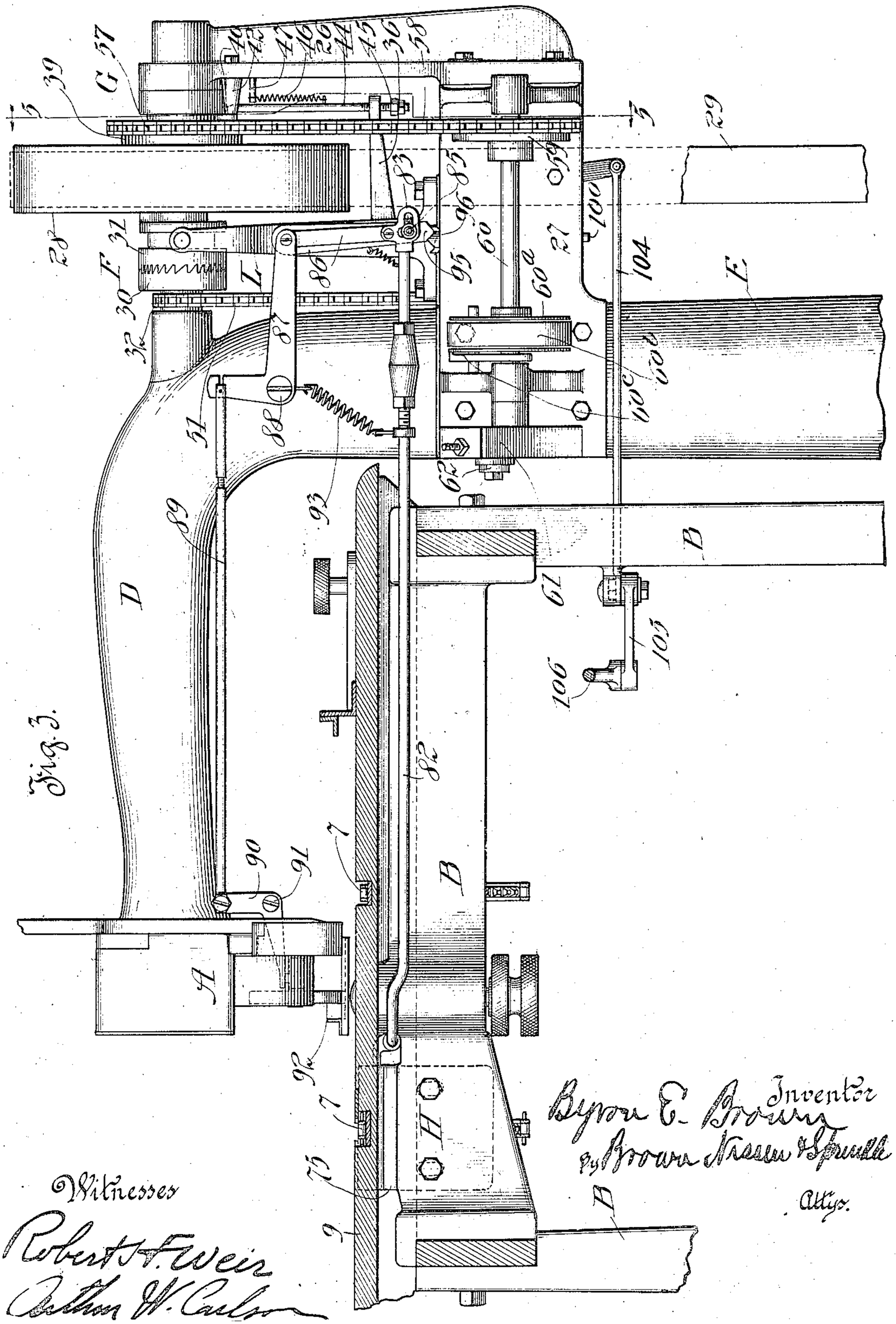

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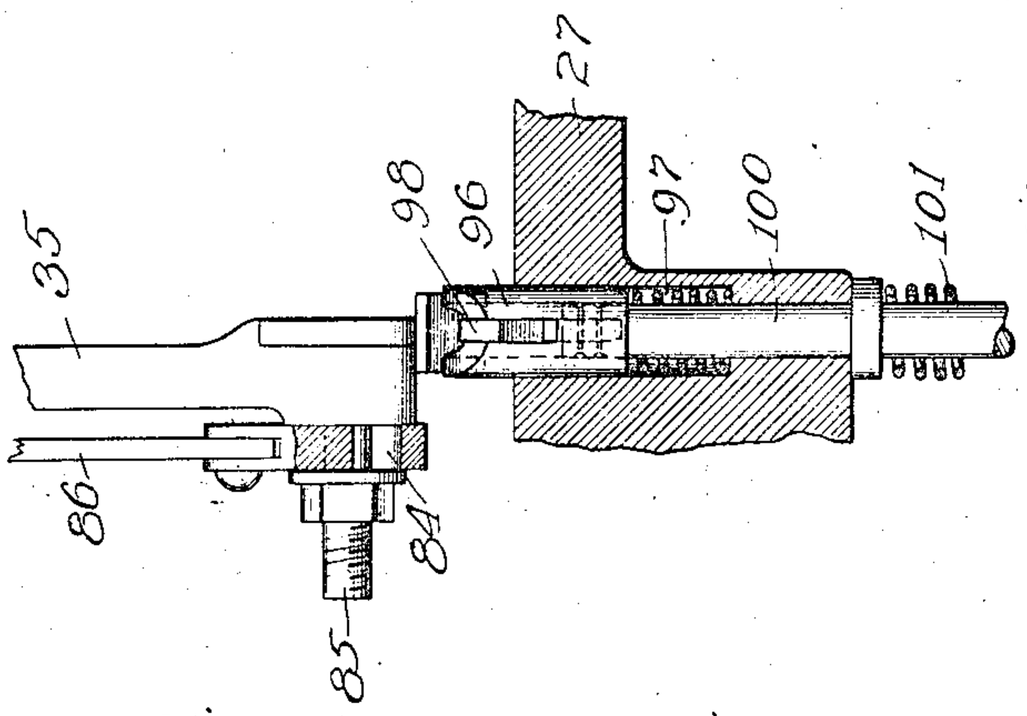

Fig. 12.

Fig. 4.

Witnesses
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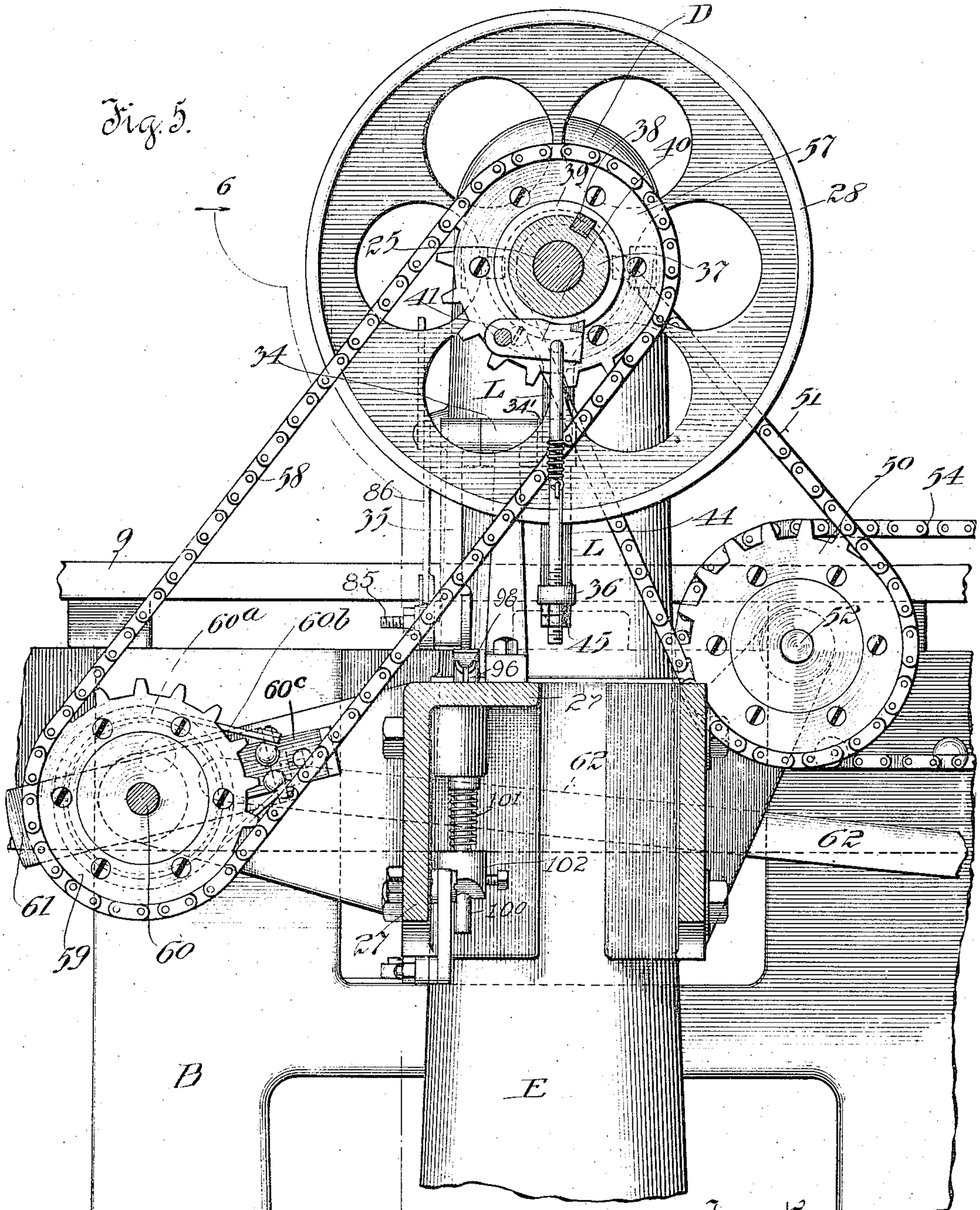
7 SHEETS—SHEET 5.

Fig. 5.



Witnesses

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7 SHEETS—SHEET 6.

Fig. 6.

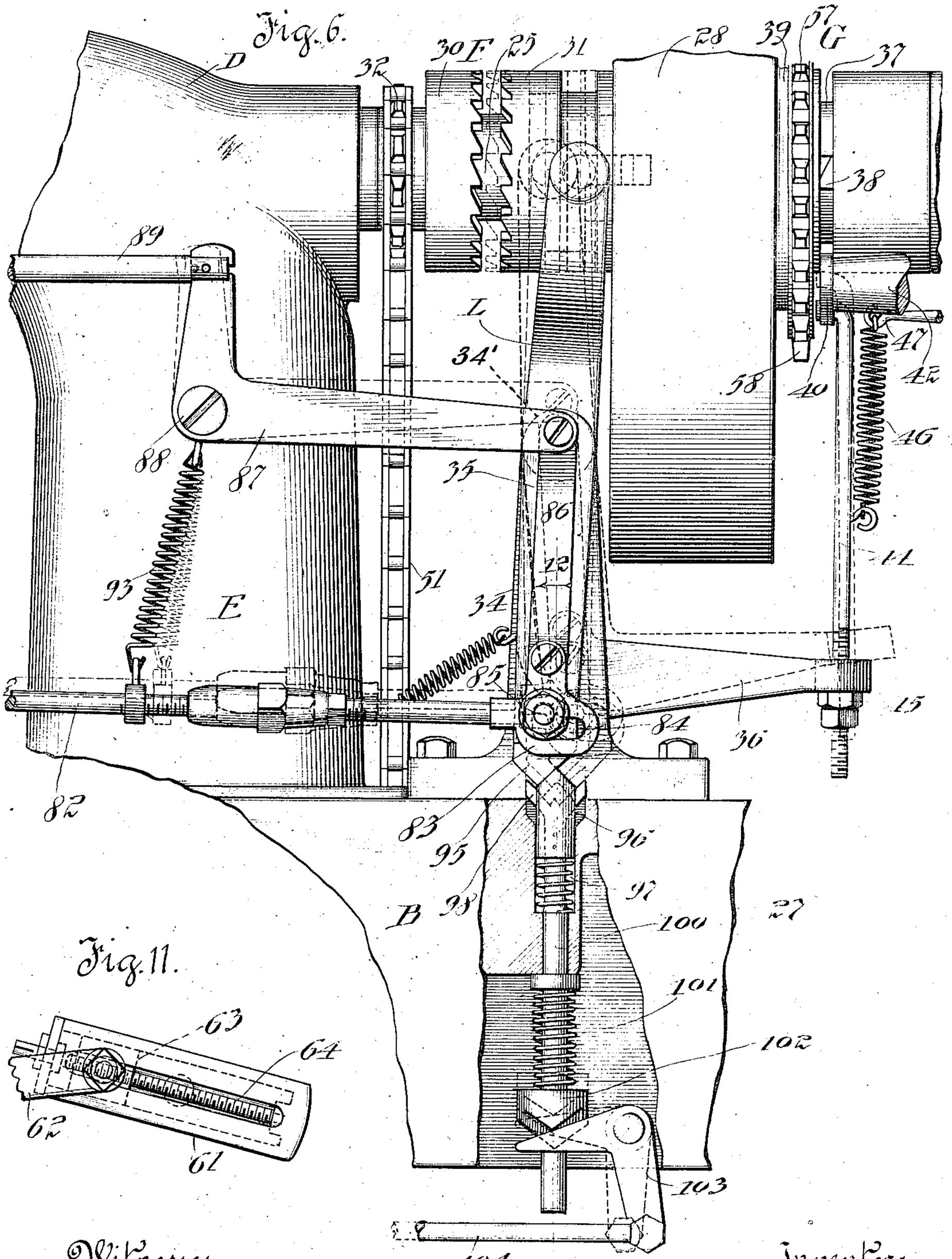

Fig. 11.

Witnesses

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7 SHEETS—SHEET 7.

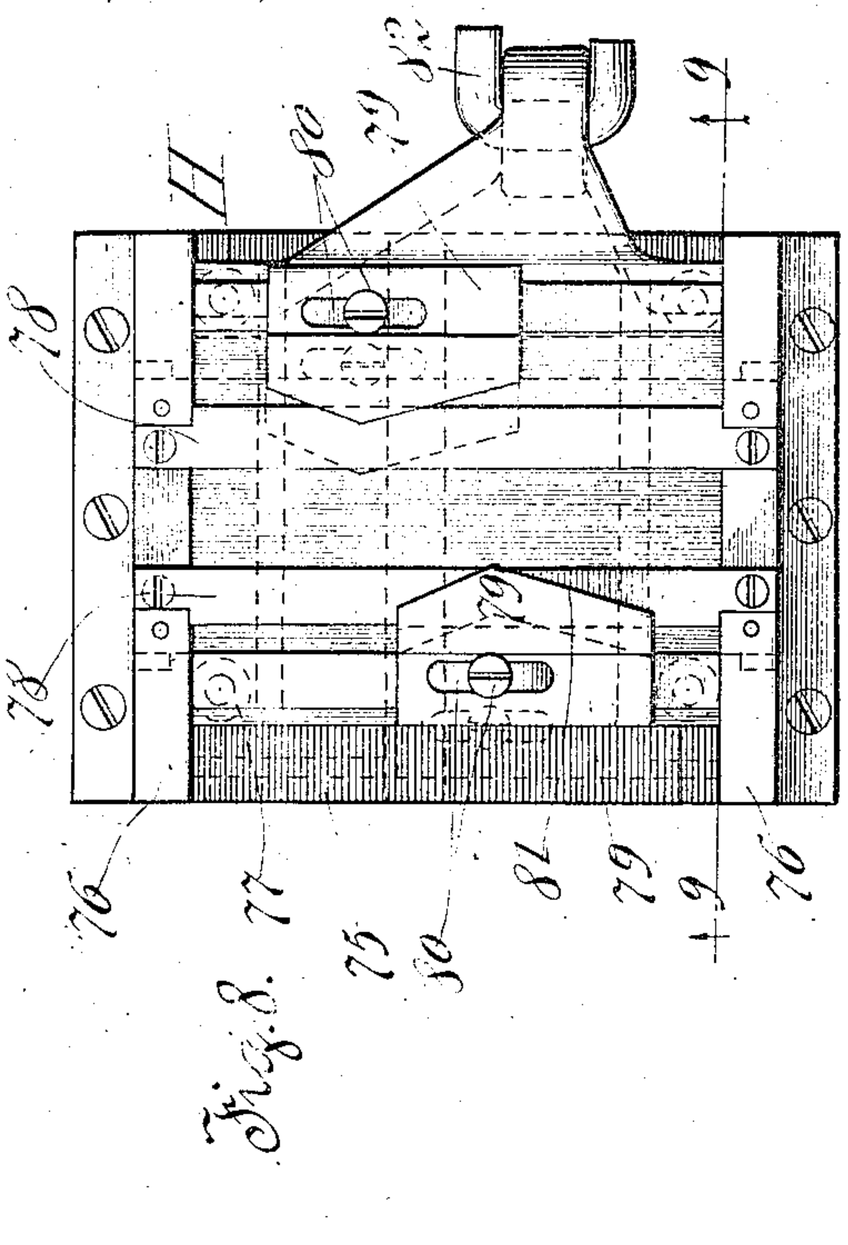

Fig. 8.

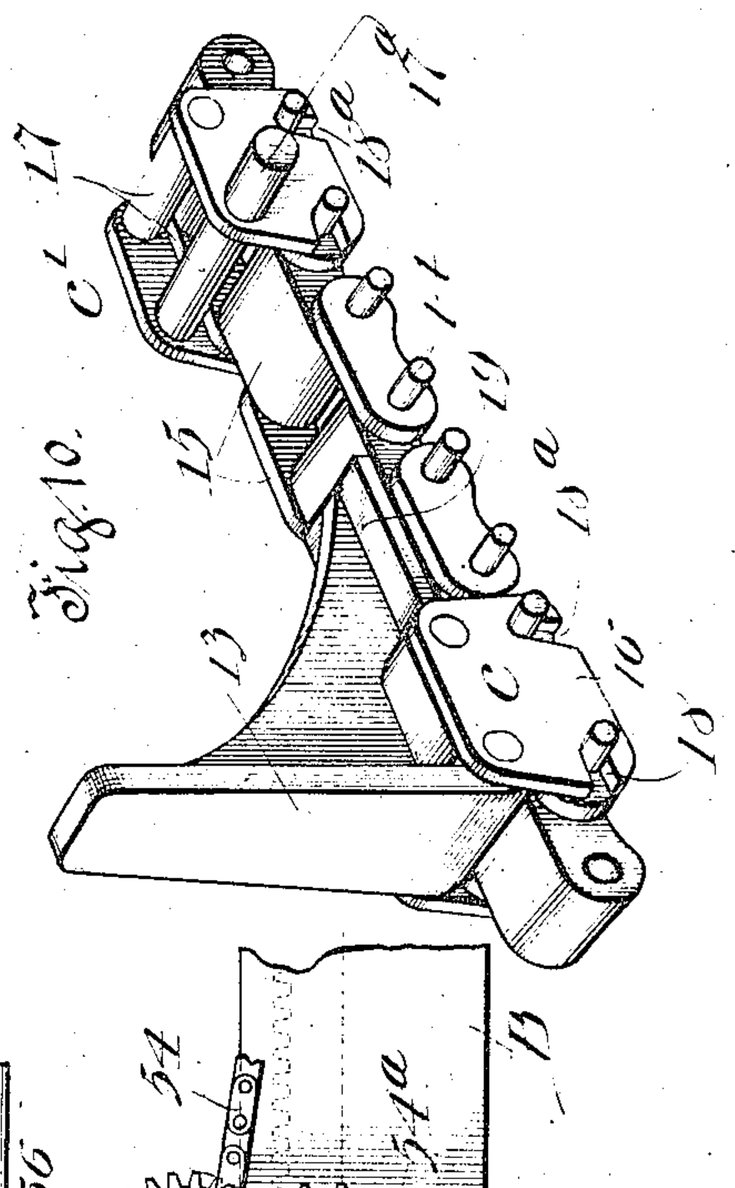

Fig. 10.

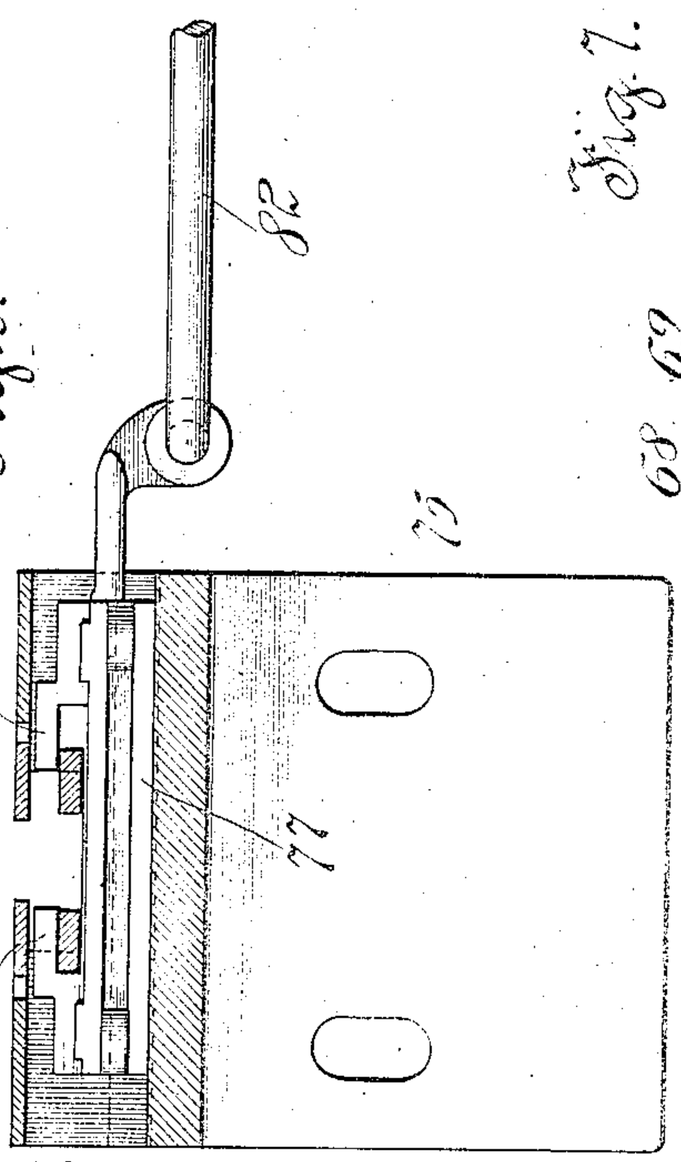

Fig. 9.

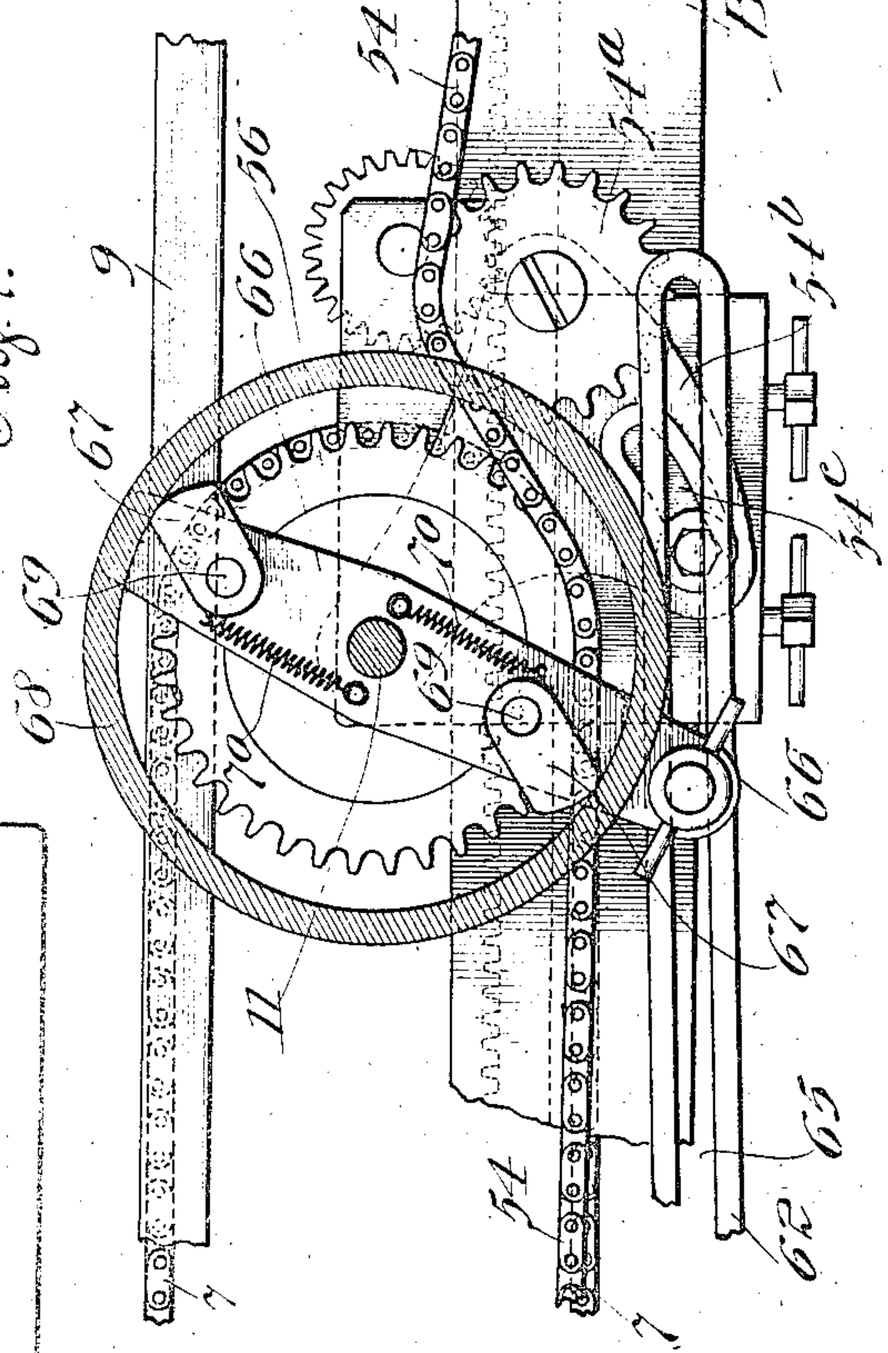

Fig. 7.

Witnesses

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UNITED STATES PATENT OFFICE.

BYRON E. BROWN, OF CHICAGO, ILLINOIS, ASSIGNOR TO LATHAM MACHINERY CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

STAPLING-MACHINE.

1,174,965. Specification of Letters Patent. Patented Mar. 14, 1916.

Application filed November 2, 1914. Serial No. 869,761.

To all whom it may concern:

Be it known that I, BYRON E. BROWN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Stapling-Machines, of which the following is a specification.

My invention relates to improvements in stapling machines for stapling or fastening the seams of paper boxes and the like, and has more particular reference to improvements in the feeding and controlling mechanism.

One of the objects of my invention is to provide an improved machine of this character which will be simple, durable and reliable in construction, and effective and efficient in operation.

Other objects of my invention will appear hereinafter.

Referring to the accompanying drawings: Figure 1 is a view in elevation of a machine embodying my invention. Fig. 2 is a top plan view of said machine. Fig. 2ª is a diagrammatic view of the seam portions of two boxes in relative position in the machine, one of said boxes being partially stapled. Fig. 3 is an enlarged transverse section of the table on the line 3—3 of Fig. 2, the chain controlling mechanism being shown in elevation. Fig. 4 is an enlarged view of the upper right hand portion of the machine shown in Fig. 1, showing the several driving and feeding chains and the parts operated thereby. Fig. 5 is an enlarged vertical section substantially on the line 5—5 of Fig. 3. Fig. 6 is an enlarged detail view in elevation of the clutch shifting mechanism and the manual stop and starting mechanism. Fig. 7 is an enlarged detail section on the line 7—7 of Fig. 2, showing the intermittent drive for the box carrying chains. Fig. 8 is an enlarged detail plan view of the chain operated mechanism for controlling the box feeding mechanism. Fig. 9 is a transverse section on the line 9—9 of Fig. 8. Fig. 10 is an enlarged perspective view of a portion of the feed chains showing the adjustable risers or pushers carried by said chains. Fig. 11 is a detail of the adjustable crank by means of which an intermittent movement is imparted to the feeding chains, and Fig. 12 is a detail sectional view on the line 12—12 of Fig. 6.

It will be obvious to one skilled in the art after having obtained an understanding of my invention from the disclosures herein made, that my invention is capable of modification without departing from the scope and spirit of the invention, and I wish it to be so understood.

The particular machine shown in the drawings was designed for stapling boxes of a type which are folded up from blank sheets of cardboard, the adjacent edges of which are brought together and stapled or otherwise fastened. These boxes, as is well-known, are formed by cutting a blank sheet of cardboard or similar material to the proper size and shape and the blank sheet is then scored along definite lines so that it may be folded.

In the drawings, particularly Figs. 2 and 2ª, I have illustrated several of these boxes in the stage of their formation in which the stapling operations are performed upon them. The blank cardboard is folded upon itself so that the parallel edges (1) overlap as shown in Figs. 2 and 2ª, to form a longitudinal seam along which the stitching or stapling is done. The stapling operation is preferably performed while the blank is folded in the manner shown in Fig. 2 in the machine, that is to say while it is flat, and after the seam has been stapled the folded blank is opened as is well-known, so that a box rectangular in cross section is formed. The blank is cut so that after the box has been formed into a rectangular section there still remain the end flaps (2) which are adapted to be tucked into the ends of the box to close the ends thereof. The stapling of the seam takes place over a length which corresponds to the overall length of a completed box, that is after the end flaps are tucked in. Thus it is obvious that while the box is in the flat condition shown in the drawings, the end flaps (2) project beyond the ends (3) of the seam to be stapled. In other words, the stapled seam is substantially equal to the length between the points (3) in Fig. 2ª. No further description of these boxes and the method of forming them is necessary as far as my invention is concerned. The staple fasteners (5) are preferably positioned at equal intervals along the seam, any number of these staples being used as desired. A single row of staples is found to be sufficient along the entire length of the seam but for the purposes of reinforcement it is

sometimes desirable to place an extra staple (6) at each end of the same, but of course this is not necessary.

My invention is not concerned with the stapling mechanism *per se*, and this mechanism may be of any suitable type for the purpose. In the drawings I have shown a stapling head (A) which needs no particular description except to say that it operates intermittently to apply staples to the seam. It is necessary therefore to feed the boxes in relation to this stapling head so that the staples will be properly applied along the seam, and in the construction shown I feed the boxes intermittently in timed relation to the operation of the stapling head, so as to equally space the staples along the seam. In the construction shown this is done by means of a pair of parallel traveling chains (7) spaced apart and traveling in slots (8) in the upper face of a suitable bench or table (9) disposed beneath the stapling head and in proper relative position thereto. This table is supported in any suitable manner as by means of the frame (B) shown more clearly in Figs. 1 and 3. These chains are preferably in the form of continuous loops which extend the entire length of the table and travel around sprockets (10) carried by suitable shafts (11) and (12) positioned transversely beneath the table. The chains lie preferably substantially flush with the top surface of the table but they have risers or pushers (13) which extend above the surface of the table and are adapted to engage the boxes and carry the boxes along the top of the table. Fig. 10 shows in detail the construction of the chain and these pushers. The chains are preferably of the link type, but the pivot pins (14) by which the several links (15) of the chain are fastened together, extend laterally beyond the width of the chain, so as to provide a convenient means for attaching the pushers to the chain. These pushers are carried by small frames (C) which are constructed so that they may be attached to the chains at any point, thus enabling the boxes to successively follow each other in any desired spaced relation. Each of these frames (C) comprises two side plates (16) and a pair of cross bars (17) rigidly secured to the plates to form a rigid frame. The side plates (16) each have a pair of notches (18) for engagement with the outstanding ends (14) of the link pivot pins. The forward notch (18) of each side plate opens in a direction longitudinally of the chain, while the rear notch (18ª) of each side plate is disposed at an angle to the forward notch (18). The frame (C) thus spans the chain and it is necessary in order to place the frame in position on the chain or remove it therefrom, to tilt the rear end of the frame upwardly or at an angle to the longitudinal line of movement of the chain. In other words, to attach the frame (C) to the chain it is necessary to place or tilt the frame at an angle to the chain and push the forward slot (18) into engagement with the pins (14) and then rotate the rear end of the frame downwardly toward the chain about the pins (14) until the rear slots (18ª) engage the corresponding pins (14). To remove the frame this operation is simply reversed; that is to say, the rear end of the frame is swung upwardly about the forward end as a pivot until the rear notches (18ª) are free of the pins (14) and the forward notches (18) may then be withdrawn from engagement with their corresponding pins (14). This construction provides a suitable and simple means for adjustably positioning the pushers (13) at any point along the chains. It will also be noted that since the pushers (13) rise upwardly substantially at right angles to the chain, any pressure against the forward face of the pushers incident to the pulling of the boxes along the table, will tend of course to hold the frame (C) in tight engagement with the chain. In attaching the pushers to the frame (C) it will be readily seen that the pushers are simply positioned between the side plates (16) of said frames and the cross bars (17) pass through the lower part of said pushers. If desired, the rear ends (19) of the pushers may be extended some distance in the rear of the frame (C) so as to provide additional resting surface for the pusher upon the following link of the chain.

I also utilize the frames (C) for the purpose of controlling the movement of the chains and in order to distinguish these controlling frames from the pusher frames they will hereafter be designated as C^1. These controlling frames are constructed the same as the frames (C) except that one of the cross rods (17) is extended laterally beyond the side plate (C) to form a tripping pin (17ª). These tripping pins (17ª) are adapted to be extended beyond either side of the chain in acordance with the requirements of a controlling mechanism hereinafter to be described. Thus it will be seen that the pushers (13) and the controlling frames (C^1) may be adjusted along the chains (7) to adapt the machine to any desired space between successive boxes or to adapt it to different sized boxes. It is desirable in a machine of this character from the standpoint of efficiency to feed the boxes to the stapling head in as rapid succession as possible, and also to propel the boxes at a greater rate of speed between the points where the stapling head stops stapling one box and begins on another. In the present construction, I intermittently feed the boxes during the stapling operation and then propel the boxes by a long continuous step until the point at which the stapling operation on

the succeeding box is to begin. In other words, the chains travel by short intermittent steps during and in timed relation to the stapling operation, and in a long continuous step between the stapling operations, thus reducing the time necessary for the completed box to be removed and the succeeding unstapled box to be brought into stapling position. I accomplish these results by driving the feed chains (7) in this manner and I will now describe the mechanism by which this variable intermittent movement of the chains is brought about.

The stapling head (A) is carried at the end of a horizontally disposed arm (D) forming, in a sense, a continuation of a vertical pedestal (E) positioned at one side of the table (9) as shown more clearly in Fig. 3. Extending through this arm (D) is a horizontal shaft (25) by means of which power is transmitted to operate the stapling head. This shaft extends beyond the arm (D) and its outer end is supported in a journal arm (26) mounted on the end of a horizontal member (27) outstanding from said pedestal (E). Loose on the shaft is a large pulley (28) which is driven from any suitable source of power by means of a belt (29). On each side of this pulley is a clutch. The clutch (F) may be of any suitable type for the purpose but in the construction shown it is composed of two opposed members (30 and 31). Both members (30 and 31) are loose on the shaft, but the member (30) carries a sprocket wheel (32) and the member (31) is fastened to the pulley wheel (28) in such a manner that it may be shifted into and out of engagement with the opposed member (30). Thus when the member (31) is in engagement with the member (30) the pulley wheel will drive the sprocket (32), and when out of engagement with the member (30), the sprocket (32) is free to rotate idly. The clutch member (31) is shifted by means of lever (L) (see Figs. 3, 5, and 6), which is fastened on a rock shaft journaled at 34′ in the upper end of a bearing standard (34), the shaft serving as a pivot for the lever. This lever is forked to embrace the clutch member (31) and has pins entering a groove in said member (31) so that said lever can shift the clutch member (31) and still allow it to rotate. The rock shaft which carries the lever (L) also carries a depending arm (35). The lower arm of the lever (L) has a horizontal extension 36. On the side of the pulley opposite the clutch (F) is another clutch (G) which is adapted to connect the pulley with and disconnect it from the main shaft (25), and it is through the medium of this clutch that the shaft is driven in order to transmit power to the stapling head. My invention does not concern this clutch *per se*, but only in combination with the other parts of the mechanism in so far as it is used for the purpose of connecting shaft (25) and sprocket wheel 57, or disconnecting them from the pulley for simultaneously operating the stapling head and intermittent drive for the feeding device. It needs no particular description except to say that one of the members (37) thereof is in the form of a collar which is fast on the shaft (25). This collar carries a longitudinally slidable member (38) which normally engages and locks the other member (39) of the clutch. This member (39) of the clutch is fastened to the pulley so that when the two members (39 and 37) of the clutch are locked together, the pulley will drive the shaft (25) and hence the stapling head, and when said members are disconnected by the shifting of member (38) the shaft remains stationary. The member 38 has a beveled face and is positioned in a groove between the two members (39 and 37) in the path of a dog (40). The dog (40) is pivoted at 41 (see Fig. 5) on a fixed arm (42) and its free end is adapted to be swung into and out of the groove. When it is swung into the groove its end engages the member (38) and shifts it to thereby unlock the clutch members (39 and 37) and stop the stapling head, and when said dog is swung out of said clutch free of member (38) the member (38) operates to lock the clutch members (39 and 37) together and thereby drive the shaft (25). The details of this clutch mechanism are not shown in the drawings and for the purposes of this description it is sufficient to understand that when the dog (40) is swung upwardly and into the groove, the clutch members will be unlocked and the stapling head stationary, and when it is swung out of the clutch the stapling head will be driven by the pulley and clutch. The operation of this dog is accomplished by a vertical rod (44) the upper end of which is pivotally connected to the dog and the lower end of which as shown more clearly in Fig. 6, loosely passes through a hole in the end of the lateral extension (36) of lever (L). Beneath said extension the rod carries a couple of nuts (45) which are adjustable along said rod for the purpose of adjusting the parts. A spring (46) is connected at one end to the rod (44) and at its other end to a fixed member or hook (47) on the frame, so that this spring tends to hold the dog into the clutch and thus maintain the stapling head stationary, and when the rod is pulled downwardly against the tension of the spring, the stapling head will be operated.

The two clutches F and G are arranged so that they both cannot be in locking condition at the same time. That is to say, by reference to Fig. 6 it will be seen that when the clutch members (30 and 31) are placed

in engagement by the rotation of the arm (35) the extension (36) allows the dog (40) to enter the groove and unlock the members of clutch G. Conversely the rotation of the arm (35) to disconnect the clutch members (30 and 31) operates to withdraw the dog (40) and connect the shaft (25) to the pulley. The sprocket (32) which is carried by the clutch member (30) drives a sprocket (50) through the medium of the chain (51). This sprocket (50) is mounted on a short shaft (52) which carries another sprocket (53) around which latter sprocket is a chain (54) (see Figs. 2 and 4.) The chain (54) travels around an idler sprocket (55) mounted at the end of the table, and it also travels on the under side of a sprocket (56) keyed to the forward shaft 11, around which the main feed chains (7) travel. Thus when the members of clutch F are in engagement, the chains (7) will be driven to carry the boxes along and it is through this driving connection that the long continuous step is imparted to said chains and boxes during the interval between the finishing of one stapling operation and the beginning of the next. The member (37) of clutch G carries sprocket teeth (57) which drive a chain (58), and this chain in turn travels around a sprocket (59) on a shaft (60). The other end of the shaft (60) carries a crank (61), to which one end of a pitman (62) is pivotally connected. As shown in Fig. 11, the crank is in the form of a slotted crossbar on the end of the shaft (60) and in the slot of said member is a sliding block (63) to which the end of the pitman (62) is pivotally connected. This block (63) may be adjusted along the slot toward and from the center of the shaft by means of a threaded adjusting bolt (64) passing through said block (63). This arrangement provides an adjustable means by which the length of the stroke of the other end of the pitman is regulated. The pitman (62) extends along parallel to the table and its other end has an elongated slot (65) by means of which it is adjustably and pivotally connected to the end of a lever (66) (see Figs. 4 and 7). This lever is pivoted on the forward shaft (11) of the feeding chain (7) and is adapted to be rocked or oscillated about its pivot by the pitman (62) when the shaft (60) is rotated. The lever (66) is loose on the shaft (11) but it carries a couple of dogs or pawls (67) adjacent its ends, which are positioned within and which coöperate with the inner periphery of the rim of a dish-shaped member (68) which, as shown in Fig. 4, is carried to the shaft (11). The dogs or pawls (67) are pivoted at (69) on the lever (66) and their free ends are held in yielding engagement on the rim of the member (68) by means of the springs (70). This construction forms a ratchet driving connection between the pitman and the shaft (11) and it is readily seen that when the pitman rocks the lever (66) clockwise, the dogs (67) operate to correspondingly rotate the member (68) and hence the shaft (11) in the same direction. When the pitman rocks the lever (66) in a contra-clock-wise direction, the member (68) and shaft (11) will remain stationary. Thus it is seen that the rotation of the shaft (60) imparts an intermittent, rotary movement to the shaft (11) and hence to the feed chains, and the length of the steps in this intermittent movement may be regulated by the adjustable crank and the adjustable connection of the pitman and the lever (66) before described, in accordance with the spacing requirements of the staples along the seam of the box. The chain (54) travels over a sprocket (54^a) which is carried on a plate (54^b). The plate (54^b) has a plate and arc-shaped slot connection (54^c) with the frame (B) (see Fig. 7) by which the sprocket (54^a) may be adjusted with respect to the chain (54). This serves as a belt tightener and is positioned so as to increase the arc of engagement of the chain (54) with the sprocket (56). Thus it is seen that by throwing the clutches (F and G), the driving mechanism for the feed chains (7) may be shifted, so to speak, with respect to said driving chains and the chains (7) may be given an intermittent advance movement or a comparatively long continuous movement as desired. The two clutches F and G as afore-described, are interconnected by the lever (L) and the extension (36) so that the throwing in of one clutch occurs practically simultaneously with the throwing out of the other clutch.

In the machine shown in the drawings, I prefer that the spacing of the boxes on the feeding chains control the intermittent and continuous driving mechanisms for the chains (7), this control being accomplished through the medium of one of the chains (7). This is the purpose of the controlling devices (C^1) which are used on one of the chains (7) as before described. These frames are positioned on the chain (7) at points corresponding to the beginning and the ending of the stapling operation for each box, and as shown in Fig. 2 the tripping pins (17^a) are alternately disposed on opposite sides of the chain (7). Adjacent the stapling head is a shifter device H having an L-shaped frame (75) which is adjustably bolted by one of its legs to a transverse member of the main frame in such a manner as to position its other leg in a horizontal plane immediately beneath the surface of the table (9) as shown in Figs. 2, 3, 8, and 9. This frame (75) has a couple of guides (76) in which a shiftable plate (77) slides in a plane transverse

to the line of movement of the chain. The frame (75) also carries a couple of longitudinal guides (78) forming a channel through which the chain (7), carrying the controlling devices (C^1), travels. The shiftable plate (77) carries a couple of cams (79) adjustably mounted thereon by means of the slot and bolt connection (80). These cam plates are positioned one slightly in advance of the other and in such manner that they overhang the channel guides (78). Their edges (81) are beveled in such a manner as to lie in the path of the controlling pins (17^a). They are spaced apart laterally in such a manner that when the controlling pin (17^a) on one side of the chain (7) strikes one of the cams, it shifts the plate (77) transversely and at the same time places the other cam in position to be engaged by the succeeding pin (17^a) on the other side of the chain. This succeeding pin operates to shift the plate (77) in the opposite direction. Thus the plate (77) is given a reciprocating movement by the controlling pin (17^a). The plate (77) is connected with the arm (35) of the clutch shifting mechanism by means of a link (82) (see Figs. 3, 6, 8 and 9) so that the reciprocation of the plate (77) rocks the clutch shifting lever (L) in the corresponding direction. Thus when the stapling operation is about to begin on the end of a seam of a box, the controlling pin (17^a) corresponding thereto, rocks the clutch shifting lever (L) in the direction to throw the clutch G and start the stapling operation, and also the intermittent movement to the chains (7). This opens the clutch F and allows the continuous driving chains to travel idly. When the stapling operation is to cease, the pin (17^a) on the opposite side of the chain (7) corresponding to the end of the seam throws the operating lever (L) in the opposite direction, allows the clutch G to open and closes the clutch F, thereupon shifting the continuous driving mechanism into operative relation to the chain (7), and the intermittent driving mechanism, although still operating the pitman and ratchet, will have no effect on the shaft (11) and the chains (7).

It is desirable to avoid the operation of the stapling head in the event that there should be no box in position to receive the staples, and I therefore provide mechanism by which the stapling operation is controlled by the boxes to be stapled. Referring to Figs. 3 and 6 it will be seen that the link (82) carries on its end a plate (83) having an L-shaped slot (84) one leg of which is disposed horizontally and the other leg vertically. This slot coöperates with a pin (85) on the end of the arm (35). The plate (83), however, and hence the end of the rod (82) are pivotally connected to and suspended from a link (86), the upper end of which is pivotally connected to one arm of a bell-crank lever (87). This bell-crank lever is pivoted at (88) to the upper end of the frame pedestal E and its other arm is pivotally connected to one end of a link (89), the other end of which is pivotally connected to one arm of a bell-crank lever (90) positioned adjacent to the stapling head. This bell-crank lever (90) is pivoted at (91) and its other arm carries a wheel or roller (92). The wheel (92) is positioned above the path of the boxes in such a manner that, as a box passes beneath it, it engages and raises the wheel and thereby rotates the bell-crank (90) about its pivot. If there is no box in position to receive the staples when the stapling operation should commence, the wheel (92) of course remains idle. Thus when a box is in position to receive the staples and hence raises the wheel (92) the link (86), through the medium of the parts just described, depresses the plate (83) and causes the pin (85) to occupy the vertical leg of the L-shaped slot (84), and hence when the pin (17^a) shifts the rod (82) this rod will transmit motion to the clutch shifting lever (L), the pin (85) and the vertical portion of the slot (84) acting as a rigid pivotal connection. Should the box be absent from its position the rod (82) and hence the plate (83) will be raised by means of a spring (93) attached to the standard and to rod (82) and cause the pin (85) to occupy the horizontal portion of the L-shaped slot (84). Hence when the rod (82) is longitudinally shifted there will be a lost motion connection between the rod (82) and the clutch shifting lever (L), and hence said clutch shifting lever will not be operated. This of course also has the effect of leaving the continuous driving mechanism in operative relation to the chains (7) until a box does arrive in position.

It is desirable to be able to stop or start the machine, oftentimes in the middle of a stapling operation, but under such conditions it is also desirable that when the machine is again started it will continue the particular operation at which it left off. For instance, suppose that the machine should be stopped when a box is only partially stapled. It is desirable then that when the machine is again started it will continue the stapling operation; or should the machine happen to be stopped in the act of driving the chains (7) by a continuous movement, it is desirable then that the machine will complete said continuous movement to finish out the cycle of operation. As shown by the dotted lines in Fig. 6, it will be seen that the clutch member (31) and the operating parts are so proportioned that this clutch member is intended to occupy a neutral position in which it is neither connected to the pulley or to its companion clutch member (30). In this neutral posi-

tion of the clutch, the arm (36) will occupy such a position that the clutch operating dog (40) will be in the groove and will maintain the pulley and sprocket wheel disconnected from the shaft. In this position of the parts, the feed chains (7) will, of course, remain idle. As shown in Figs. 6 and 12, the lower end of the arm (35) has a wedge-shaped piece (95) which is adapted to coöperate with the correspondingly wedge-shaped end of a plunger (96). Whenever the arm (35) is swung to shift the clutches it must snap past the plunger (96), so to speak, and thus the plunger, in a sense, forms a sort of snap lock to hold the arm (35) on either side of its center. This plunger, however, is slotted, as shown in Fig. 12, to provide a guideway for a Y-shaped member (98). This Y-shaped member is carried on the upper end of a rod (100) and is yieldingly held normally in its lower position by a spring (101) positioned on the rod (100) between a portion of the frame and a collar (102) on the rod. The faces of this member (98) are inclined in the opposite direction to the faces of the plunger member (96) and at the same angle as the faces of the member (95). Thus, by pushing upward on the rod (100), and raising the (Y) member (98), one of its faces will coöperate with the corresponding face on the member (95) and by a sort of cam or wedge action will rotate the arm (35) until the point of the member (95) almost but not quite passes the point of the plunger member (96). In this position the clutch member (31) will be in its neutral position before described and the chains (7) will stop. It might happen that the machine was thus stopped when the stapling operation on a box was only partially completed and of course it is desirable when the machine again starts that it will continue the operation which it was last performing. Thus when the (Y) member is released and withdrawn by its spring, the spring pressed plunger (96) will act against the face of the member (95) and return the arm (35) to its original position. This action occurs whether the member (95) be on one side or the other of the plunger member (96) when the machine is to be stopped. Any suitable means for operating the (Y) member (98) may be employed. In the present construction I provide a bell crank lever (103) one arm of which operates against the collar (102) and the other arm of which is connected to one end of a link (104). This link (104), as seen in Fig. 3, is connected to another bell crank lever (105) on the frame of the machine. The latter bell crank lever is connected by a link (106) to one arm of another bell crank lever (107) (see Fig. 1) pivoted on the forward end of the machine. The other arm of this latter bell crank lever is connected by a link (108) to a foot treadle (109) which is located in a convenient position for the operator to manipulate with his foot. In this manner the stopping and starting of the machine may be controlled by the operator's foot and each time the machine is started it will continue the operation at which it was last stopped.

When the clutches (F and G) are shifted to bring the contacts and intermittent mechanism into connection with the chains (7) there may be provided on the shaft (60) a suitable brake. In the construction shown more particularly in Figs. 3 and 5, this brake may comprise a brake wheel (60^a) acting on a shaft and surrounded by a brake belt (60^b). The ends of the brake belt (60^b) being connected on the arm (60^c) in such a manner as to exert friction on the brake wheel (60^a).

As the particular form of the brake is not a part of the invention, further detailed description thereof seems unnecessary.

I claim:

1. The combination of an intermittent driving mechanism, a continuous driving mechanism, box feeding means adapted to be driven by said mechanisms, means for periodically connecting and disconnecting said driving mechanisms alternately with respect to said feeding means, and means for preventing simultaneous connection of said driving mechanisms with said feeding means.

2. The combination of a box feeding chain, mechanism for intermittently driving said chain, mechanism for continuously driving said chain, means for alternately changing the driving relation of said mechanisms with respect to said chain, and means for positively preventing simultaneous connection of said mechanisms with said chain.

3. The combination of a box feeding chain, mechanism for intermittently driving said chain, mechanism for continuously driving said chain in the same direction as said intermittent drive, and means under the control of the chain for changing the driving relation of said driving mechanisms with respect to the chain.

4. The combination of a box feeding chain, mechanism for driving said chain intermittently, mechanism for driving said chain continuously, a source of power common to both of said driving mechanisms, means for rendering said driving mechanisms alternately effective and ineffective to drive the chain and means for positively preventing said mechanisms from being simultaneously placed in driving relation with said feed chain.

5. The combination of a stapling mechanism, a continuous chain for feeding boxes to said stapling mechanism, an intermittent

and a continuous driving mechanism for said chain, and means under the control of the boxes for starting and stopping said stapling mechanism and for controlling the movement of said chain.

6. The combination of a feeding chain, an intermittent and a continuous driving mechanism for said chain, and means controlled by said chain for connecting one and then the other of said driving mechanisms in driving relation to said chain.

7. The combination of a feeding chain, an intermittent and a continuous driving mechanism for said chain, means controlled by said chain for connecting one and then the other of said driving mechanisms in driving relation to said chain, and stapling mechanism under the control of the boxes fed by said chain.

8. The combination of a feeding chain, mechanism for imparting continuous movement to said chain, mechanism for imparting intermittent movement to said chain in the same direction as said continuous movement, a common source of power and means for alternately connecting one and disconnecting the other of said driving mechanisms with respect to said source of power.

9. The combination of a feeding chain, mechanism for imparting continuous movement to said chain, mechanism for imparting intermittent movement to said chain, a common source of power, and automatic means under the control of the chain for alternately connecting one and disconnecting the other of said mechanisms with respect to said source of power.

10. The combination of a feeding chain, mechanism for imparting continuous movement to said chain, mechanism for imparting intermittent movement to said chain, a common source of power, automatic means under the control of the chain for alternately connecting one and disconnecting the other of said mechanisms with respect to said source of power, stapling mechanism and box controlled means for starting and stopping said stapling mechanism.

11. The combination of a continuous feeding chain, stapling mechanism to which said chain successively carries boxes, a driving mechanism for imparting intermittent movement to the chain during the stapling operation, a driving mechanism for imparting continuous movement to the chain between the stapling operations, and means operated by the chain for controlling the operation of said driving mechanisms.

12. The combination of a box stapling mechanism, a box feeding chain for feeding the boxes thereto in succession, mechanism for intermittently driving said chain during the stapling operation, mechanism for continuously driving the chain between the stapling operations on successive boxes, box controlled means for controlling the stapling mechanism and chain controlled means for determining the operation of said driving mechanisms.

13. The combination of a feeding chain, mechanism for driving the chain intermittently, mechanism for driving the chain continuously, means for stopping either of said driving mechanisms and means for automatically causing the particular driving mechanism to continue its operation when the machine is again started.

14. The combination of a feeding chain, mechanism for driving the chain intermittently, mechanism for driving the chain continuously, a common source of power, a clutch for each of said driving mechanisms for connecting it with and disconnecting it from said source of power, a common operating mechanism for said clutches and means under the control of said chain for actuating said common mechanism.

15. The combination of a stapling mechanism, a feeding chain for successively feeding boxes to said stapling mechanism, mechanism for imparting a continuous movement to the chain during the interval between the stapling operations on successive boxes, mechanism for intermittently imparting movement to said chain and for driving said stapling mechanism, means controlled by the chain for rendering said driving mechanisms alternately effective to drive the chain, and means operable in the absence of a box for rendering the stapling mechanism ineffective.

16. The combination of a feeding chain, mechanism for driving said chain intermittently, mechanism for driving the chain continuously, common mechanism for alternately rendering said driving mechanisms effective and ineffective, means for operating said common mechanism to stop the particular driving mechanism in operation, and means for restoring the particular driving mechanism to operating condition.

17. The combination of a feeding chain, a common source of power, a driving mechanism for driving the chain intermittently, a driving mechanism for driving the chain continuously, a clutch associated with each driving mechanism for connecting it with and disconnecting it from the common source of power, a common operating lever for both of said clutches, means for operating said lever to disconnect both of the said mechanisms from the source of power, and means operable to restore the last operated driving mechanism to driving relation with said source of power.

18. The combination of box stapling mechanism, a chain for feeding boxes to said stapling mechanism, and means controlled by the chain for stopping the stapling mechanism and simultaneously in-

creasing the speed of said chain in the direction in which it is then traveling.

19. The combination of an intermittent box stapling mechanism, means for feeding boxes to said stapling mechanism in timed relation therewith, and means for automatically stopping said stapling mechanism and simultaneously changing the movement of said feeding means to a continuous movement in the same direction as said timed movement.

20. The combination of a box feeding mechanism, means for driving said box feeding mechanism intermittently in one direction, means for driving said mechanism continuously in the same direction, and adjustable means for automatically determining the relative periods of operation of the said intermittent and continuous mechanisms.

21. The combination of a box feeding mechanism, means for driving said box feeding mechanism intermittently, means for driving said mechanism continuously in the same direction as said intermittent feed, and means controlled by said feeding mechanism for determining the relative periods of operation of said intermittent and continuous driving means.

22. The combination of a stapling mechanism, a box conveyer mechanism, and means automatically imparting relatively different periods of movement in a single direction to said conveyer mechanism.

23. The combination of a stapling mechanism, a box conveyer mechanism, means automatically imparting relatively different periods of movement in a single direction to said conveyer mechanism, and means for causing said conveyer mechanism to operate in timed relation with said stapling mechanism.

24. The combination of a stapling mechanism, a box conveyer mechanism, means imparting relatively different periods of movement in a single direction to said conveyer mechanism, and means for automatically stopping and starting said stapling mechanism in timed relation with the periodic movement of said conveyer mechanism.

25. The combination of a stapling mechanism, a box conveyer mechanism for positioning the boxes relatively to the stapling mechanism, means for timing the stapling mechanism with respect to the conveyer mechanism, and means for automatically stopping the timed movement of said stapling mechanism and conveyer mechanism and starting a continuous movement of said conveyer mechanism in the same direction as said timed movement.

26. In a stapling machine, a feeding device, a plurality of means for alternately driving said feeding device, means for stopping said stapling machine and feeding device, and means for causing said feeding device to be driven, when said stapling machine is restarted, by the driving means by which it was last driven before the stopping of said stapling machine.

27. In a stapling machine, a work-feeding device, a plurality of means for imparting movements having different characteristics to said work-feeding device, means for preventing simultaneous operative connection between said driving means and said work-feeding device, means for stopping the movement of said work-feeding device, and means for reëstablishing, upon the restarting of said work-feeding device, operative connection between said work-feeding device and the driving means by which said work-feeding device was being driven when its movement was stopped.

28. In a stapling machine, staple driving mechanism, intermittent feeding mechanism, continuous feeding mechanism, and automatic means for preventing the operation of said staple driving device and said intermittent feed mechanism and for causing the operation of said continuous feed mechanism, in the absence of work to be operated upon by said staple driving device.

29. In a stapling machine, a staple driving device and a simultaneously operable intermittent feeding device, a continuous feeding device, power mechanism, means normally holding one or the other of said feeding devices in connection with said power mechanism, and means for disconnecting both of said feeding devices from said power mechanism.

30. The combination of an intermittent driving mechanism, a continuous driving mechanism, box feeding means adapted to be driven by said mechanisms and means for periodically and automatically connecting and disconnecting said driving mechanisms alternately with respect to said feed mechanisms.

31. The combination of a box feeding chain, mechanism for driving said chain intermittently, mechanism for driving said chain continuously, a source of power common to both of said driving mechanisms, and means for automatically rendering said driving mechanisms alternately effective and ineffective to drive said chain.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 31st day of October, A. D. 1914.

BYRON E. BROWN.

Witnesses:

CHARLES H. SEEM,

KENT W. WONNELL.