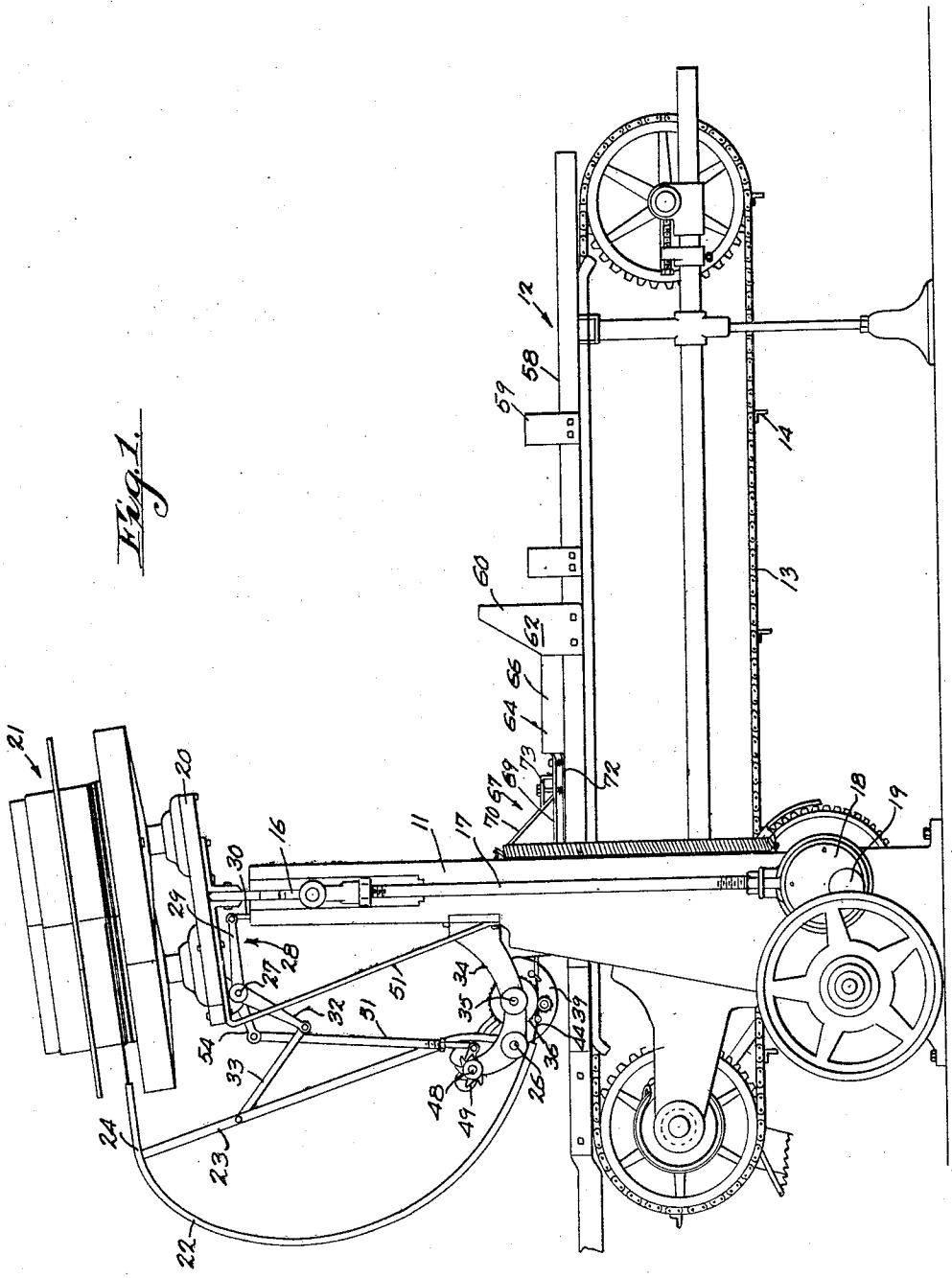
May 16, 1933. G. E. BREECE 1,909,451

STAPLING MACHINE

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Fig. 1.



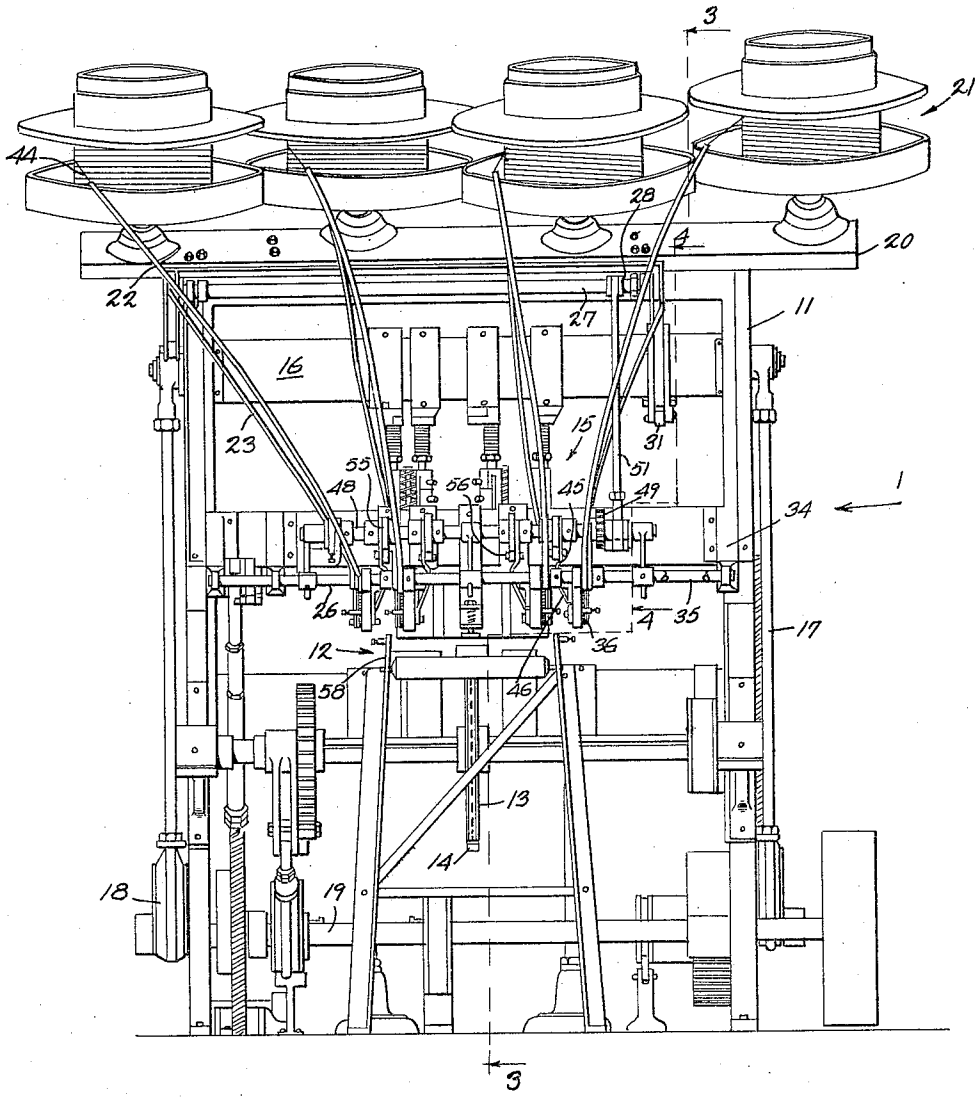
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Fig. 2.



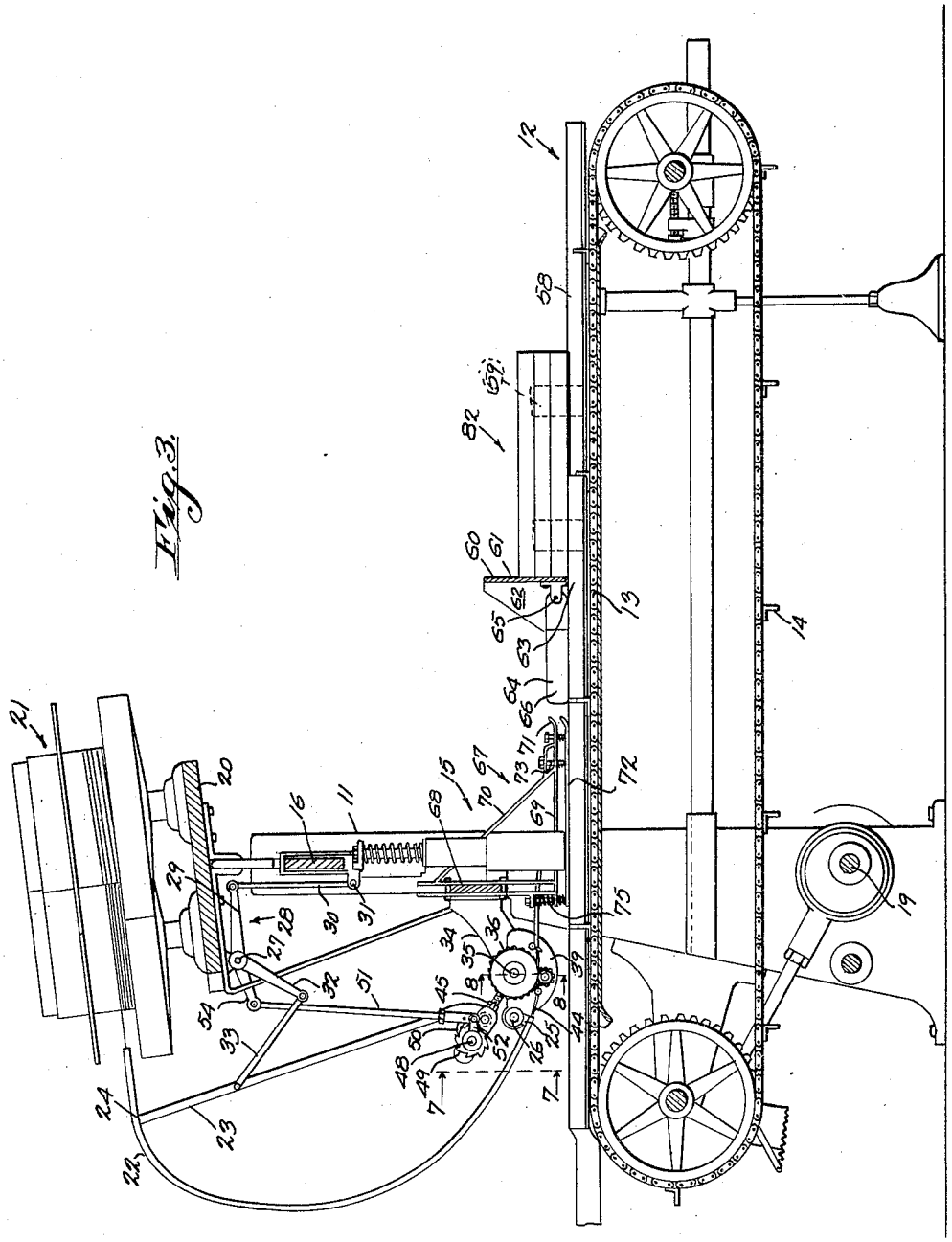
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Fig. 3.



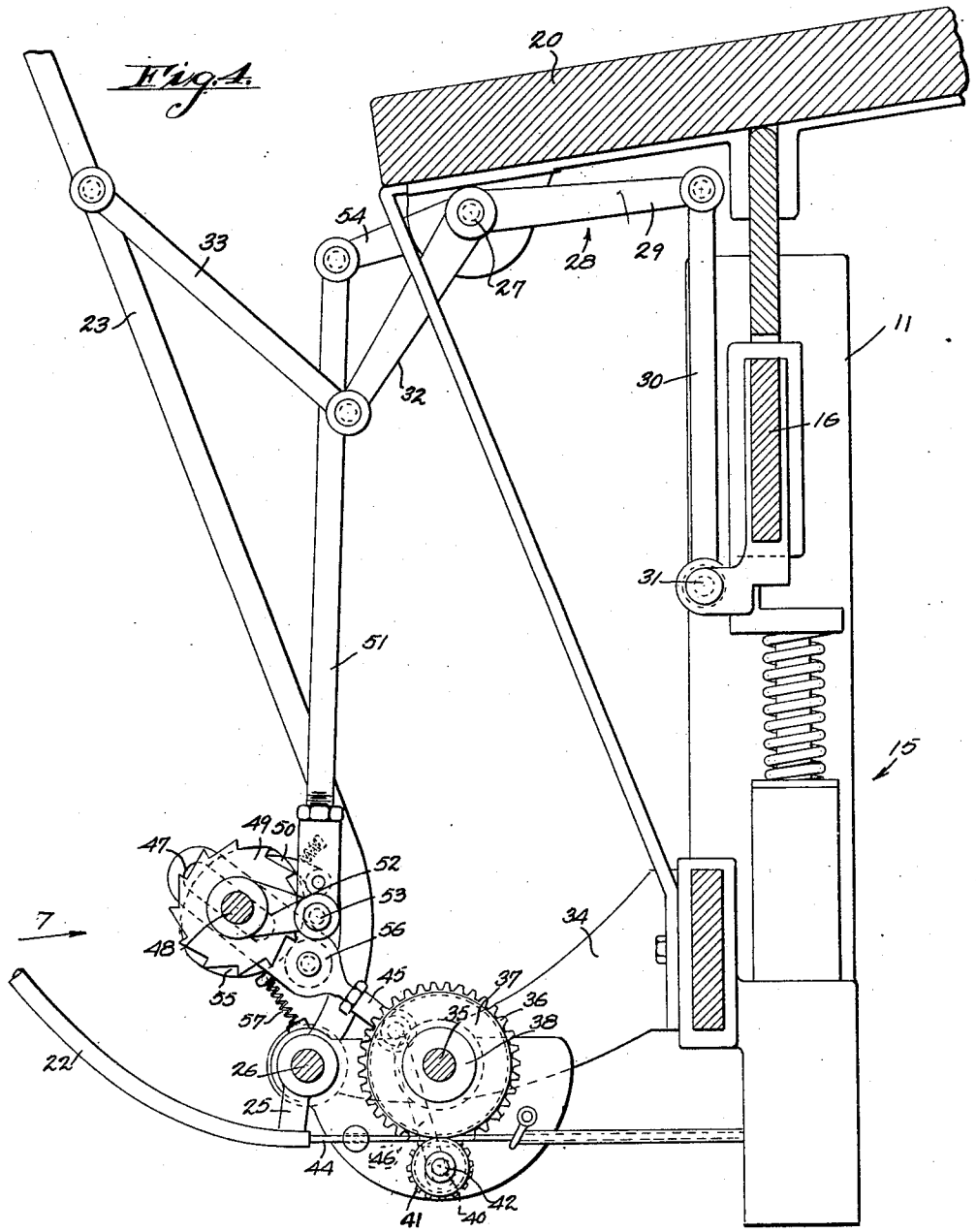
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Fig. 4.



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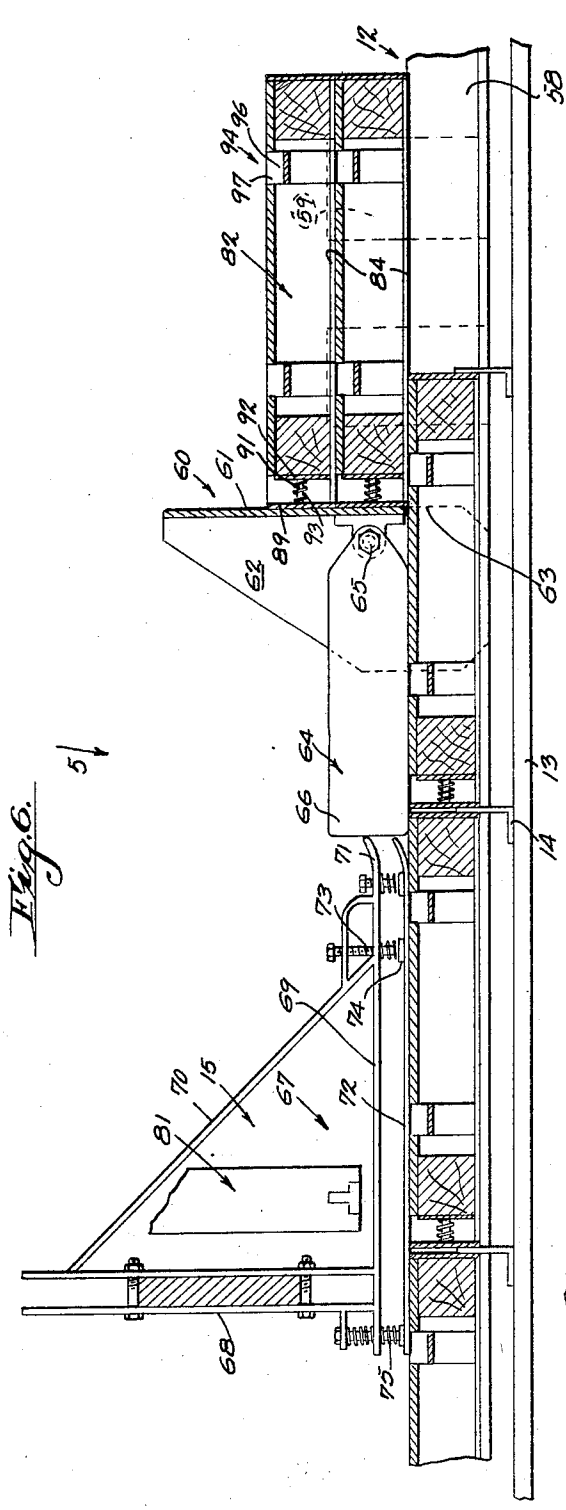


Fig. 6.

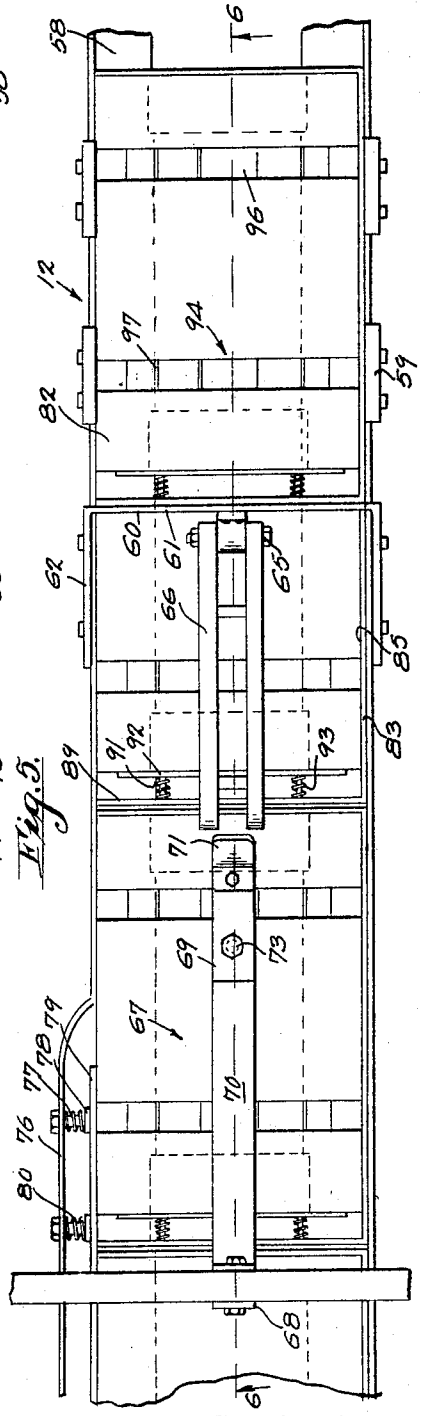


Fig. 5.

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STAPLING MACHINE

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Fig. 7.

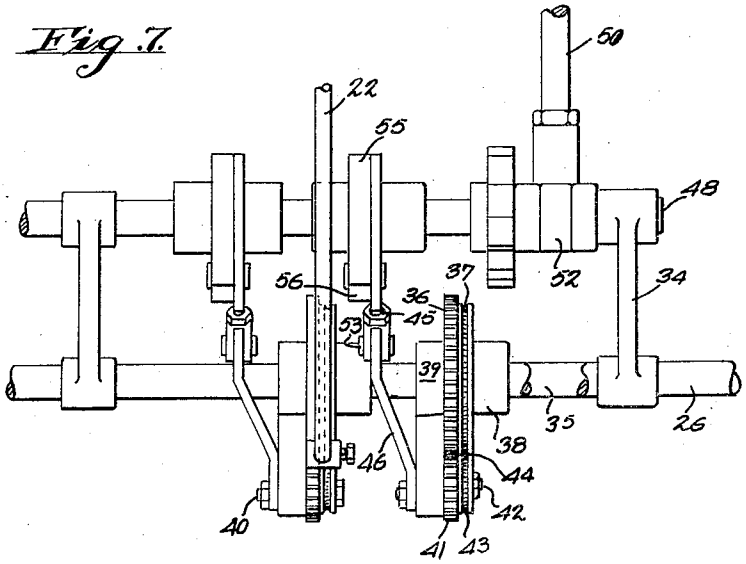


Fig. 9.

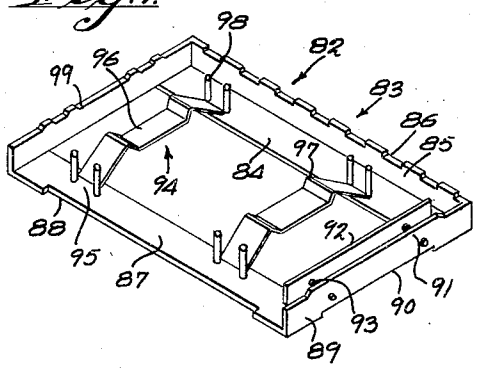


Fig. 8.

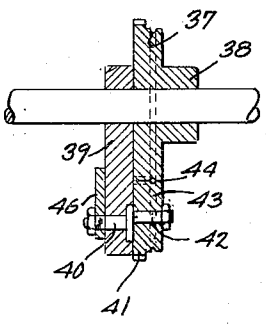
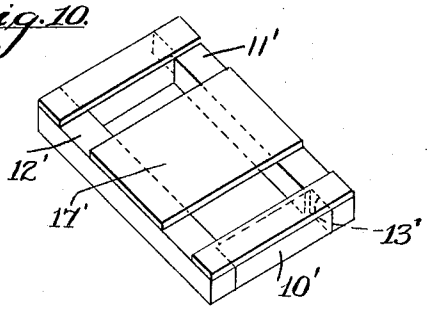


Fig. 10.



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UNITED STATES PATENT OFFICE

GEORGE E. BREECE, OF ALBUQUERQUE, NEW MEXICO

STAPLING MACHINE

Application filed February 20, 1931. Serial No. 517,181.

My invention relates to a stapling machine such as used for stapling crates and the like and in which wire from coils is fed to the machine and forms the staples. My invention is applied as an improvement on what are known as chain feed stapling machines in which the sides or parts of the box crate are fed to the machine in an assembled position and may then have the staples driven into these assembled parts of the crate.

With this type of machine one of the objects and features of my invention is in the feeding of the stapling wire and comprises an arrangement for periodically gripping the wire and feeding it forwardly and at substantially the same time giving a rocking motion to guide tubes carrying the wire, the feed of the wire being synchronized with part of the machine for forming the staples and driving these.

A still further object and feature of my invention is a construction by which the mounting of the spools of wire and the mechanism for feeding the wire to the stapling machine may be incorporated with the parts of a standard and now used machine and in which I may make use of a driven shaft to form the drive mechanism for feeding the wire.

A further detailed object and feature of my invention in connection with the wire feeding is the employment of a roughened or knurled wheel driven by a shaft, there being one wheel for each of the wires to be fed, and each of these wheels has a gear wheel in connection therewith. The gear wheel meshes with a small pinion driven thereby and this pinion has a small knurled wheel adapted to grip the opposite side of the wire from the driven knurled wheel and thereby, when both of these wheels are in feeding relation, to feed the wire. The small knurled wheel is mounted on a crank type of shaft and is given an oscillating and partly reciprocating movement by means of a cam actuated in a step by step manner by a pawl and ratchet device, this operation being linked with a cross beam of the stapling machine to work in synchronism with the driving of the staples. The retraction of the small gear wheel, which is mounted on a radius arm, from the shaft carrying the main knurled wheel releases the grip on the wire and a reverse motion toward the machine gives a grip for feeding the wire. The driven shaft for operating the wire feed is actuated by a pawl and ratchet movement interconnected with operating parts of the machine.

A further object of my invention relates in the structure of the machine to hold the form in place until the crate side pieces are stapled together and which comprises a pressure device to bring a weight on the top of the forms, such weight, preferably, being pivotally mounted, and a spring pressed plate to bear on the top of the forms while they are passing through the stapling part of the machine.

A further object and feature of my invention relates to the forms or holders for the crate sides and which are adapted to form supports and holding frames for the individual elements of the crate sides and to retain these in position whereby the forms with the crate side elements therein may be fed through the stapling machine and these various elements held in the desired position during such feeding to effect proper stapling of the various members.

The forms used comprise a tray like structure with a marginal rim on three sides, the other side having no rim, and with a pressure plate spring pressed from one end for pressing the elements of the crate side to one end of the tray. A pair of spring like straps hold some of the component parts of the crate side in position and, in addition, a plurality of pins are used to engage in openings in the elements of the crate sides and hold these properly spaced apart.

My invention in its various features is illustrated in the accompanying drawings in which the adaptation of my device to a known machine is illustrated.

Fig. 1 is a side elevation of the machine taken in the direction of the arrow 1 of Fig. 2.

Fig. 2 is an end elevation taken in the direction of the arrow 2 of Fig. 1.

Fig. 3 is a longitudinal section taken on

the line 3—3 of Fig. 2 in the direction of the arrows.

Fig. 4 is a detailed vertical section taken on the line 4—4 of Fig. 2 in the direction of the arrows, omitting parts which would cause confusion.

Fig. 5 is a plan of part of the table or feeding end of the machine taken in the direction of the arrow 5 of Fig. 6, showing the guides for the forms carrying the crate material.

Fig. 6 is a longitudinal section taken on the line 6—6 of Fig. 5 in the direction of the arrows.

Fig. 7 is a detail transverse section on the line 7—7 of Fig. 3 in the direction of the arrows, omitting parts which might cause confusion in the drawings.

Fig. 8 is a detail transverse section on the line 8—8 of Fig. 3 in the direction of the arrows, omitting certain parts.

Fig. 9 is a perspective view of one of the forms for holding the crate elements.

Fig. 10 is a perspective view of one type of a crate side to fit in the crate forms.

Referring to the general construction of the machine, this has side columns or posts 11 spaced apart and between these there extends a table 12, and underneath this table there operates an endless chain 13. This chain has a series of pusher devices 14 attached thereto, these pusher devices in the upper run extending upwardly into slots in the table. The stapling head 15 has a reciprocating vertical motion, being carried by a cross head or cross beam 16, this being operated by rods 17 on opposite sides of the machine driven by an eccentric 18 from the driven shaft 19. These and other features of the drive mechanism are parts of the old and standard machine.

In my arrangement I employ a platform 20 supported from the columns or posts 11 and on this there are mounted a series of spools 21, these spools carrying the wire for the stapling. A series of spools are shown to feed wire for each line of staples. The wire from each spool passes through a guide tube 22, which tube is attached to a rocking lever 23 at the top as indicated at 24, and the lower end of each tube is supported by a bracket 25 mounted on a pivot shaft 26. The tube is given a rocking motion by means of the rock shaft 27 (note particularly Fig. 4) which is mounted underneath the platform 20 and which has a bell crank 28 connected thereto. Each bell crank has an arm 29 which has a pivotal connection to a link 30. These links at their lower end have a pivotal attachment 31 to the cross head 16 and, therefore, in the up and down motion of this cross head the end 32 of the bell crank is given a rocking motion, and by means of the link 33 attached thereto and also attached to the rod 23 this rod and the guide tube are given a slight rocking action.

The wire feeding mechanism employs a bracket 34 attached to each column or post and in such bracket there is journaled a wire feeding shaft 35. This shaft has a gear 36 connected thereto for each wire to be fed and directly connected to each of the gears there is a roughened or knurled wheel 37 (note the section of Fig. 8) this wheel having a hub 38. A radius arm 39 is rotatably mounted on the shaft 35 and carries a crank shaft 40 mounted therein. This crank shaft has a geared pinion 41 thereon which has teeth meshing with the teeth of the gear 36. The crank end 42 of this shaft carries a small knurled or roughened wheel 43. This wheel and the wheel 37 have complementary grooves for the wire 44.

The mechanism for oscillating the radius arm 39 and periodically bringing the small knurled wheel 43 into feeding engagement with the knurled wheel 37 is as follows, having reference particularly to Fig. 4:

An adjustable reciprocating rod 45 has an arm 46 connected thereto, which arm is secured to the crank shaft 40, which is mounted on the radius arm 39. The rod 45 has a slot 47 through which slot extends a transverse shaft 48. The shaft is provided with one ratchet wheel 49, which ratchet wheel is operated by a pawl 50 connected to an adjustable reciprocating link 51. This link has its lower end connected to a radius arm 52 on the shaft 48 having a pivotal connection 53 with this radius arm. The upper end of the link is operated by a rock arm 54 which is connected to the rock shaft 27. In the operation of the ratchet wheel 49 and, hence, the rotation of the shaft 48, a cam 55 for each wire is rotated and this cam bears against a pressure wheel 56 mounted on the rod 45 and thus gives a reciprocating motion to this rod, which action causes a backward and forward rolling of the pinion 41 on the gear wheel 36 and a release of the small knurled wheel 43 from driving in relation with the wire due to the crank action of the small crank shaft 40. A compression spring 57 is utilized to retract the rod 45.

As the arm 46 is rigidly secured to the crank shaft 40 the oscillation of the radius arm 39 carrying the small pinion 41 causes the movement of the small knurled wheel 43 to and from the knurled wheel 37 for releasing and feeding the wire.

While in my drawings I have illustrated the various shafts used in connection with the wire feed as being secured to the structural frame on the stapling machine it is to be understood that mountings other than those illustrated may be utilized.

The arrangement for holding the forms containing the crate side elements in position while being stapled is illustrated particularly in Figs. 5 and 6. In this illustration the side rails of the stapling machine are

indicated at 58 and on opposite sides there are holder plates 59 which extend upwardly to a sufficient height to support a stack of forms. These forms may rest against a transverse holder 60, which holder has a cross plate 61 and side plates 62 secured to the machine, there being an opening 63 at the bottom of the cross plate to allow feeding of the forms. A heavy arm 64, which is illustrated as pivoted to the holder 60 at 65 and illustrated as being formed of two bars 66, bears on the forms as they are being fed by the pusher devices 14 through the machine. Should any of the plate elements become displaced this arm may be raised and thus allow adjustment of such pieces before they enter the stapling part of the machine.

An additional presser device 67 is employed. This has a frame 68 which is secured to a fixed part of the machine, and has an upper strap 69 extending toward the infeeding end of the machine and a diagonal brace 70, this upper plate being curved upwardly at the front as indicated at 71. A shoe strap 72 is located below and parallel to the strap 69. This is connected to the strap 69 by bolts 73 which have a head fitting in a socket 74, there being springs 75 pressing the shoe downwardly on the forms. The head and socket prevent dropping or sliding of the shoe 72 but cause a downward pressure on the forms being fed. In addition, at the side of the machine there is an offset plate 76 which has bolts 77 therein. These bolts have a head and socket engagement 78 with a lateral pressure plate 79, this plate being pressed inwardly by springs 80. This arrangement presses the side elements of the form while undergoing the stapling operation by the stapling head 81 which is standard to the machine.

The particular form designated generally 82 for supporting the crate side elements and one form of the crate side are illustrated in Figs. 9 and 10, this crate side being made somewhat in accordance with my patent application, Serial No. 439,083 for crate construction, filed March 26, 1930. In this arrangement I employ an angle member 83 having a bottom flange 84 and a vertical flange 85, this having notches 86 at the top. The opposite side has a plate 87 with an elongated notch 88. At one end there is a transverse plate 89 with a transverse notch 90 in the bottom and this plate carries a plurality of bolts 91 which engage a spacer plate 92, this plate being held spaced from the plate 89 by springs 93. A pair of adjusting springs 94 have ends 95 resting on the flange 84 and the plate 87 and have a center recess section 96 with upwardly extending portions 97 which, with the spacing pins 98, engage in the open spaces of the crate side elements. An end 99 connects the opposite sides.

The side of the crate illustrated in Figure 10 is of the type illustrated in my patent application, Serial No. 439,083, filed March 26, 1930, for crate construction (now abandoned), in which the top and bottom rails 11′ and 12′ are joined by the vertical posts 10′, these fitting in a recess 13′ in the end of the rails. Boards or slats 17′ are nailed to the bottom and top rails. These elements before nailing are fitted in the forms of Figure 9.

By this construction the various wood members forming part of the crate may be assembled in the forms and held in these forms while these are placed in stacks, and the bottommost form in succession is fed to the stapling portion of the machine and after stapling, the form with the crate side is removed and the side element removed from the form.

Various changes have been made in the details of construction without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. In a stapling machine, guide rails to receive forms containing the sides to be stapled, means to feed said forms, a transverse holder positioned across and above the said rails and forming a retainer for a stack of forms, and a heavy arm pivotally connected to said holder adapted to bear on the top of forms fed from beneath the holder, said arm being tiltable upwardly to permit adjustment of the sides to be stapled.

2. In a stapling machine having longitudinal rails and means to feed forms having the sides for stapling in such forms, a transverse holder extending across and above the rails to engage a stack of forms, the forms being fed underneath the holder, a heavy weighted arm pivotally connected to the holder to bear on the top of the forms, and a pressure device connected to a fixed part of the stapling machine and having a spring pressed pressure shoe to bear on the top of the forms, said arm being tiltable upwardly to permit adjustment of the sides to be stapled.

3. In a stapling machine, a table having guide rails and means to feed forms along said rails, holder plates at the side of the rails to engage the sides of forms, said forms being adapted to hold the sides to be stapled, a transverse holder connected above and across the rails and having a passage underneath for the forms, a heavy arm pivotally connected to the holder and adapted to bear on the top of the forms, a pressure device connected to a fixed part of the stapling machine and having a longitudinal strap with a pressure shoe therebelow and springs pressing said pressure shoe downwardly on the forms, and a lateral pressure plate on one side of the table, an offset plate outside of the pressure plate, and springs between the offset plate and the pressure plate, said arm being tiltable

upwardly to permit adjustment of the sides to be stapled.

4. In a stapling machine, a form for holding crate sides having an angle on one side, a horizontal plate extending along the other side, end pieces connecting the angle and the plate, a spacer plate resiliently connected to one of the end pieces, and supports for the sides connected between the angle and the side plate.

5. In a stapling machine, a form for crate sides having an angle on one side, a horizontal plate on the other side, a pair of end pieces connecting the angle and the plate, a spacer plate resiliently connected to one of the end pieces, and a plurality of supporting springs having ends bearing on the angle and the plate on opposite sides of the form adapted to support part of the elements forming the crate side.

6. In a stapling machine, a table having guide rails, a transverse vertical holder plate extending across the guide rails and having a passage underneath for forms adapted for supporting sides to be stapled, a heavy arm pivotally connected to the holder, a pressure device connected to a fixed part of the stapling machine, said arm when in its lowermost position reaching substantially to the pressure device, said pressure device having a longitudinal strap with a pressure shoe therebelow and springs to force said pressure shoe downwardly on the crate sides carried by the forms, said arm being adapted to tilt upwardly adjacent the transverse holder plate to permit adjustment of said sides on the forms, and means to feed forms longitudinally through the passage underneath the holder and underneath said plate and the pressure device.

7. In a stapling machine a table having angular guide rails extending longitudinally thereof, a transverse holder plate positioned above said rails and extending across from side to side of the rails, there being a passage for forms underneath said plate, lateral holding plates secured to the guides on the infeeding side of the transverse plate to center forms stacked one above the other, a pressure device having an upper strap extending longitudinally between the guide rails, a shoe positioned below said strap, bolts extending through the strap and connected to the shoe, and compression springs on the straps bearing against the shoe and the strap to force the shoe downwardly, a heavy weighted arm pivoted on the transverse plate and extending when in its horizontal position substantially from such plate to the shoe, the arm being upwardly tiltable to permit adjustment of sides on the forms, and an endless chain having pusher devices secured thereto to engage the ends of the forms and convey the lowermost form in the stack through said passage underneath the weight and the shoe.

8. A stapling machine comprising, in combination, a table having longitudinal guide rails spaced apart, a transverse holder plate extending across said rails and having a passage for forms therebelow, side holder plates connected to the guide rails to support a stack of forms, each form having an angle on one side and a horizontal plate on the other side connected by end plates, there being a resiliently mounted spacer plate at one end, the side angle and the plate being adapted to support rails, and the ends to hold posts for a crate, means on the form to locate boards in the forms, a heavy weighted arm pivotally connected to the transverse holder plate on the side opposite the stack, a pressure device having a pressure shoe, said arm extending substantially to the pressure shoe, means to feed the lowermost form of the stack through said passage and underneath the arm and the pressure device, said arm being tiltable upwardly to permit adjustment of the rails, posts, and boards mounted in the form.

9. In a stapling machine, the combination of a table having guide rails spaced apart, a transverse vertical holder plate extending from side to side of said rails and having a passage underneath, side holder plates at the side of the rails for a stack of forms, each form having an angular member on one side and a horizontal plate on the opposite side to accommodate the rails of a crate side, and having opposite ends, one end of which has a resiliently mounted spacer plate to hold and retain end posts of the crate side, springs resting on the angle member and the plate to position boards extending between the rails, a heavy weighted arm pivotally connected to the transverse holder plate, a pressure device having a strap and a shoe resiliently connected thereto to exert a downward pressure, the weight when extended reaching substantially to the shoe, an endless chain having pusher devices to engage the lowermost form of the stack and to feed such form through said passage underneath the weighted arm and underneath the shoe, said arm being tiltable upwardly to permit adjustment of the boards, rails, and posts of the crate side in the form carrying same.

10. In a stapling machine, a form for crate sides having an angle member on one side with a horizontal and vertical flange, a horizontal plate on the other side, a pair of end pieces connecting the angle and the plate, a spacer plate resiliently connected to one of the end pieces, and a plurality of flat leaf-like, adjusting springs each having an end resting on the horizontal flange of the angle and the horizontal plate.

11. In a stapling machine as claimed in claim 10, the ends of said springs fitting against vertical spacing pins, said pins being

secured respectively to the horizontal flange of the angle and to the horizontal plate.

12. In a stapling machine, a form for holding crate sides having an angle member on one side with a horizontal and a vertical flange, a horizontal plate on the opposite side, vertical end pieces, a spacing plate parallel to one of the end pieces and resiliently mounted thereon to permit adjustment to and from such end pieces, and vertical spacing pins secured to the horizontal flange of the angle and to the horizontal plate, said pins being adapted to space boards or slats of the crate sides.

13. In a stapling machine as claimed in claim 12, a pair of leaf-like springs having their free ends supported on the horizontal flange and the horizontal plate, said springs having a central depression, the ends of the plates being adapted to engage said pins.

14. In a stapling machine, a form for holding crate sides having an angular member on one side with a horizontal and a vertical flange, the vertical flange having transverse notches, a horizontal plate on the opposite side having a longitudinal notch on its edge, vertical end pieces, bolts connected to one end piece having a spacer plate mounted thereon, springs engaging the spacer plate forming a resilient mounting for same, a plurality of pairs of pins secured to the horizontal flange of the angle and to the horizontal plate, and flat adjusting springs having their ends resting on the horizontal flange of the angle and on the horizontal plate, said springs having a central depression or recess.

In testimony whereof I have signed my name to this specification.

GEORGE E. BREECE.