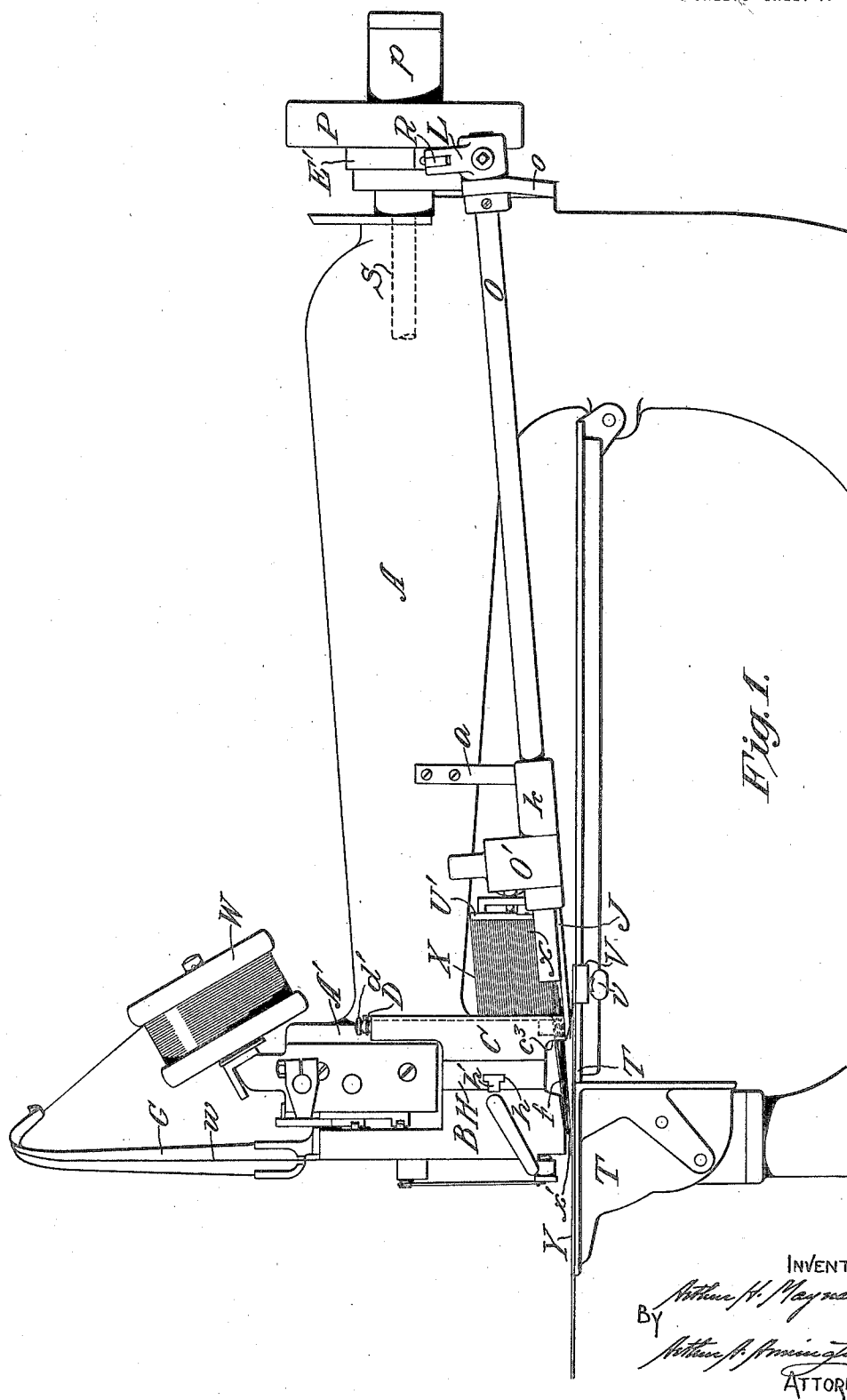


A. H. MAYNARD.
 AUTOMATIC FEEDING MECHANISM FOR WIRE STITCHERS AND LIKE MACHINES.
 APPLICATION FILED MAR. 15, 1916.

1,275,960.

Patented Aug. 13, 1918.
 6 SHEETS—SHEET 1.



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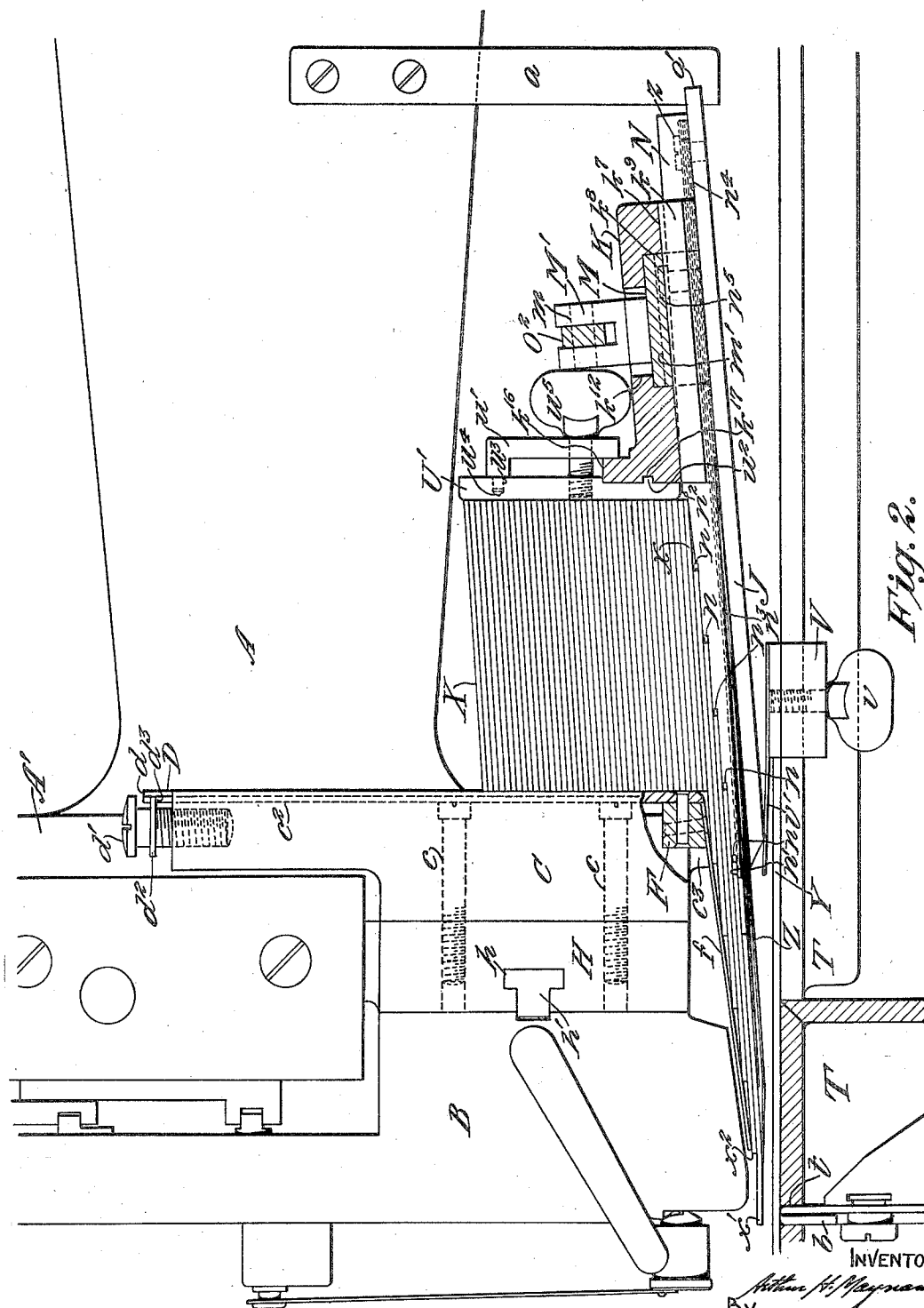


Fig. 2.

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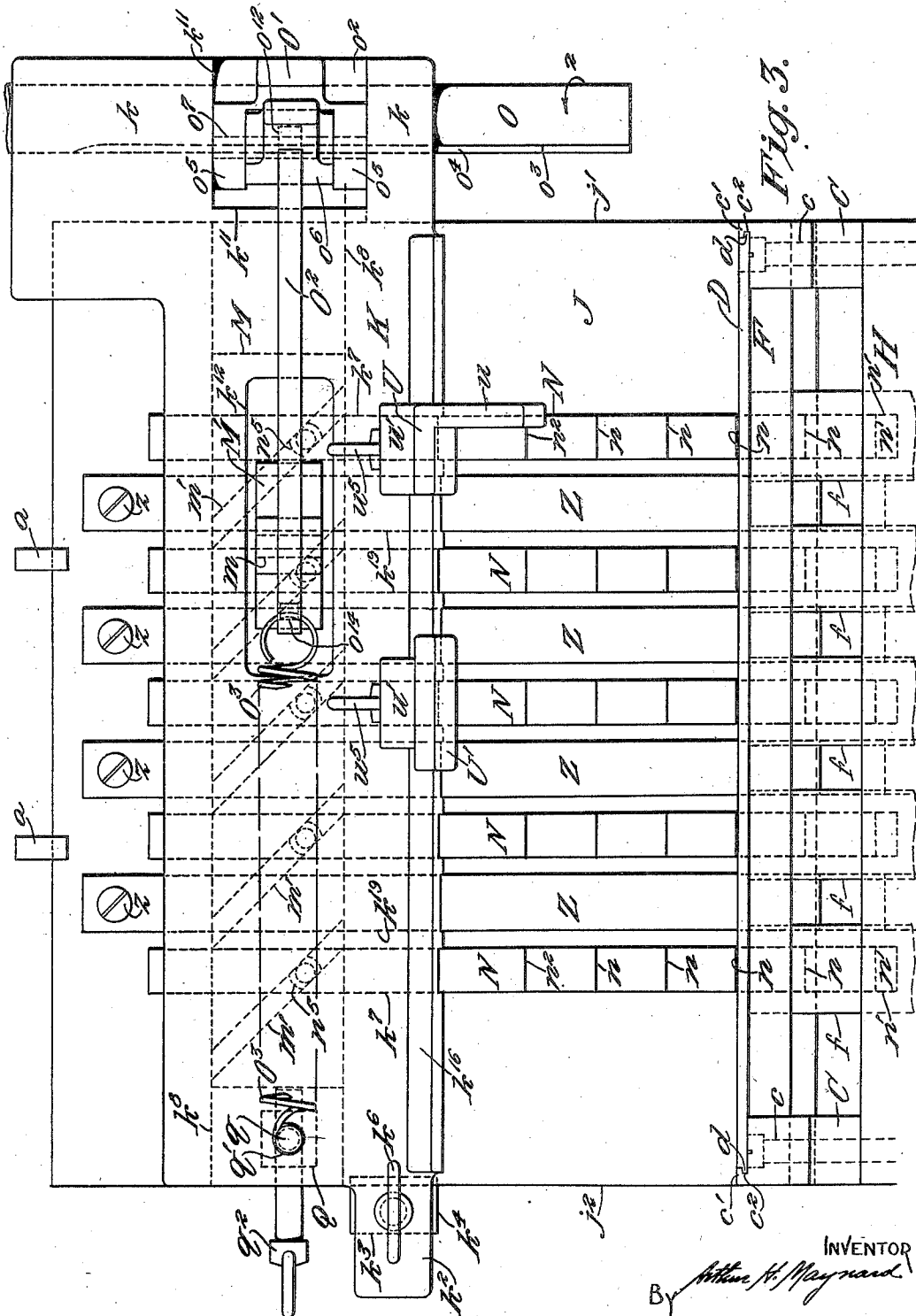


Fig. 3.

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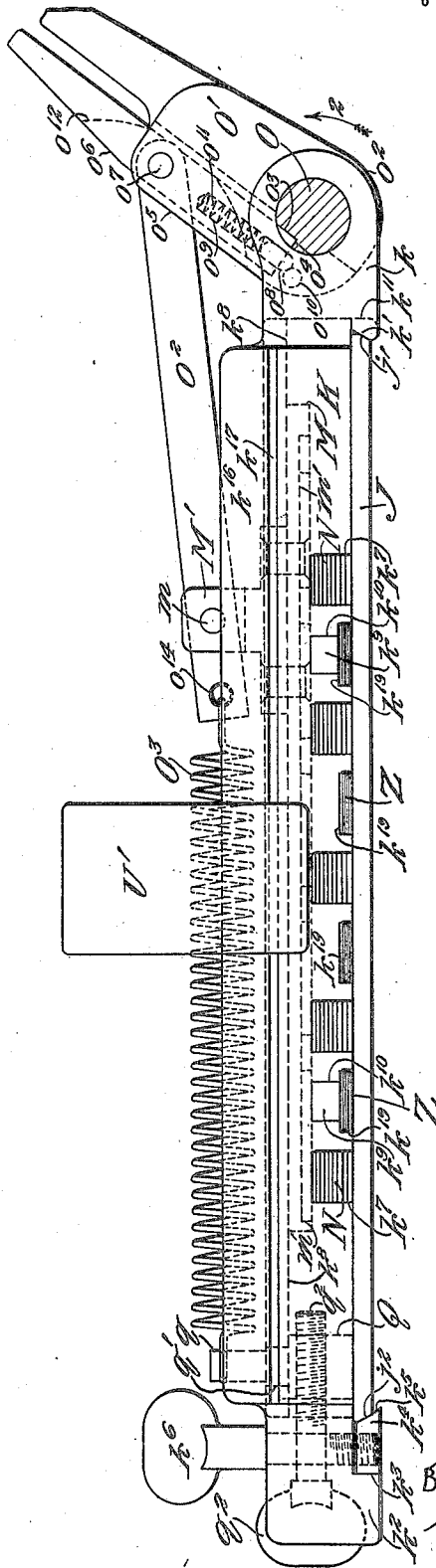


Fig. 4.

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6 SHEETS—SHEET 5.

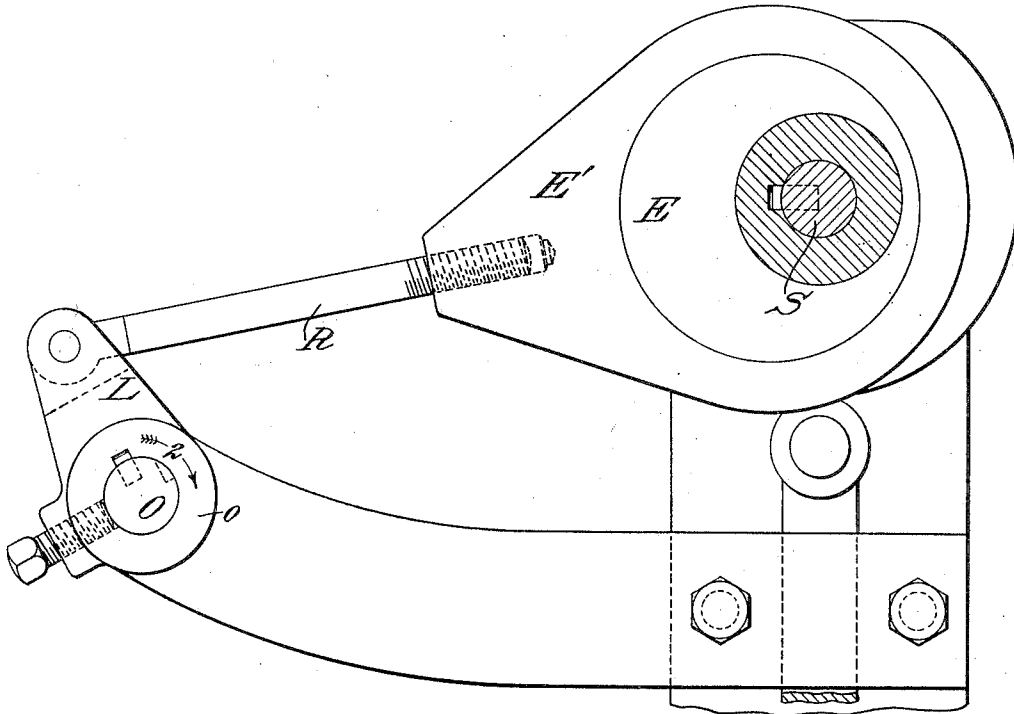


Fig. 5.

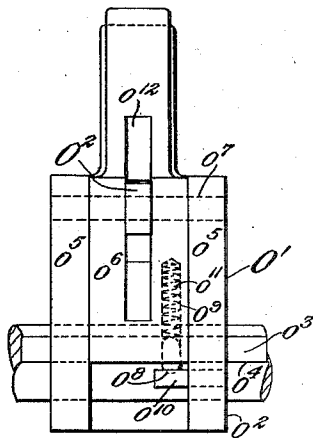


Fig. 6.

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6 SHEETS—SHEET 6.

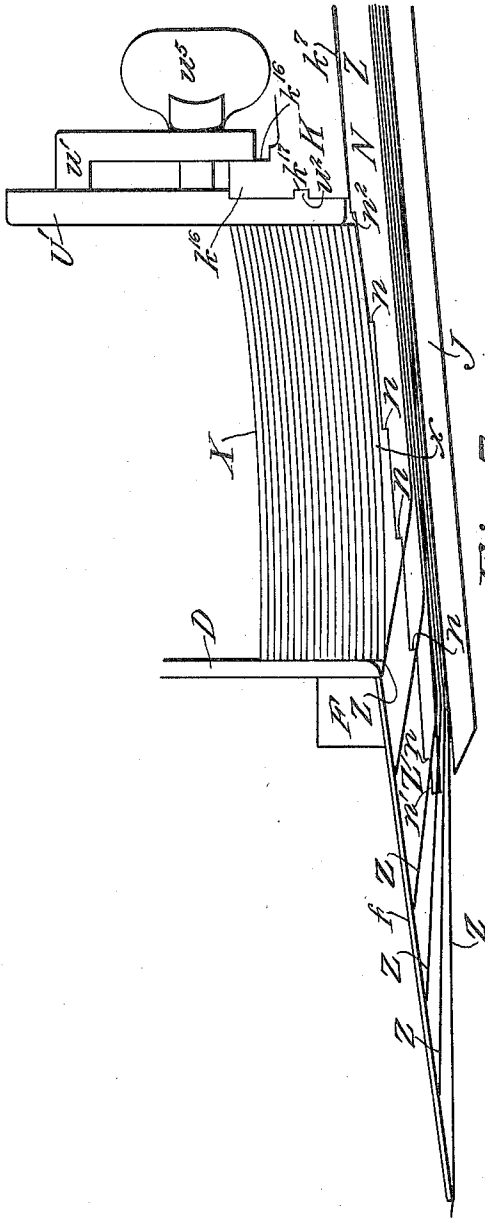


Fig. 7.

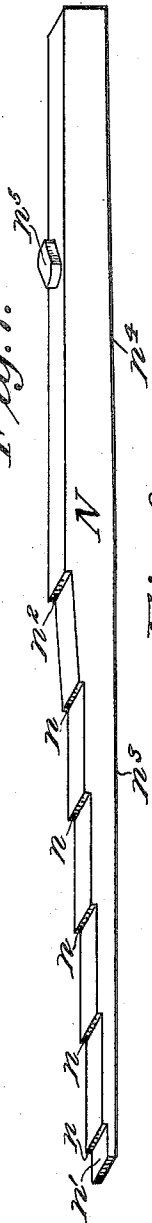


Fig. 8.

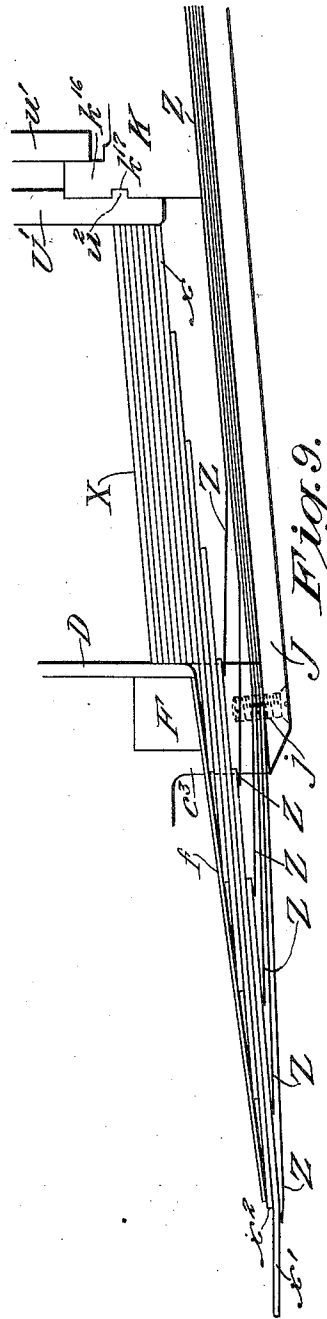


Fig. 9.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC FEEDING MECHANISM FOR WIRE-STITCHERS AND LIKE MACHINES.

1,275,960.

Specification of Letters Patent. Patented Aug. 13, 1918.

Application filed March 15, 1916. Serial No. 84,329.

To all whom it may concern:

Be it known that I, ARTHUR H. MAYNARD, a citizen of the United States, residing at Warwick, in the county of Kent, State of Rhode Island, have invented certain new and useful Improvements in Automatic Feeding Mechanism for Wire-Stitchers and like Machines, of which the following is a specification.

My invention consists of an improved automatic feeding-mechanism adapted for use with wire-stitching or stapling machines and other apparatus of a like character. The object of my improvement in particular is to provide means for continuously feeding calendar-pads or similar blanks to the stitching-mechanism of the machine to deliver them into position to be stitched or fastened on to the cards or backs. My improved feeding-device is arranged to successively feed the pads from the bottom of a pile or stack placed in the machine and is designed to operate intermittently to advance a plurality of the pads at the same time to carry them forward progressively in overlapped relation to the stitching-mechanism.

In this manner I effect a continuous step-by-step feeding of the pads, while maintaining them under accurate and positive control to insure their proper positioning in relation to the stitching-devices, thereby securing a faster rate of feed and increasing the production of the machine. My invention also contemplates other improvements in the construction and method of operation of the feeding-mechanism in general which are set forth in detail hereinafter.

The manner and means for carrying out my improvements are fully described in the following specification, illustrated by the accompanying drawings, in which like reference characters designate like parts.

In the drawings:—

Figure 1 is a side elevation of the upper portion of a wire-stitching machine showing my improved feeding-mechanism as applied thereto;

Fig. 2, an enlarged side view of the stitcher-head showing the correlation of the feeding-device therewith and illustrating the parts more in detail;

Fig. 3, an enlarged plan view of the feeder;

Fig. 4, an enlarged front view of the same,

showing its connection with the driving-mechanism for operating it;

Fig. 5, an enlarged detail view of the driving-connections;

Fig. 6, another detail view of the same;

Fig. 7, a detail view showing the arrangement of the reciprocating feeder-bars;

Fig. 8, a view in perspective of one of the feeder-bars; and

Fig. 9, a detail view of the tension-springs which control the position of the pads during the feeding-operation.

Fig. 1 illustrates my invention in connection with a well known type of wire-stitching machine for stitching together strips or sheets of cardboard and other material in the manufacture of various articles of commerce. While I have preferred to herein describe and illustrate my improved feeding-mechanism as applied to a machine of this class, it will be obvious that it might be employed in connection with other types of apparatus such as thread-sewing machines, nailing-machines, printing-presses, folders, binders, or any similar device in which it is required to feed work-blanks or pieces to the operating-mechanism of the machine.

The wire-stitcher illustrated in Fig. 1 is constructed with an overhanging arm A, supporting the stitcher-head A' at its forward end, on which is mounted the bonnet B carrying the staple-forming and driving devices. Mounted on the top of the head A' is the supply-spool W from which the wire *w* delivers over a guide G and thence leads down through the bonnet B to be severed into lengths and formed into staples which are driven through the work and clenched thereagainst to fasten the parts together. The staple-forming and bending-devices may be of any preferred construction, such, for instance, as that shown and described in United States Letters Patent No. 970,461, granted to Thomas A. Briggs, Sept. 20, 1910, but the arrangement of these parts not being essential to the present invention they will not be herein described in detail. Suffice to state that in stitching calendar-pads or for similar work two or more bonnets are usually mounted on the head A' with their stitching devices arranged to operate in unison so that a plurality of staples, as many as may be required, are applied simultaneously to the parts to be fastened together. Beneath the head A' is a work-table T,

shown in Fig. 2 as being constructed in two parts which are foldable into different positions for different classes of work. Extending horizontally through the arm A is the driving-shaft S of the machine, shown in section in Fig. 5, which operates the stitching-mechanism in the bonnets B, and at its rear end is a belt-pulley P, see Fig. 1, adapted for connection with a motor or any other suitable source of power. Preferably, the pulley P is connected to rotate the shaft S through a clutch-mechanism inclosed within its hub *p* and arranged to be operated manually from a hand-lever or foot-treadle. These devices, however, not being essential to the present invention, are not herein shown or described.

Referring to Fig. 5, an eccentric E is mounted fast on the driving-shaft S adjacent the pulley P, see also Fig. 1 and surrounding its periphery in the usual manner is a strap E'. Projecting from the strap E' is a connecting-rod R pivotally jointed at its outer end to an arm or lever L. The lever L is keyed to the end of a shaft O which extends along the side of the arm A toward the front of the machine, being mounted free to turn in the bearings *o* and *k*, see Fig. 1. As the shaft S is rotated to drive the machine the eccentric E acts through the strap E' and connecting-rod R to rock the lever L and thereby oscillate the shaft O. Through this means motion is imparted to the feeding-mechanism at the forward end of the machine by connections which will be later described.

Extending horizontally across the front of the head A' of the machine is a rail or crosshead H which projects outwardly some distance at either side and serves as a means for supporting the bonnets B. As here shown the crosshead H is formed with a horizontal T-slot *h* adapted to receive T-headed projections *h'* on the backs of the bonnets B for holding the latter in place while allowing them to be adjusted laterally in relation to each other. The stitching-mechanism in the bonnets is also adjustable up and down in accordance with the thickness of the work to be operated upon. The construction of this part of the machine is described in detail in my copending application, Serial No. 89,205 filed Apr. 5, 1916, and will not be explained further herein. Fig. 3 shows the crosshead H in plan, and secured to its rear face at either end are two blocks or cleats C, C which extend vertically upward on opposite sides of the arm A, see Fig. 2. Preferably the cleats C, C are fastened to the back of the crosshead H by means of screws *c*, *c* which have their heads countersunk into the rear faces of the cleats to prevent them from projecting therefrom. The backs of the cleats C, C are recessed to provide shoulders *c'*, *c'* on their

outer sides which are formed with vertical grooves *c''*, *c''* extending throughout their length. Abutting the recessed portions of the cleats C, C is a vertical plate D having its side edges formed with tongues *d*, *d* which are fitted to slide in the grooves *c''*, *c''*, see Fig. 3. A horizontal strip or bar F is riveted to the front of the plate D along its lower edge, see Fig. 2, and is formed with its under side inclined downwardly toward the front of the machine. Riveted to the bottom of the strip F are a plurality of forwardly-projecting, apron-like fingers or guards *f*, *f* which are inclined downwardly to bring their ends underneath the bottom of the bonnets B. As illustrated in the plan view, Fig. 3, I provide a series of these guards *f*, *f* spaced slightly apart across the machine to adapt them to individually engage the pads *x* as they feed under the bonnets B. It will be noted from Fig. 2 that the vertical plate D forms the front gate of a magazine or receptacle for the blanks or calendar-pads *x* which are to be fed to the stitching-devices in the bonnets B. The fingers *f* projecting forwardly from the bottom of the plate D act as guides to direct the pads *x* down under the bottom of the bonnets B and prevent them from striking thereagainst as they feed into place beneath the stitching-mechanism as later described. As shown in Fig. 2, the under sides of the bonnets B are inclined upwardly toward the rear of the machine and the inclination of the fingers *f* corresponds thereto. The fingers *f* are also adjustable up and down in relation to the bonnets B to provide for altering their position in accordance with the thickness of the work being fed through the machine. The adjustment of the fingers *f* is effected by sliding the plate D up and down in its grooves *c''* in the cleats C. To render this adjustment more convenient and accurate I provide a screw *d'* at the top of each cleat C formed with a flange *d''* engaging a slot *d'''* in the face of the plate D. By turning the two screws *d'* an equal amount in the same direction the plate D will be caused to slide up or down on the cleats C to regulate the position of the fingers *f* in the manner and for the purpose as more fully described hereinafter.

Referring to Figs. 2 and 9, the lower ends of the cleats C, C are formed with downwardly extending lugs *c''*, *c''* to which is attached the forward end of an inclined web or base-plate J. The plate J serves as the supporting means for the feeding-mechanism proper and at its rearward end is hung on two bars *a*, *a* screwed onto the sides of the arm A and reaching down therefrom, see Figs. 2 and 3. Preferably, the forward end of the plate J is fastened to the cleats C by means of the screws *j*, see Figs. 2 and 9, while its rearward edge is inserted in the

slots a' , a' at the bottom of the bars a , a . The method of attaching the cleats C , C to the crosshead H and the means for supporting the rear end of the plate J adapts the feeding-mechanism for attachment to different types of machines.

Attached to the top of the plate J is a horizontal cross-frame or saddle K , see Figs. 2 and 3, in which is mounted a reciprocating slide M for operating a series of longitudinal feeder-bars N , N . At one side the saddle K is formed with the bearing k , before referred to, which is slidable along the shaft O to adapt the frame to be adjusted longitudinally of the plate J . Through this arrangement the frame K and its associated feeder-bars N may be set in proper relation to the stitching-mechanism of the machine in accordance with the size of the blanks x and the amount of feed required. That is to say, the feeder-device is adjustable as a whole in relation to the operating-mechanism of the machine to adapt it for a wide range of work on blanks of different sizes and shapes, and to provide for regulating the position of the staples in relation to the marginal edges of the pads.

The means for adjusting the saddle K in position on the plate J and for securing it thereto are arranged as follows: Referring to Fig. 4, the longitudinal edges j' , j' of the plate J are beveled off on their under sides and a corresponding beveled shoulder k' is formed on the overhanging bearing-portion k of the saddle K on its right-hand side. On the left-hand side of the saddle K , as viewed in Fig. 4, is a lug k^2 overhanging the edge j^2 of the plate J and formed with a square shoulder k^3 extending upwardly from its under side. Fitted to the vertical shoulder k^3 is a loose key-plate or wedge k^4 having its side beveled off at k^5 to fit the beveled edge j^2 of the plate J . A thumb-screw k^6 extends down through the lug k^2 with its threaded end screwed into the key-plate k^4 to draw it up against the edge of the plate J . When the screw k^6 is loosened the saddle K is free to slide along the top of the plate J to adjust it in position thereon; and by tightening the screw k^6 the bevels k^5 and j^2 are forced into engagement to draw the opposite beveled shoulder k' of the saddle K against the edge j' to clamp the parts together in fixed relation.

Referring to Fig. 3, the frame or saddle K is formed with a series of parallel slots k^7 extending across its under side and adapted to receive the sliding feeder-bars N . In the drawings I have shown a series of five feeder-bars N arranged to slide in the slots k^7 of the saddle K but it is obvious that this number may be increased or reduced as desired in accordance with the size of the blanks to be operated upon. Usually, however, enough bars for the longest pads are

provided and in using the device for shorter blanks as many as necessary become operative thereon.

Referring particularly to Fig. 8, the feeder-bars N are substantially square in cross-section throughout approximately half their length, and extend some distance forward of the saddle K to bring their ends under and in advance of the lower edge of the magazine-plate D , see Fig. 2. Each feeder-bar N is formed with its forwardly projecting end stepped down from the top with a series of upstanding shoulders or ledges n spaced therealong. The shoulders n are designed to engage with the rearward edges of the blanks x during the feeding of the latter as shown in Fig. 2 and more fully described hereinafter. As illustrated in Fig. 8 the forward or lower step n' is preferably the shortest, about one-third the length of the other steps which are arranged with their shoulders n spaced equidistantly. As here shown each bar N has six shoulders n spaced equidistantly apart toward its rearward end, but the number of steps may be varied as required. For instance, with wider pads it might be expedient to provide more steps to adapt the feeder-bars to engage a greater number of the blanks at one time so as to reduce the extent of the feeding motion to the minimum. Referring to Figs. 7 and 8, it will be noted that while each of the first five steps is formed with its top-face horizontal, or parallel with the bottom of the bar; the last or rearmost step has its top slightly inclined upward. The purpose of this is to insure that the last shoulder n^2 at the top of the bar will always engage the edge of the lower pad x in the stack X even though the blanks may be curled or bent upwardly at their ends as shown in Fig. 7. That is to say, it frequently happens that the calendar pads x are curled or warped out of shape somewhat after their leaves are bound together and to provide for this irregularity the upper step in the series is made inclined to accommodate the bend at the edges of the pad.

Referring now to Figs. 2, 3 and 4, the slide M which actuates the feeder-bars N is arranged to reciprocate in a slot k^8 which extends across the saddle K above the bars. It is to be noted, however, that the slide M does not rest on the top of the bars N , but on the contrary is free from any contact therewith for a purpose to be later explained. Referring to Fig. 4, the slide M , which consists merely of a flat plate or bar, is arranged to slide across the top of two bearing-blocks or rests k^9 , k^9 which are driven through slots k^{10} cut crosswise of the saddle K , see also Fig. 2. The rests k^9 hold the slide M in place against the upper face of its slot k^8 in the saddle K so as to allow a clearance between its under side and the

tops of the bars N. The object of providing this clearance is as follows: Referring again to Fig. 8, it will be noted that the bottom n^3 of the forward end of the feeder-bar N is inclined upwardly from the plane of the bottom n^4 of its rearward end. In other words, the bottom of the forward end of the bar is in a plane arranged at an angle to the plane of the bottom of the rearward end. These two planes meet at a point just beneath the upper shoulder n^2 and provide a sort of rocker-bearing for the bar as it rests on the base-plate J. Referring to Fig. 2, the rear end of the bar N is heavier than the forward end so that normally the face n^4 rests against the top of the plate J while the forward, stepped end tilts upwardly therefrom. It will be seen from Figs. 2 and 7 that this leaves a slight clearance between the top of the bar N and the top of its slot k^7 in the saddle K at its rearward end and as before explained the bottom of the slide M is also free from contact with the top of the bar N. The whole purpose of this construction is to provide that while the forward end of the bar N is tilted upward at the rear end of its stroke it is free to rock downward at the opposite end of the stroke, or, in other words, when it is slid forward under the pads x which are feeding beneath the fingers f . The reason for this longitudinal tilting or rocking motion of the bar will be explained more in detail in describing the operation of the complete feeding-mechanism.

The means for reciprocating the cross-slide M to actuate the feed-bars N is arranged as follows: Mounted on the forward end of the oscillating shaft O is a lever O', see Figs. 3, 4, and 6, which is adapted to be connected to the shaft to receive a rocking motion therefrom. Preferably the lever O' has its hub o^2 held in a slotted opening k^{11} in the bearing k , see Fig. 3, so that when the saddle K is adjusted longitudinally of the base-plate J the lever will slide with it along the shaft O. Referring to Figs. 3 and 4, the shaft O is formed on its periphery with a slot o^3 extending some distance rearwardly from its front end to provide a radial shoulder o^4 which serves as a keyway for the lever O'. As shown more particularly in Fig. 6 the lever O' is slotted along one side to form two opposite wings o^5 , o^6 between which is a pawl or key-lever o^6 pivoted on a cross-pin o^7 . Referring to Fig. 4, the lower end of the pawl o^6 is arranged to normally engage the shoulder o^4 of the key-slot o^3 in the shaft O. The opposite end of the pawl o^6 extends beyond the pivot-pin o^7 parallel with and at a slight distance apart from the end of the lever O'. In this way a sort of pincers arrangement is provided so that by pressing the two parts of the lever O' together the pawl o^6 may be released from the shoulder o^4 on the shaft O.

To maintain the pawl o^6 in engagement with the shoulder o^4 I provide a yielding detent-arrangement comprising a plunger-pin o^8 which slides in a bore o^9 at its end. Referring to Fig. 6, a detent-pin o^{10} projects inwardly from the side o^5 of the lever O' to adapt it to be engaged by the rounded end of the plunger o^8 . A coiled spring o^{11} acts to force the plunger o^8 against the detent-pin o^{10} while allowing it to slide in its bore o^9 to adapt its end to ride across the pin. The movement of the pawl o^6 is limited by its upper end striking against the lever O' so that the plunger o^8 is prevented from swinging outwardly beyond the pin o^{10} which maintains it in its bore.

Referring still to Figs. 3, 4 and 6, the pawl o^6 is slotted at o^{12} along its center to receive the end of a flat link O² which is hinged on the pivot-pin o^7 . The opposite end of the link O² is pivoted in a block M' by means of the cross-pin m . The block M' is riveted to the top of the cross-slide M and projects up through an opening k^{12} in the top of the saddle K, see Figs. 3 and 4. Hooked through an opening o^{14} in the end of the link o^2 is a coiled spring o^3 which is anchored at its opposite end to a stud q projecting upwardly from a block Q. The block Q sets in the slot k^8 of the saddle K and is held in place by the shouldered portion q' of its stud q which is driven through a hole in the top of the saddle. A thumb-screw q^2 is threaded through the block Q to adapt its end to contact with the end of the slide M. By adjusting the screw q^2 in its block Q the extent of movement of the slide M under the action of its spring o^3 may be regulated as required.

On the under side of the slide M is a series of obliquely extending slots m' corresponding in number to the feed-bars N. Referring to Fig. 8, each feed-bar is provided on its top with a stud n^5 which is flattened off on its opposite sides to adapt it to fit into one of the inclined slots m' . Through this connection the slots m' act as cam-grooves to impart a longitudinal sliding motion to the feed-bars N when the slide M is reciprocated back and forth in its slot k^8 in the saddle K.

On its forward side the saddle K is provided with an upstanding ledge k^{16} which is formed with a longitudinal slot k^{17} , see Fig. 2. Mounted on the ledge k^{16} to adapt them to be slid therealong are two supports or guides U, U' for the blanks or pads x . The guides U, U' are preferably both of the same construction except that the end one U, see Fig. 3, is provided with a forwardly projecting wing or side u adapted to extend along the side edges of the pads x . Any suitable means may be employed for securing the guides U, U' in position on the saddle K, but as shown in Fig. 2 I prefer

to employ the angle-shaped clamps u' adapted to bind against the ledge k^{16} . The rear faces of the guides U, U' are recessed to receive the front of the ledge k^{16} and provided with tongues u^2 fitted to the slot k^{17} . The clamps u' are held at the top by projections u^3 inserted in holes u^4 while their lower ends straddle the ledge k^{16} and are pinched thereagainst by the thumb-screws u^5 . In this way the guides are adapted to be set in position along the saddle K in accordance with the size of the pads x , and with the side wing u on the guide U acting as a gage to determine the lateral position of the pads in relation to the stitching-devices of the machine. Clamped to the edge of the work-table T by means of a thumb-screw v is a gage V for the calendar-card or back Y, see Fig. 2, which is adapted to regulate the extent of its insertion in under the stitcher-head A'. Preferably the gage V has an upwardly inclined apron or guard v' on its top which acts to guide the card Y in under the front of the plate J to insure that its edge comes into position against the front face of the gage.

Extending forwardly across the top of the plate J are a series of overlapping, flat, ribbon-like springs Z, Z, arranged between the feed-bars N, see Fig. 3. The springs Z are disposed one above another in sets of six and are secured to the plate J at their rearward ends by the screws z . As shown in Fig. 4 the springs Z extend through suitable slots k^{19} in the bottom of the saddle K and are thereby held in alinement. Referring to Fig. 9 the associated springs of each set are graduated in length and their forward ends are bent upwardly to adapt them to bear against the overlapped pads x when the latter feed under the fingers f as more fully explained hereinafter.

The method of operation of the complete feeding-mechanism is as follows: Referring to Fig. 2, the calendar-pads or other blanks x are arranged in a pile or stack X and placed at the rear of the head a' of the machine with their forward edges alined against the back-plate D. The clamping-screw k^6 at the left-hand end of the saddle K, see Figs. 3 and 4, is first released and the saddle and its connected devices are then slid forward on the plate J until the gages U, U' are brought up against the rear edges of the pads x . The gage U is now adjusted in position longitudinally of the saddle K to bring its side-wing u against the side edges of the pads to aline them with the stitching-mechanism in the bonnets B so that the wire staples will be inserted in appropriate positions along their margins. It will be understood, of course, that the bonnets B are also adjusted laterally of the machine to provide for the proper spacing between the staples. The card-gage V is now set in position on

the table T in accordance with the amount of overlap that each pad x is to have on its calendar-back Y and the machine is then ready to operate.

Before operating the machine under power it is generally the practice to feed the first pad into position by hand to insure that the mechanism operates properly to position the work as required. This manual operation of the feeding-mechanism is easily accomplished by rocking the hand-lever O' back and forth while holding its pawl o^6 disengaged from the keyway o^4 on the shaft O. As the lever O' is oscillated its motion is communicated through the link O² to the slide M and the latter will thereby be reciprocated in its slot k^8 in the saddle K. As the slide M moves back and forth across the saddle K the engagement of its cam-slots m' with the studs n^5 on the feed-bars N imparts to the latter a longitudinal reciprocation along the plate J. The stop-screw q^2 in the saddle K, see Fig. 4, is set to limit the movement of the slide M to regulate the stroke of the feed-bars N so that the latter will traverse a distance slightly greater than the length of the steps at their forward ends. This provides that when the bars N first feed forward their upper shoulders n^2 will engage with the rear edge of the lower pad x in the stack X to carry it forward into position to be engaged by the next lower shoulder n at the subsequent forward stroke of the bars. That is to say, as the bars N return to the rearward end of their stroke the first or upper shoulder n^2 will be carried back a slight distance beyond the rear edge of the next lower pad x , see Fig. 2, while the next lower shoulder n will also be brought back beyond the rearward of the edge of the pad x which has first been fed forward. In this way the first shoulder n^2 is made to engage the edge of a new pad at each forward stroke and each of the other shoulders n also comes into engagement with a new pad, so that eventually the bars N will feed forward six pads or blanks at every stroke.

Referring to Fig. 7, it has before been explained that the upper step on the feed-bars N is set at an angle so that the whole stack of blanks is allowed to drop sufficiently to bring the rear edge of the lower pad opposite the shoulder n^2 even when the edges are curled or bent up from a flat plane. Fig. 7 also illustrates the manner in which the leaf-like springs Z, Z are bent upwardly at their forward ends to progressively bear against the guiding-fingers f . Referring now to Fig. 9, as the pads x feed forward under the fingers f the springs Z are depressed while acting to hold the pads pressed together in overlapped relation to prevent their accidental displacement. After the six pads have been fed forward

from the stack X the first or bottom one x' will be brought into position with its leading edge beneath the stitching-mechanism in the bonnets B as shown in Fig. 2. Meanwhile, the rearward ends of the pads will all be held tightly pressed one against the other in overlapped relation by the ends of the springs Z, see Fig. 9. As before explained the weight of the rear or butt ends of the bars N normally maintains them with their forward ends slightly canted up and bearing against the under sides of the pads. When, however, the feed-bars start to move back to the opposite end of their stroke their forward ends will have a tendency to tilt downwardly to free them from contact with the pads. In other words, the feeding pads are always maintained pressed upwardly against the fingers f by the springs Z and the inclined under faces of the bars N allow them to rock slightly on the plate J to free them from the under sides of the pads. In this way all undue friction between the pads and the feed-bars is prevented so that the bars will be retracted without any tendency to draw the pads back after they have once been fed forward. The provision for raising and lowering the plate D allows for setting the fingers f to secure their coaction with the springs Z in accordance with the thickness of the pads and the amount of their overlap, so that the positioning of the pads in relation to the feed-bars may be adjusted for different varieties of work.

After the first pad x' has been fed into position by hand as shown in Fig. 2 the whole mechanism is set in motion to accomplish the work automatically. Power is applied to the machine by connecting the belt-driven pulley P with the main driving-shaft S, see Fig. 1, through the means of the clutch-devices, before referred to, but not herein shown and described. The rotation of the shaft S causes the eccentric E to transmit an oscillating motion to the lever L to rock the feeder-shaft O through an arc of approximately forty-five degrees. As the shaft O turns in the direction indicated by the arrow 2, Fig. 4, the spring O^3 acts through the link O^2 to rock the lever O' in the same direction with the pawl o^6 maintained in engagement with the shoulder o^4 on the shaft. The spring O^3 also acts through the connection of the link O^2 with the slide M to move the latter to the left until its end brings up against the limiting-screw q^2 . The movement of the shaft O in this direction, as above described, is somewhat in excess of what is required to allow a full stroke of the slide M and therefore the shaft continues to rock a slight distance farther than the lever O' with the shoulder o^4 leaving the end of the pawl o^6 . This causes a slight pause at the end of the stroke of the slide M, but when the motion

of the shaft O is reversed and it turns back in the opposite direction its shoulder immediately picks up the pawl o^6 , which is maintained in engaging position by the detent-pin o^8 , and the lever O' is thereby locked to the shaft to cause it to turn therewith. As the lever O' is thus rocked back in the direction opposite to that indicated by the arrow 2 in Fig. 4 the link O^2 will draw the slide M to the right against the action of the spring O^3 . In this way a substantially continuous reciprocation of the slide M is effected with only a slight pause at the end of its inward stroke.

It is obvious that the lever O' might be connected to the shaft O positively so as to receive its full oscillation in both directions, but with the present means I am enabled to adjust the length of stroke of the slide M so as to regulate the extent of movement of the feed-bars N which are reciprocated therefrom. In this way the extent of feed of the pads or blanks x may be adjusted as required in accordance with different varieties of work and to regulate the positioning of the staples in relation to the marginal edges of the blanks. A further and most important purpose of the releasable connection between the shaft O and the slide M is to guard against accidental injury to the mechanism. It occasionally happens that some of the pads or blanks are imperfectly bound or assembled and this sometimes results in their getting caught or jammed in the machine. Should the blanks fail to feed properly or become jammed under the head A' , with the present arrangement the feeding-mechanism will automatically cease operating until the machine has been cleared. It will be observed by reference to Fig. 3 that the feed-bars N are carried forward by the movement of the slide M to the left. The stroke of the slide M in this direction is effected solely by the action of the spring O^3 and not positively from the movement of the shaft O. Therefore, should the feeding-mechanism become clogged and the bars N be hindered in their movement the slide M simply ceases from movement under the action of the spring O^3 until the operator determines the trouble and removes the obstruction. With the slide M held from movement the shaft O still continues to oscillate but the lever O' is not carried back and forth with it. Should the bars N meet with the obstruction at the forward end of their stroke they will be carried back to the opposite end of the traverse, but as long as their forward motion is restricted there will be no tendency to positively force them against the obstruction. Through this arrangement the feeding-mechanism is protected against undue stress or strain which might result in injury to its parts. For instance, if the slide M were connected to

be reciprocated positively from the shaft O there would be danger of shearing off the studs n^5 on the feed-bars N, should the latter be held from movement, or some of the other parts might be damaged and bent out of alinement. It is also to be noted that the provision for allowing the forward ends of the feed-bars N to rock downwardly slightly toward the plate J adapts them for normally freeing themselves from any slight obstruction due to irregularities in the thickness of the pads. The releasable detent-mechanism on the pawl o^6 of the lever O' also provides a convenient means for arresting the operation of the feeding-mechanism manually when required. That is to say, when it is desired to stop the feeding of the pads the pawl o^6 is operated to disengage it from the shoulder o^4 on the shaft O. Under this action the detent-plunger o^5 will ride across the pin o^{10} and engaging the outer side thereof will hold the pawl o^6 free from the shaft O so that the latter may continue to oscillate without operating the slide M.

As the slide M is reciprocated during the continuous operation of the machine the feed-bars N are slid back and forth to feed the blanks x forward to the stitching-mechanism of the machine. The timing of the feeding-mechanism is so synchronized with the operation of the stitching-devices that each time a pad x' is delivered with its forward end under the bonnets B the staple-driving devices will descend and apply the staples to fasten the pad to the card Y which has previously been inserted in place on the table T. As shown in Fig. 2 the pad x' is delivered in position to the stitching-mechanism slightly elevated above the table T, but as the staple-driver, not here shown, slides downward it presses the margin of the pad against the card Y while the end of the under spring Z is depressed to allow for this displacement. As the staples are driven down through the work the clencher-devices b operate through an opening t in the table T in the usual manner to bend over the legs of the staples and clench them in place. As soon as this operation is accomplished the operator withdraws the card Y with its attached pad and inserts a new card in place under the head A' of the machine. Meanwhile the feed-bars N are being withdrawn from their advanced position and immediately they start forward again to feed the next pad x^2 into place after which the stitching-operation is repeated again in the same manner as just described. In this way a practically continuous feeding of the blanks is maintained throughout the operation of the machine with the supply of pads being replenished at intervals as required.

It will be observed that my improved feeding-mechanism is extremely simple in

construction and method of operation while being especially efficient for the purpose required. The arrangement of the mechanism is such as to guard against injury or derangement of the parts and to provide for long wear. The device is also capable of adjustment for different varieties of work and is universally applicable to various types of machines. Besides being adapted for the class of work herein described it is also applicable to machines used in other arts and could be arranged to operate for feeding various and sundry forms of articles or blanks which are too diversified to herein enumerate.

Various modifications might be made in the construction and arrangement of the parts of the device and in the manner of its attachment to the machine without departing from the spirit or scope of the invention; therefore, without limiting myself to the exact embodiment shown, what I claim is:—

1. In a feeding-mechanism for wire-stitchers or similar machines, the combination with means for supporting a stack of blanks, of a reciprocating four-motion separator operating beneath the stack to engage a plurality of the blanks at their rearward edges to feed them forward in series in overlapped relation with a step-by-step motion to bring them successively into position to be operated upon.

2. In a feeding-mechanism for wire-stitchers or similar machines, the combination with means for supporting a stack of blanks, of a reciprocating four-motion separator for engaging a plurality of the blanks at their rearward edges to feed them forward from the bottom of the stack in overlapped relation to bring them successively into position to be operated upon.

3. In a feeding-mechanism for wire-stitchers or similar machines, the combination with means for guiding pads or blanks in a stack, of a reciprocating four-motion separator for engaging a plurality of the blanks at their rearward edges to feed them forward from the bottom of the stack in overlapped relation with a step-by-step motion to bring them successively into position to be operated upon.

4. In a feeder for wire-stitchers or similar machines, a reciprocating four-motion separator comprising means operating beneath the blanks for progressively engaging them at their rearmost edges to carry them forward in overlapped relation with a step-by-step motion to deliver them successively into position to be operated upon.

5. In a feeder for wire-stitchers or similar machines, a reciprocating four-motion separator comprising means operating beneath the blanks for engaging a plurality of them at their rearmost edges, and means for

operating the blank engaging means with a step-by-step motion to feed forward a series of blanks at the same time in overlapped relation to deliver them successively into position to be operated upon.

6. In a feeder for wire-stitchers or similar machines, a reciprocating four-motion separator, means for progressively engaging the rearward edges of the blanks to carry them forward from a stack in overlapped relation, and means for operating the blank-engaging means intermittently to feed a plurality of the blanks forward at the same time to a predetermined extent whereby the blanks are successively brought into position to be operated upon.

7. In a feeding-mechanism for feeding blanks from a supply arranged in a pile or stack, the combination in a reciprocating four-motion separator, of means operating beneath the stack for successively engaging the blanks at their rearward edges to feed them forward progressively from the stack in overlapped relation, and means to operate the feeding-means to cause it to carry forward a plurality of the blanks at the same time and to then engage and carry forward another series of the blanks whereby the latter are advanced with a step-by-step movement to deliver them into position one at a time.

8. In a feeding-mechanism for feeding blanks from a pile or stack, the combination in a reciprocating four-motion separator, of means for engaging the edges of the blanks to successively feed them forward from the stack, said means adapted to engage a plurality of the blanks in overlapped relation in series after they have been fed forward from the stack, and means to operate the feeding-means to maintain a continuous step-by-step movement of the blanks to deliver them progressively into operative position one at a time.

9. In a feeding-mechanism for feeding blanks from a pile or stack, the combination in a reciprocating four-motion separator, of means for engaging the blanks successively at their edges to feed them forward from the stack one at a time into overlapped relation one with another, and means for operating the feeding-means to carry a whole series of the overlapped blanks forward at the same time to maintain a continuous step-by-step movement of the blanks whereby they are delivered into position one at a time.

10. In a feeding-mechanism for feeding blanks from a pile or stack, the combination with reciprocable means operating beneath the blanks to engage them at their edges to feed them forward from the stack, of means for reciprocating the feeding-means to maintain a continuous step-by-step movement of the blanks in series to cause them to advance

in overlapped relation whereby they are delivered into position one at a time.

11. In a feeding-mechanism for feeding blanks from a pile or stack, the combination in a reciprocating four-motion separator, of a feeding-means arranged beneath the blanks and having a series of stepped shoulders adapted to engage their rearward edges, and means for actuating the feeding-means to cause it to successively feed the blanks forward from the stack into overlapped relation and to then engage with a series of the blanks to carry them forward all at the same time whereby the blanks are progressively delivered into position one at a time.

12. In a feeding-mechanism for feeding blanks from a pile or stack, the combination in a reciprocating four-motion separator, of means operating beneath the blanks for engaging their edges to successively feed them forward from the stack, and means to operate the feeding-means to feed each blank forward a predetermined distance into position to be again advanced when the next blank is fed from the stack to provide for advancing a plurality of the blanks in series in overlapped relation with a step-by-step motion.

13. In a feeding-mechanism for feeding blanks from a pile or stack, the combination in a reciprocating four-motion separator, of means operating beneath the blanks for engaging their edges to feed them forward from the stack one after another, and means to operate the feeding-means to cause it to feed each blank a predetermined distance and to then feed the next blank forward while also feeding the first blank again to the same extent whereby a whole series of the blanks are fed forward at the same time in overlapped relation to maintain a continuous, progressive delivery thereof.

14. In a feeding-mechanism for feeding blanks from a pile or stack, the combination in a reciprocating four-motion separator, of means operating beneath the blanks for engaging their edges to feed them forward from the stack one after another, and means to operate the feeding-means to cause it to feed one blank forward and to then return and feed the next blank forward while also engaging the blank first fed to advance it again to the same extent, whereby a plurality of the blanks are advanced from the stack into overlapped relation and then fed forward at the same time in series with a step-by-step motion.

15. In a feeding-mechanism for feeding blanks from a pile or stack, the combination in a reciprocating four-motion separator, of means operating beneath the stack for successively selecting the blanks one at a time to feed them forward therefrom, and means to operate said feeding-means to advance

the blanks progressively in series in overlapped relation with a step-by-step motion to deliver them into position while maintaining a continuous feeding of the blanks from the supply.

16. In a feeding-mechanism for feeding blanks from a pile or stack, the combination in a reciprocating four-motion separator, of means operating beneath the stack for engaging a plurality of the blanks at their rearward edges, and means for operating the feeding-means to select the blanks from the stack one at a time to feed them progressively forward into overlapped relation and to advance a plurality of the overlapping blanks in series with a step-by-step motion to maintain a continuous feeding of the blanks from the supply.

17. In a feeding-mechanism for feeding blanks from a pile or stack, the combination with means reciprocable beneath the stack for engaging the edges of the blanks, of means for reciprocating said means to cause it to advance each blank a predetermined distance and to then return and advance the next blank to the same extent while also again advancing the first blank to cause the blanks to feed forward in series in overlapped relation with a step-by-step motion.

18. In a feeding-mechanism for feeding blanks from a supply, the combination with means reciprocable beneath the supply for engaging the blanks at their edges, of resilient means for moving the feeding-means in one direction to feed the blanks forward in overlapped relation, and continuously-operated means for positively moving the feeding-means in the opposite direction to return it to its initial position to adapt it to be moved forward again by the resilient means.

19. In a feeding-mechanism for feeding blanks from a supply, the combination with a feeding-element adapted to engage a plurality of the blanks at their edges, of a spring for moving the feeding-element in one direction to feed the blanks forward, and continuously-operated means for positively moving the feeding-element in the opposite direction to return it to its initial position to adapt it to be carried forward again by the spring.

20. In a feeding-mechanism for feeding blanks from a supply, the combination with a reciprocatable feed-bar, of a slide for reciprocating the feed-bar, an oscillating shaft, means for connecting the shaft to move the slide in one direction only and a spring for moving the slide in the opposite direction.

21. In a feeding-mechanism, the combination with a reciprocatable feed-bar, of a slide for reciprocating the bar, an oscillating shaft, a lever on said shaft, a pawl for connecting said lever to be rocked in one di-

rection by the shaft, a link connecting the lever to move the slide when the lever is oscillated by the shaft, and a spring for moving the slide in the opposite direction during the reverse oscillation of the shaft.

22. In a feeding-mechanism for feeding blanks from a supply, the combination with a reciprocatable feeding-element for engaging the blanks, a spring for reciprocating the feeding-element in one direction to feed the blanks forward, means for adjusting the extent of forward movement of the feeding-element, and means for positively moving the feeding-element in the opposite direction to withdraw it to its initial position.

23. In a feeding-mechanism for feeding blanks from a supply, the combination with a reciprocatable feeding-element for engaging the blanks, of a slide for reciprocating the feeding-element, an oscillating shaft, a lever mounted on said shaft, means connecting said lever with the slide, and means for connecting the lever to be rocked from the shaft in one direction while allowing the shaft to oscillate free from the lever in the opposite direction.

24. In a feeding-mechanism for feeding blanks from a supply, the combination with a reciprocatable feeding-element for engaging the blanks, of a slide for reciprocating said feeding-element, a spring for moving the slide in one direction to carry the blanks forward, an oscillating shaft, a lever on said shaft connected with the slide, and means for connecting said lever to the shaft to be rocked therefrom to cause the slide to be moved against the action of its spring while allowing the shaft to turn free of the lever when oscillating in the opposite direction.

25. In a feeding-mechanism for feeding blanks, the combination with a plurality of sliding feed-bars for engaging the blanks, of a slide connected to reciprocate the bars, a spring for moving the slide in one direction to slide the bars forward, an oscillating shaft, and means for connecting the shaft to move the slide to return the bars to their retracted position while allowing the slide to advance the bars solely under the action of its spring.

26. In a feeding-mechanism for feeding blanks, the combination with feeding-means for engaging the blanks, of a slide for reciprocating the feeding-means, a spring for moving the slide in one direction to advance the feeding-means, an oscillating shaft, a lever mounted on the shaft and connected with the slide, manually-controlled means for connecting the lever with the shaft to cause it to move the slide against the action of its spring, and detent-means for normally maintaining the lever-connecting means operative.

27. In a feeding-mechanism for feeding

blanks from a pile or stack, the combination with a feeding-element having a series of stepped shoulders for engaging with the edges of the blanks as the latter are supported thereon in overlapped relation, of means to reciprocate the feeding-element to cause it to successively advance the blanks from the stack from step to step thereon and to then engage a plurality of the blanks to feed them forward in series all at the same time.

28. In a feeding-mechanism for feeding blanks from a pile or stack, the combination with a series of parallel bars having stepped shoulders for engaging the rearward edges of a series of blanks arranged in overlapped relation thereon, of means for reciprocating the bars to feed the blanks successively forward from the stack and to advance them from one step to another with a plurality of the blanks all feeding forward at the same time.

29. In a feeding-mechanism for feeding blanks from a pile or stack, the combination with a series of parallel bars formed with stepped shoulders for engaging the rearward edges of a series of blanks supported thereon in overlapped relation, of means to reciprocate the bars to cause them to feed the blanks successively forward from the stack and to advance them from step to step, and means to maintain the blanks in operative relation with the shoulders on the bars.

30. In a feeding-mechanism for feeding blanks from a pile or stack, the combination with a series of parallel bars formed with stepped shoulders for engaging the rearward edges of a series of blanks arranged in overlapped relation thereon, of means to reciprocate the bars to feed the blanks forward from the stack and to advance them from step to step therealong, and means for preventing the blanks from being withdrawn from their advanced position during the retraction of the bars.

31. In a feeding-mechanism for feeding blanks from a pile or stack, the combination with a series of parallel bars formed with stepped shoulders for engaging the rearward edges of a series of blanks arranged in overlapped relation thereon, of means to reciprocate the bars to feed the blanks forward from the stack and to advance them from step to step therealong, guiding-means for maintaining the blanks pressed into contact with the bars, and means for adjusting the guiding-means in relation to the bars.

32. In a feeding-mechanism for feeding blanks from a pile or stack, the combination with a series of parallel bars formed with stepped shoulders for engaging the rearward edges of a series of blanks arranged in overlapped relation thereon, of means to reciprocate the bars to feed the blanks forward

from the stack and to advance them from step to step therealong, of a series of fingers overlying the stepped portions of the bars, and means to raise or lower the fingers in unison to adjust their relation to the bars.

33. In a feeding-mechanism for feeding blanks from a pile or stack, the combination with a series of parallel bars formed with stepped shoulders for engaging the rearward edges of a series of blanks arranged in overlapped relation thereon, of means to reciprocate the bars to advance the blanks from step to step therealong, a vertical gate-plate against which the forward edges of the blanks are adapted to be stacked, fingers at the bottom of the gate for pressing the blanks against the bars, and means to slide the gate up and down to adjust the position of the fingers.

34. In a feeding-mechanism for feeding blanks from a pile or stack, the combination with a series of sliding feed-bars having stepped shoulders for engaging the edges of the blanks, means for reciprocating the bars to advance the blanks from step to step therealong, guiding-means for maintaining the blanks in engagement with the bars, and a series of springs adapted to press against the blanks to restrain their rearward movement when the feed-bars are retracted.

35. In a feeding-mechanism for feeding blanks from a pile or stack, the combination with a series of feed-bars having stepped shoulders for engaging the rearward edges of the blanks, of means to reciprocate the bars to advance the blanks from step to step therealong, guiding-means for holding the blanks against the bars, means for pressing the blanks against the guiding-means to prevent them from being retracted during the rearward movement of the bars, and means for allowing the bars to rock at their forward ends during their withdrawal from the blanks to free them from interference therewith.

36. In a feeding-mechanism for feeding blanks to the operating mechanism of a machine, the combination with a support, of a series of reciprocatable feed-bars mounted to slide thereon, means connected with the feed-bars to reciprocate them on the support, and means to adjust the feed-bars and the reciprocating-means as a whole along the support to regulate their position in relation to the operating mechanism of the machine.

37. In a feeding-mechanism for wire-stitchers or similar machines, the combination with the operating-mechanism thereof, of a series of sliding feed-bars for feeding blanks thereto, means connected to reciprocate the feed-bars, and means for adjusting the feed-bars and their connected reciprocating-means as a whole in relation to the operating mechanism of the machine to reg-

ulate the positioning of the blanks in delivering them thereto.

38. In a feeding-mechanism for wire-stitchers or similar machines, the combination with the stitcher-head carrying the stitching-mechanism, of a support arranged adjacent thereto, feeding-means on the support, means also mounted on the support for actuating the feeding-means, and means to adjust the feeding-means and its connected actuating-means bodily along the support to regulate its position with respect to the stitching-mechanism.

39. In a feeding-mechanism for wire-stitching machines, the combination with the stitcher-head carrying the stitching-mechanism, of a plate supported adjacent thereto, a saddle adjustable along the plate and adapted to be clamped thereon, a series of feed-bars mounted to slide on the plate, a slide mounted in the saddle and connected

to reciprocate the feed-bars, and means to operate the slide from a going part of the machine.

40. In a feeding-mechanism for wire-stitchers, the combination with the stitcher-head, of a support adapted to be attached thereto, a series of feed-bars mounted to slide on the support, a frame adjustable along the support toward and away from the stitcher-head, a slide mounted to slide in the frame and connected to reciprocate the feed-bars, and means to connect the slide with the driving-mechanism of the machine while allowing it to be adjusted along its support.

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

ARTHUR H. MAYNARD.

Witnesses:

MINNIE B. LOOMIS,
WILLIAM M. OWEN.