

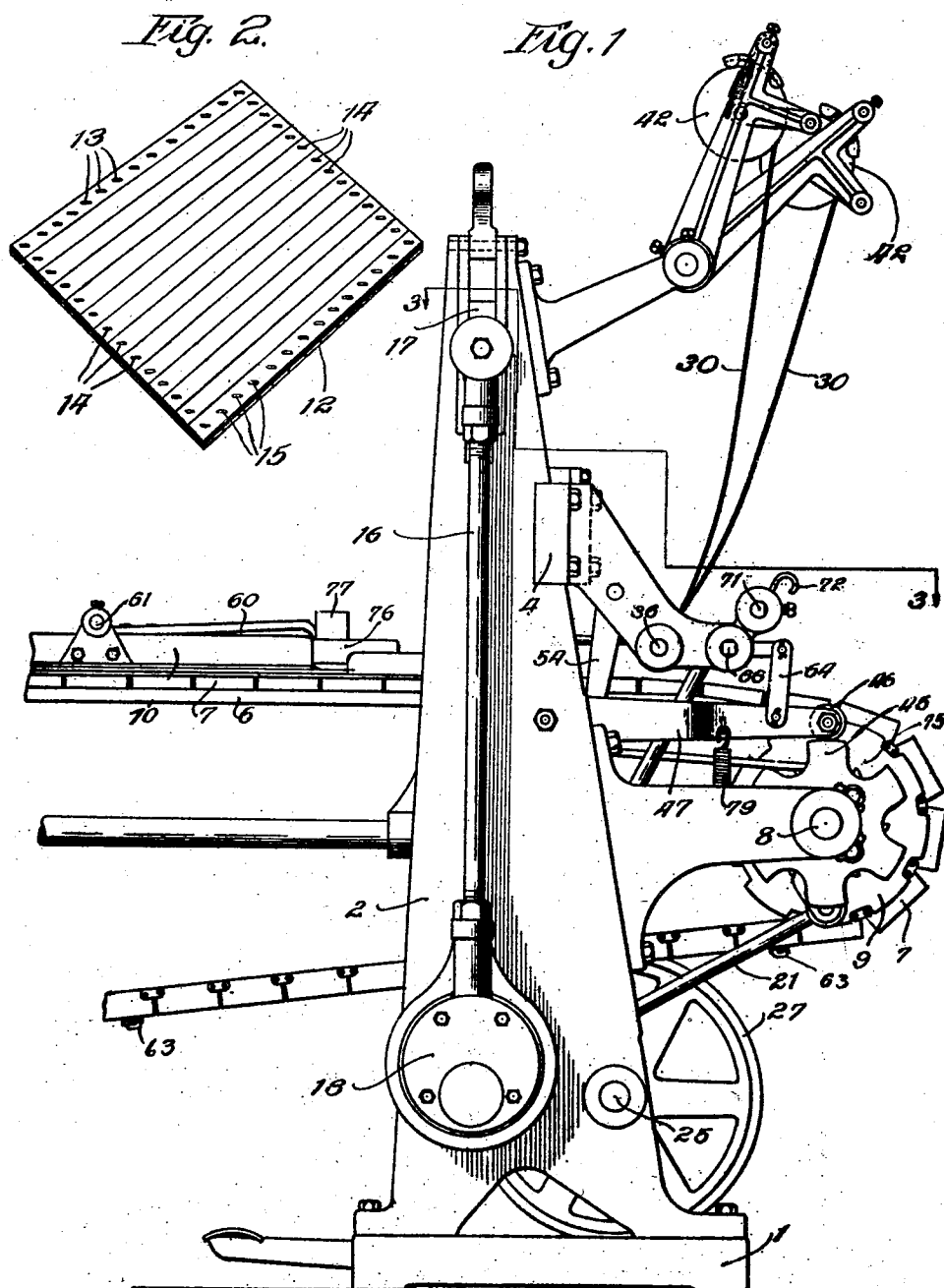
March 23, 1926.

E. CRAIG

1,578,015

AUTOMATICALLY CONTROLLED FASTENER FORMING AND DRIVING MACHINE.

Original Filed August 23, 1920 7 Sheets-Sheet 1



Inventor:
Edward Craig
By: Arthur F. Devant
Att'y

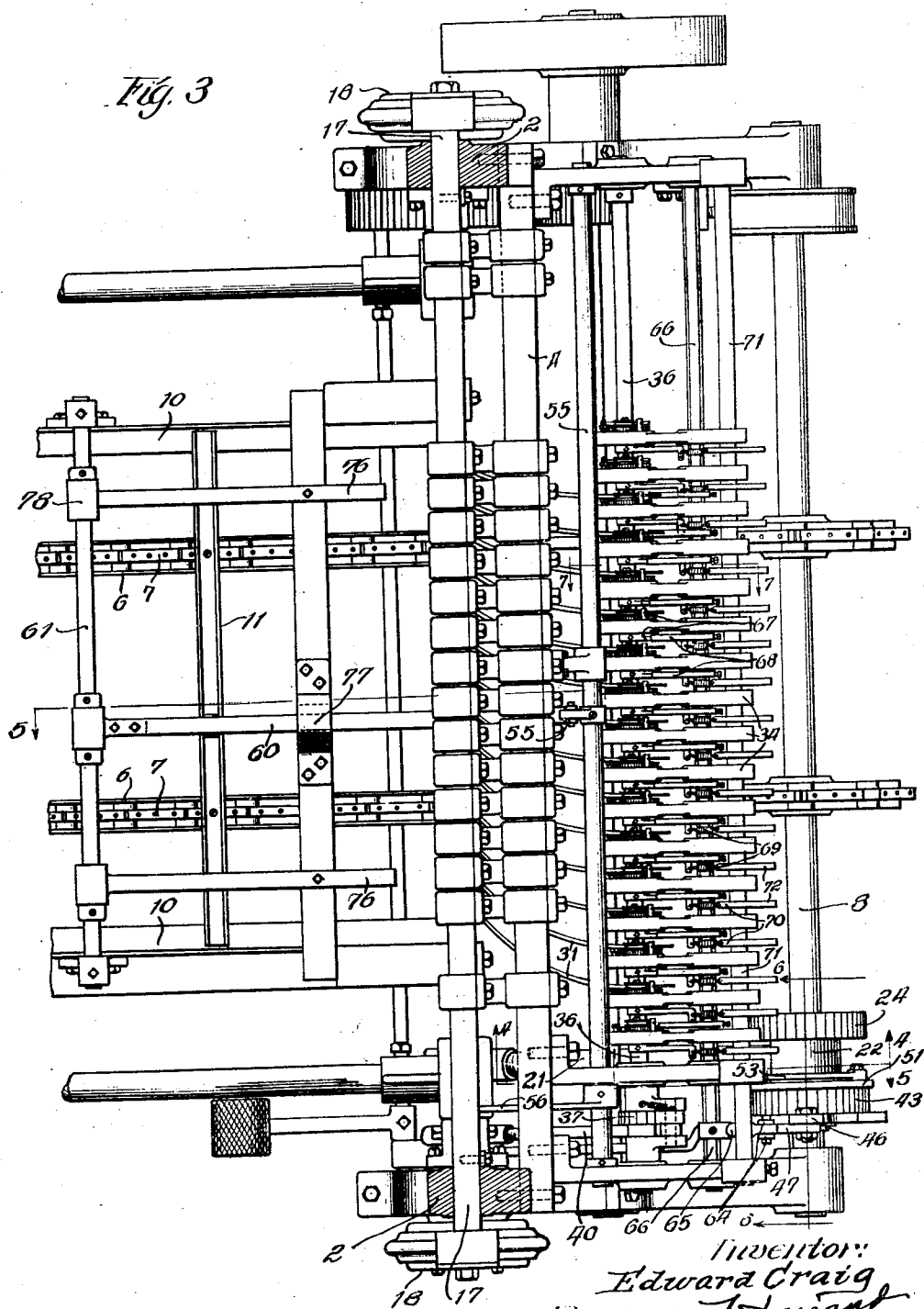
March 23 , 1926.

1,578,015

E. CRAIG

AUTOMATICALLY CONTROLLED FASTENER FORMING AND DRIVING MACHINE

Original Filed August 23, 1920 7 Sheets-Sheet 2



Inventor:
Edward Craig
By: Arthur F. Durand Atty.

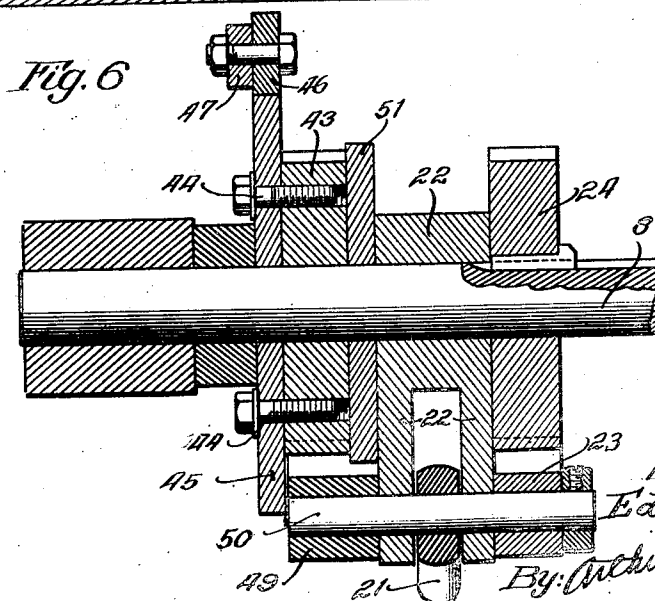
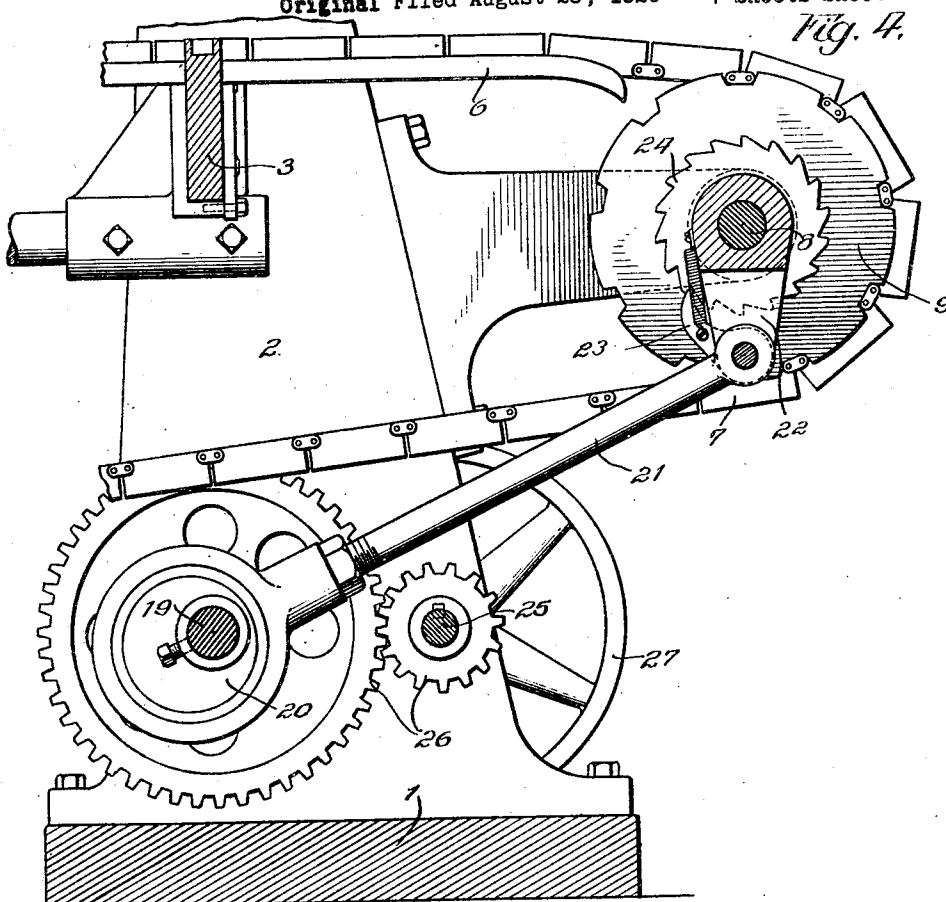
March 23 , 1926.

E. CRAIG

1,578,015

AUTOMATICALLY CONTROLLED FASTENER FORMING AND DRIVING MACHINE

Original Filed August 23, 1920 7 Sheets-Sheet 3



Inventor:
Edward Craig
John J. Fennell
Atty.

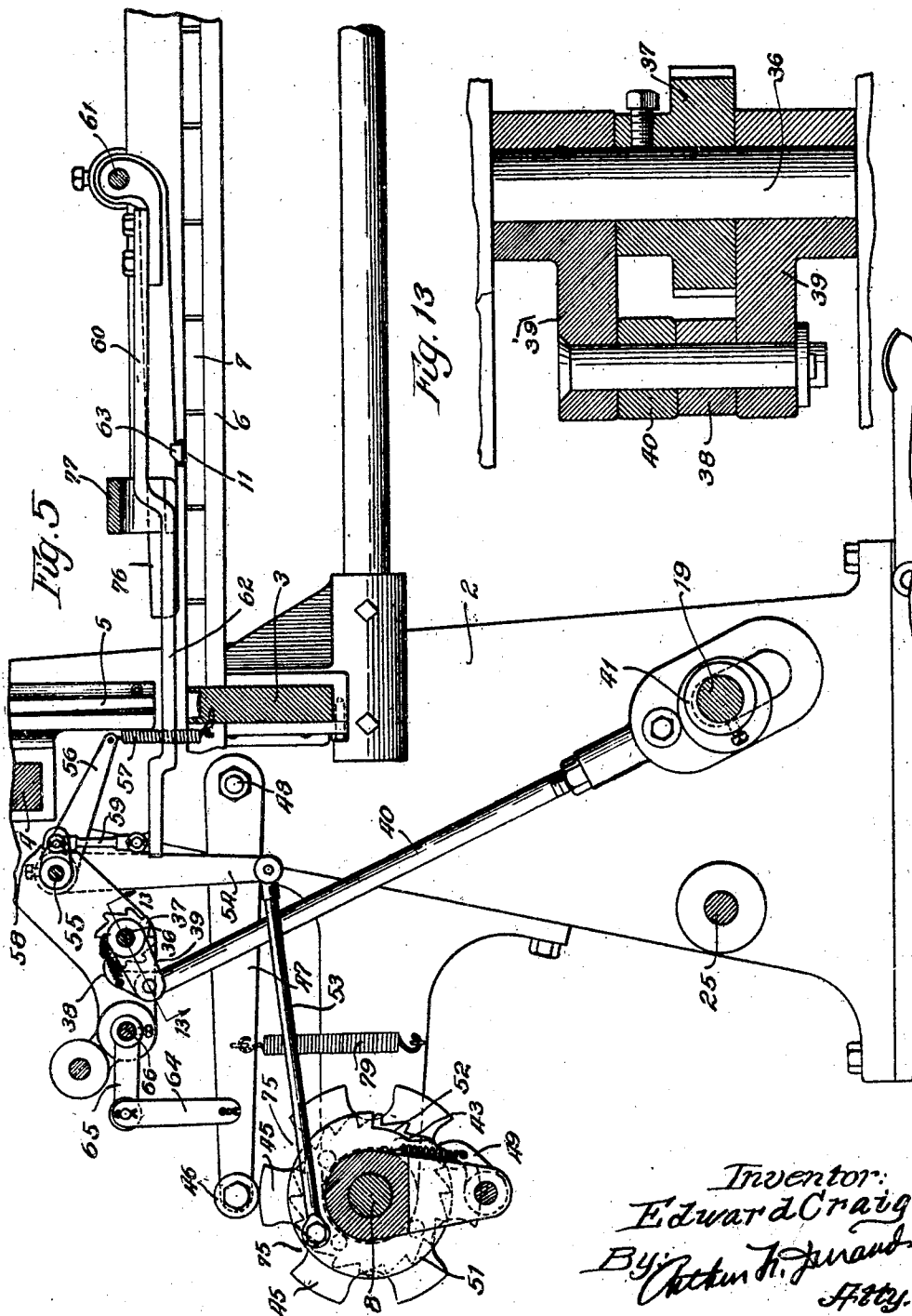
March 23, 1926.

1,578,015

E. CRAIG

AUTOMATICALLY CONTROLLED FASTENER FORMING AND DRIVING MACHINE

Original Filed August 23, 1920 7 Sheets-Sheet 4



March 23, 1926.

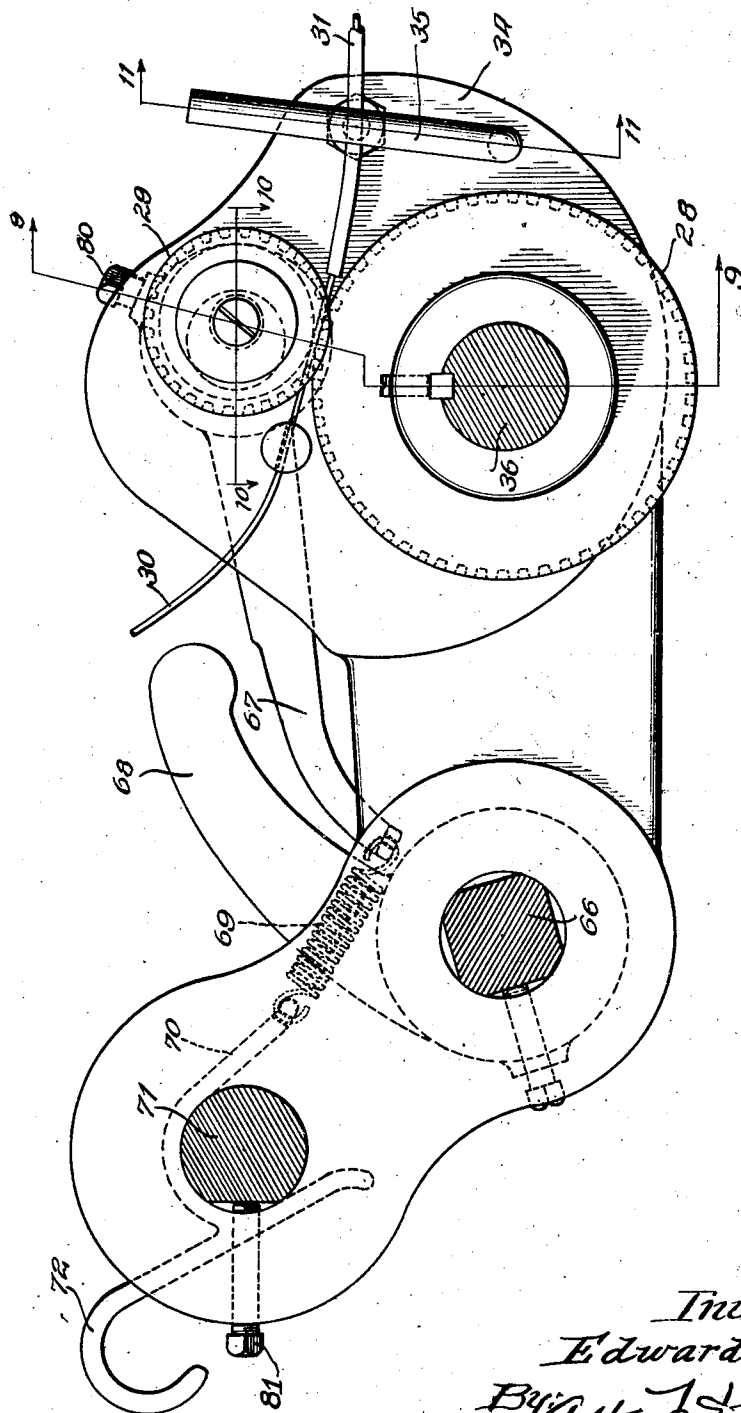
E. CRAIG

1,578,015

AUTOMATICALLY CONTROLLED FASTENER FORMING AND DRIVING MACHINE

Original Filed August 23, 1920 7 Sheets-Sheet 5

Fig. 7.



Inventor:
Edward Craig
By: Arthur J. Smart
Atty.

March 23, 1926.

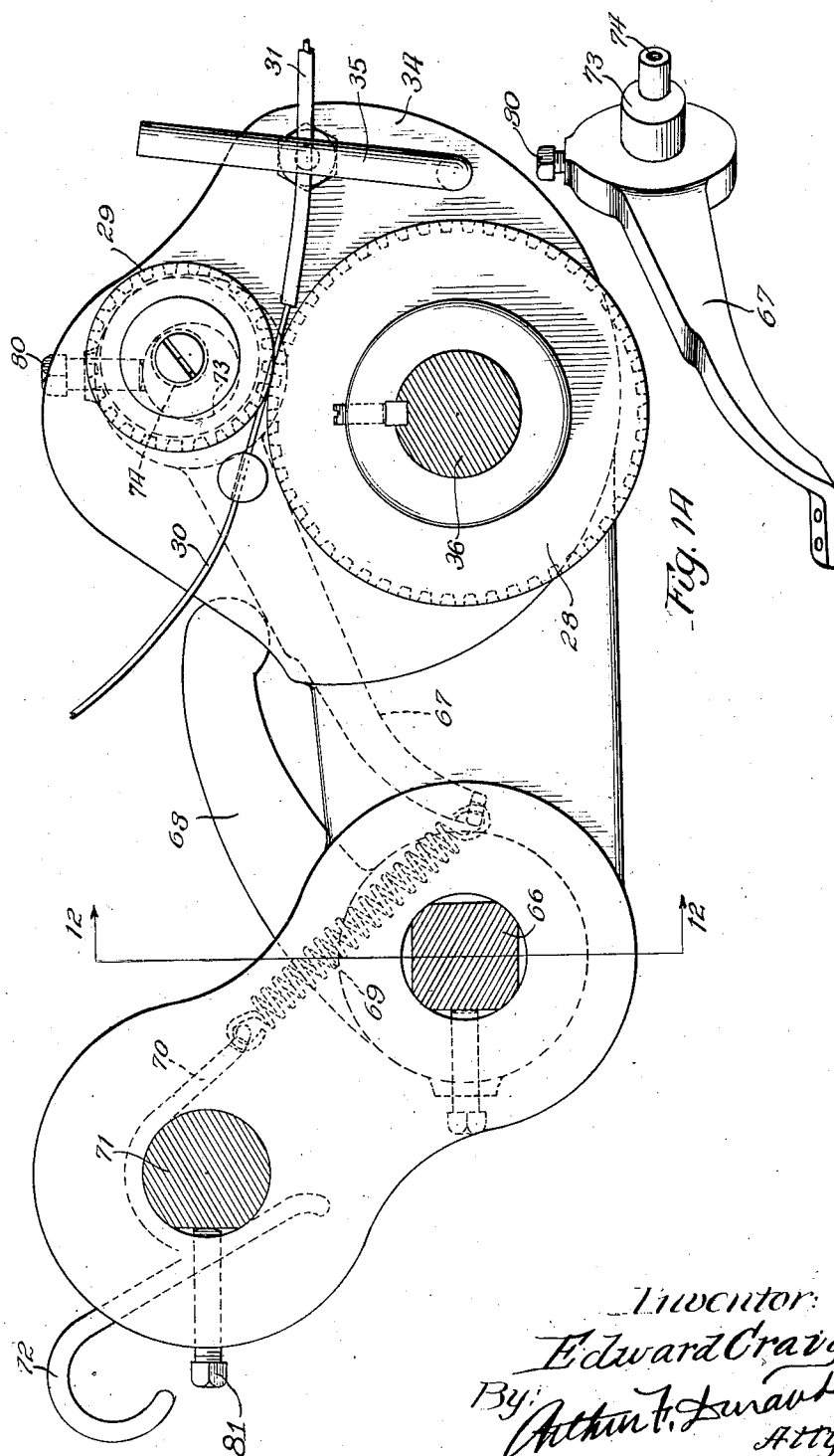
E. CRAIG

1,578,015

AUTOMATICALLY CONTROLLED FASTENER FORMING AND DRIVING MACHINE

Original Filed August 23, 1920 7 Sheets-Sheet 6

Fig. 8



Inventor:
Edward Craig
By: Arthur F. Lusk
Atty.

March 23, 1926.

1,578,015

E. CRAIG

AUTOMATICALLY CONTROLLED FASTENER FORMING AND DRIVING MACHINE

Original Filed August 23, 1920 7 Sheets-Sheet 7

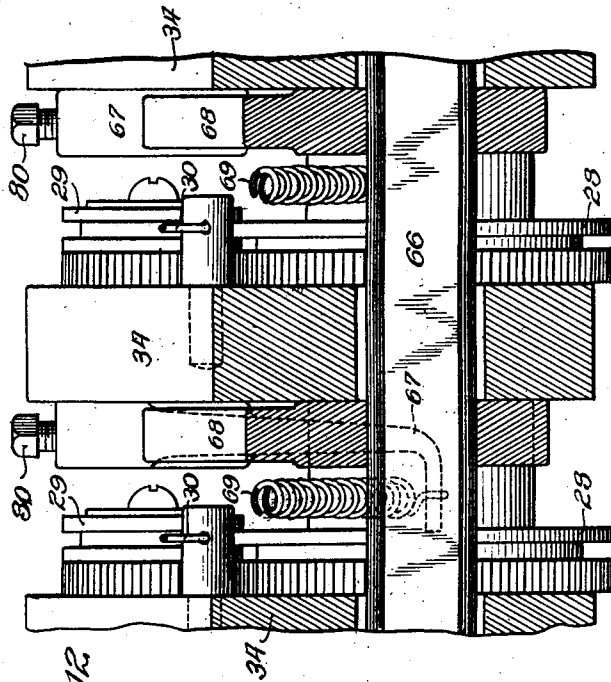


Fig. 12

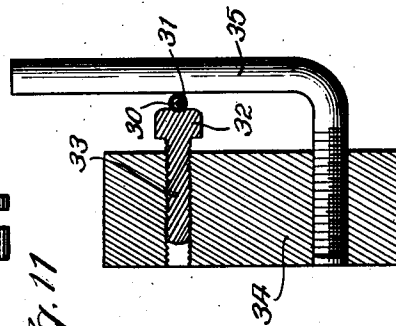


Fig. 11

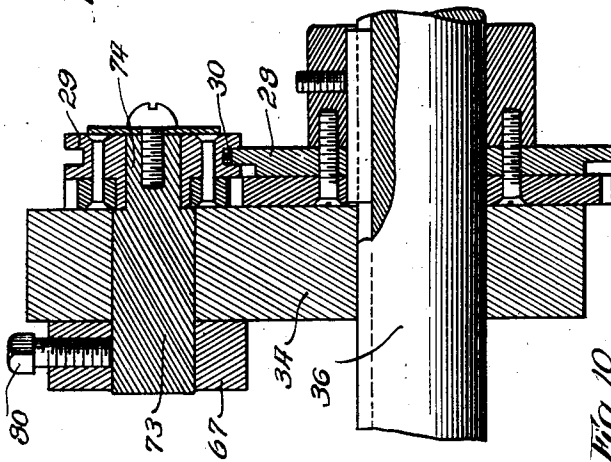


Fig. 9

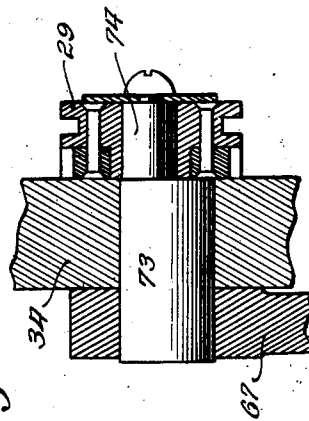


Fig. 10

Inventor:
Edward Craig
By: Charles F. Duval
Atty.

Patented Mar. 23, 1926.

1,578,015

UNITED STATES PATENT OFFICE.

EDWARD CRAIG, OF ST. JOSEPH, MICHIGAN.

AUTOMATICALLY-CONTROLLED FASTENER FORMING AND DRIVING MACHINE.

Application filed August 23, 1920, Serial No. 405,474. Renewed August 21, 1925.

To all whom it may concern:

Be it known that I, EDWARD CRAIG, a citizen of the United States of America, and a resident of St. Joseph, Michigan, have invented a certain new and useful Improvement in Automatically-Controlled Fastener Forming and Driving Machines, of which the following is a specification.

This invention relates to stapling machines for securing materials together, and more particularly to machines for stapling a set of upper strips to a set of lower strips, thereby to form a rectangular structure which can be used for various purposes, such as the supporting of stoves on the floor, the flat rectangular structure being ordinarily covered with zinc for this purpose, or with any other suitable sheet material.

The object of the invention is to provide a machine in which the fastener driving means, such as staplers, are automatically controlled to cause the insertion of two transverse rows and two longitudinal rows of fasteners, said rows forming a rectangle along the edges of the rectangular structure formed by thus fastening the strips of veneer or other materials together.

It is also an object to provide certain details and features of construction and combinations tending to increase the general efficiency and the desirability of a machine of this particular character.

To these and other useful ends the invention consists in matters hereinafter set forth and claimed, and shown in the accompanying drawings, in which—

Fig. 1 is a side elevation of a machine embodying the principles of the invention, showing one end of the machine broken away for convenience of illustration.

Fig. 2 is a perspective of the rectangular structure which constitutes the product of said machine, formed by fastening an upper set of strips crosswise of a lower set of strips, by the insertion of staples in the manner explained.

Fig. 3 is a plan of the structure shown in Fig. 1.

Fig. 4 is an enlarged section on line 4—4 in Fig. 3.

Fig. 5 is a similar section on line 5—5 in Fig. 3.

Fig. 6 is an enlarged detail section on line 6—6 in Fig. 3.

Fig. 7 is an enlarged detail section on line 7—7 in Fig. 3, showing the wire feeding

mechanism in one position, which is the operative condition for feeding the wire.

Fig. 8 is a similar view showing the parts in the position which they assume to render the mechanism inoperative to feed the wire.

Fig. 9 is a section on line 9—9 in Fig. 7.

Fig. 10 is a section on line 10—10 in Fig. 7.

Fig. 11 is a section on line 11—11 in Fig. 7.

Fig. 12 is a section on line 12—12 in Fig. 8.

Fig. 13 is an enlarged detail section on line 13—13 in Fig. 5.

Fig. 14 is a perspective of one of the eccentric cams with which the wire feeding mechanism is provided for the control thereof, to stop the feeding of the wire to certain of said staplers, when it is desired to drive the two longitudinal rows of staples in the materials.

As thus illustrated, the invention comprises a base 1 upon which are mounted the two upright side frames 2, the latter being suitably connected together by a cross bar 3, and by an upper bar 4, upon which the usual or any ordinary or suitable staplers 5 are mounted to drive staples into the assembled materials. The machine is provided with longitudinal guides 6 for the endless sprocket chains 7 which constitute the means for propelling the materials along, in a step by step manner, thereby to feed the materials in assembled relation below the staplers. A shaft 8 is provided at the discharge end of the machine, upon which sprockets 9 are mounted to support the said endless chain belts which form the work feeding means. It will be understood that the receiving end of the machine is provided with similar sprockets (not shown) to support the chains or belts, so that the upper portions of the latter travel horizontally and longitudinally of the machine, in the said guides 6 provided for this purpose. The materials, preferably strips of veneer or other sheet material, assembled as shown in Fig. 2, are placed by hand on the two parallel sprocket belts 7, and are propelled along the guides 10 by the transverse pusher bars 11 which are secured to the two sprocket belts, each bar engaging the rear edge 12 of one of the rectangular structures or blanks forming the product of the machine. The said staplers are so controlled that the transverse row of staples 13 is driven first, by the

simultaneous action of the staplers, and so that the longitudinal rows of staples 14 are then driven next, by the successive operation of the two outer or end staplers. Finally, of course, the transverse row of staples 15 is driven by the simultaneous action of all the staplers, the four rows of staples thus driven forming a rectangle along the four edges of the rectangular structure formed by thus securing the strips of veneer or other materials together. A rectangular structure of this kind can be used for any suitable or desired purpose, but in the present instance it is intended for use in supporting stoves on the floor. These rectangular stapled structures thus formed are usually covered with zinc or other sheet material, and then placed on the floor to support the legs or base of a stove, in the well known manner. By fastening the upper set of strips crosswise of the lower set of strips, in the manner shown, a compound structure is formed which is not liable to warp and which will lie flat on the floor.

It will be understood that the staplers are operated in the usual or any suitable manner, as by pitman 16 connected to the upper cross head 17 and operated at their lower ends by the eccentric cams 18 which are driven by the transverse shaft 19 mounted in suitable bearings on the body frame. The said shaft is provided with an eccentric cam device 20 which is connected by pitman 21 with the arm 22 which swings on the shaft 8 and this arm is provided with a ratchet dog 23 for engaging the ratchet wheel 24, which is keyed to the shaft 8 to intermittently rotate the latter through the medium of the rigid feed connection thus provided, thereby to intermittently advance the work below the staplers. The shaft 19 is preferably driven from the shaft 25 through the medium of a gear connection 26 of any suitable or desired character, the shaft 25 having a pulley 27 at one end thereof to receive power from any suitable source.

The wire from which the staples are made is fed to the staplers by wire feeding mechanism as follows: A lower feed roll 28 and an upper feed roll 29 are provided for each stapler, and suitably supported in position to feed the wire 30 between them to a tube 31 which leads to the stapler. This tube 31 is removably held against the head 32 of a screw 33 inserted in the support 34 on which the feed rolls are mounted, there being a plurality of these supports, as shown in Fig. 3. For this purpose, the support 34 is preferably provided with a retaining member in the form of an L-shaped rod 35 which is screwed into the support 34 and arranged in position to be swung around against the tube 31 to hold the latter against the head of said bolt or screw, as shown more clearly in Figs. 7 and 11, whereby the

said tube may be adjusted or removed at will to suit the requirements of the work. The shaft 36 extends across the machine, from one side to the other, through the wire feeding device of each stapler, to support all of the rolls 28, and is provided with a ratchet wheel 37 for engagement with the dog 38 carried by the swinging arm 39 mounted on said shaft. This ratchet feed device for intermittently rotating the shaft 36 is operated by a pitman 40 which is connected to an actuating cam device 41 of any suitable, known or approved character, on the shaft 19, whereby the shaft 36, and all of the feed rolls 28 thereon, are actuated intermittently to feed the wires to their respective staplers, in the desired manner. It will be understood that the said wires 30 can be fed to their respective feed rolls from reels 42 suitably supported over the machine. It will also be understood that the operations or movements of the different parts are so timed that the staples are driven while the work-feeding means is stationary, or while the materials themselves are stationary, and that the wire for the staples is fed just before the downward stroke of the staplers, so that suitable lengths of wire will be cut off in the ordinary or well known manner to form the staples which are then driven by the final downward movement of the staplers.

The device whereby the staplers are automatically caused to drive the row of staples 13 first, simultaneously, and then the staples 14 successively, while the staples 15 are finally driven simultaneously, are as follows: Another ratchet wheel 43 is loosely mounted on the shaft 8 and has secured thereto, by means of bolts or screws 44, a notched cam disk or wheel 45 for engaging the roller 46 on the arm 47 which swings up and down about a pivot 48 therefor on one of the side frames 2 of the main body frame. A ratchet dog 49 is carried by the pivot pin 50 of the arm 22, and is arranged to engage the ratchet wheel 43, so that the latter will be intermittently rotated by the reciprocation of the pitman 21 previously mentioned. A cam plate 51 is loosely mounted on the shaft 8 between the arm 22 and the ratchet wheel 43, and is provided with a notch 52 in one edge thereof to allow the ratchet dog 49 to operatively engage the teeth of the ratchet wheel 43, as will hereinafter more fully appear. Said cam plate 51 is connected by a link 53 with the lower end of an arm 54, which latter is suitably mounted on the rock shaft 55 which extends transversely of the machine, and which is suitably supported in bearings on the body frame. Said rock shaft 55 has another arm 56 which is subject to the downward pull of a coil spring 57, so that said spring tends to rotate the plate 51 in a di-

rection to raise the ratchet dog 49 out of the notch 52 and out of engagement with the teeth of the ratchet wheel 43, so that the said dog is thereby rendered inoperative to actuate the said ratchet wheel. The shaft 55 also has a short crank arm 58 which is connected by a vertically disposed link 59 with the free end of the vertically swinging controller 60, which latter is pivoted on the transverse shaft 61 to swing up and down about a transverse axis. This controller, it will be seen, has a depressed portion 62 which forms a sort of cam for engagement with the cam block 63 mounted on the transverse pusher bar 11 previously described, it being understood that each of said pusher bars is provided with one of these cam blocks at a point near the middle of the path of travel of the materials to be fastened together. The arm 47 is connected by a vertically disposed link 64 with the arm 65, which latter is rigidly secured to the transversely arranged shaft 66, which latter is preferably square in cross section, as shown. Each upper feed roll 29 is subject to control or up and down adjustment by the arm 67, and for each of said arms 67 there is a cam arm 68 mounted on the said shaft 66, as shown more clearly in Figs. 7 and 8, and each arm 67 is preferably connected by a spring 69 with a hook 70 which is removably hooked over the transverse bar or round member 71 in the manner shown; each hook 70 having a handle 72 by which it can be manually disconnected from the bar 71 when it is desired to throw the stapler out of action—that is to say, when it is desired to throw the wire feeding device allotted to any hook out of action and into an inoperative position. Each arm 67, as shown more clearly in Fig. 14, is provided with a cylindric portion 73 which is pivoted in the support 34, as shown in Fig. 9, and which is provided with an eccentrically located axle 74 for the feed roll 29 previously mentioned. With this arrangement it is obvious that any up and down movement of the arm 67 will result in sufficient up and down movement of the feed roll 29 to control the operation of the two feed rolls, for when the roll 29 is lifted by the downward movement of the arm 67, as shown in Fig. 8, the wire 30 is then released by the feed roll 29, so that no feeding action takes place; but when the roll 29 is lowered into engagement with the wire, by upward movement of the arm 67, as shown in Fig. 7, the wire is then gripped tightly between the two rolls and is caused to feed forward into the tube 31 in the desired manner. The cam wheel 45 is provided with notches 75, and when the roller 46 is in one of these notches all of the staplers are operative to drive staples, because under such conditions all of the wire feeding devices, or the entire wire feeding mechanism, is operated to feed all the wires simultaneously to their allotted or respective staplers; but when the roller 46 is pushed upward and caused to engage one of the high places between any two notches 75, as shown in Fig. 5, it is obvious that the shaft 66 is thereby rocked into the position shown in Fig. 8, causing all of the arms 68 to swing downward against the arms 67, thus lifting the upper feed rolls 29 of all of the staplers except the two end or outer staplers of the gang or row which extends transversely across the machine. Thus, while the staples 13 are being driven simultaneously, the shaft 66 is in the position shown in Fig. 7, because the roller 46 is in one of the notches 75, and all of the staplers of the row or gang are operative to drive staples; but while the staples 14 are being driven successively, in the manner explained, the shaft 66 is in the position shown in Fig. 8, so that the arms 68 are down against the arms 67, and all of the feed rolls 29 which are thus mounted on eccentrically located axles 74 are in raised position, so that they do not engage the wires 30, and consequently there is no wire feeding action at such time for any of the wire feeding rolls except those allotted to the end or outer staplers, which latter are the ones which drive the staples 14; and then when the time arrives to drive the staples 15, the roller 46 is again in one of the notches 75, so that the arms 68 are all in the raised position shown in Fig. 7, and consequently all of the wire feeding rolls for all of the staplers are operative to feed the wires which are necessary for the formation of the staples 15, which latter are then driven simultaneously in a row transversely of the forward path of travel of the materials forming the work. It will be understood, of course, that for this purpose, and in order to accomplish the stated mode of operation, the portions 62 and 63 previously mentioned are arranged in the proper or required relation to each other, so that the wire feeding devices are automatically controlled or governed in the manner stated to render all of the staplers operative when the staples 13 are to be driven and to render the intermediate staplers inoperative to drive staples while the two end or outer staplers are driving the staples 14, and to then again render the said intermediate staplers operative when the time arrives to drive the staples 15 at the rear edge of the rectangular blank or structure formed by thus driving staples in four rows which form a rectangle around the edge of the rectangular structure forming the product of the machine.

The portion 62 rides on the top of the materials, of course, and is of a length to produce the desired result, and the described

mode of operation. The shoes 76 also ride on the top of the materials, to hold the latter down just in advance of the point where they pass under the staplers, and are connected together by a transverse bar 77 which extends over the controller 60 previously described. The said shoes 76 are mounted at 78 on the shaft 61 previously mentioned, so that they are free to swing up and down about the transverse axis provided by said shaft. When the dog 49, it will be understood, drops into the notch 52, it is then free to actuate the ratchet wheel 43, thereby to turn the cam wheel 45 at the proper time, so that the arm 47 will be actuated up and down in the manner necessary to properly control the feeding of the wires from which the staples are made, in the manner previously described. Thus the controller 60 rests or floats on the forwardly moving materials, or extends close to the upper surface of the materials, and is adapted to be engaged by the cam blocks 63 disposed at intervals along the endless traveling work holders formed by the sprocket chains 7, whereby the action of the staplers is automatically controlled by means which are in turn controlled by the forward feeding motion of the said intermittently operated traveling work-holder, or by the work feeding means, so that by the forward feeding of the materials in a horizontal plane, the action of the said staplers is controlled or governed to cause the driving of the staples 13 first, the driving of the staples 14 next, and the driving of the staples 15 last, in the manner shown and described. A spring 79 is preferably provided to yielding hold the arm 47 down, so that the automatic control exerted by said arm over the wire feeding devices will be rendered certain. Of course, if it be desired to control the wire feeding action at will, for any desired purpose, this can be accomplished, as previously explained, by unhooking the hooks 70 from the transverse member 71, thus allowing the arm 67 to swing downward to control the upper feed rolls of any of the wire feeding devices which it is desired to thus render inoperative. The said springs 69 tend to raise the arm 67 and thus maintain the feed rolls in operative condition.

It will be seen that the support 34 is supported by the rotary transverse shafts 36 and 66 and by the stationary shaft-like member 71, a set screw 81 being inserted through the end of the support 34 to hold the same against lateral displacement, and set screws 80 are inserted through the arms 62 to hold them against displacement from the cylindrical portions 73 previously described. Thus each wire feeding device is supported by a bracket-like support 34 which is in turn supported by two rotary shafts and one non-rotary or stationary shaft-like cylindric

member. All of the wires are fed through all of the tubes 31 when the arms 68 are all up; but when the roller 46 is up, as above in Fig. 5, the arms 68 are all down, and hence at such time only the staples 14 are being driven. It will be understood, of course, that the staples 5 and the feed belts 7 and the elements 62 and 63 are all so timed in their action that the staples 15 are driven in one blank, and the staples 13 in the blank immediately in rear thereof, when the cam 63 strikes the depressed portion 62 of the controller, and while the controller remains in raised position, but the driving of the staples 13 is immediately followed by the automatic control of the wire feeding devices to drive the staples 14, as the next actuation of the dog 49 brings the roller to 46 up into the position shown in Fig. 5; and, when the cam block 63 escapes from below the portion 62 of the controller, the dog 49 is thrown out of engagement with the ratchet 43, thus allowing the wheel 45 to remain stationary during several actuations of the staplers 5 and the work feeding belts 7, thereby to ensure the desired mode of operation. For example, when the cam 63 strikes the portion 62, and while the controller remains in raised position, the roller 46 first drops into a notch 75, and the staples 15 are driven; then the actuation of the ratchet 43 raises the roller 46 into the position shown in Fig. 5, and during this time the staplers make two or more strokes while the bar 11 is passing under them; then the actuation of the ratchet 43 causes the roller to drop into another notch 75, and the staples 13 of the next blank are driven; and then the actuation of the ratchet 43 again raises the roller 46, causing the staples 14 to be driven, and during this time the controller 60 is in lowered position, as the cam 63 has passed out from under the portion 62, so that the wheel 45 remains stationary with the roller 46 on the edge of the next notch 75 while the staples 14 are being driven, and until the next cam 63 again raises the controller to render the dog 49 operative to rotate the wheel 45, as described. It is obvious, however, that the automatic control over the staplers may be changed or varied to meet the requirements of different kinds of work, and in accordance with the distance between the rows of staples 13 and 15, or for other reasons, without departing from the spirit of the invention.

It will be seen that the rotary mechanism comprising the cam wheel 45 is subject to intermittent rotation by the feeding motion of the means which feed the work in the manner explained. This rotary governing mechanism is in turn controlled by the controller 60 previously described, so that the necessary control is automatically exercised

over the stapling mechanism to thereby automatically control the action thereof on the work. The controller 60 is mounted to move up and down, and is engaged and released by the engaging means 63 on the work feeding means, so that the wire feeding means and the stapling mechanism are subject to automatic control by the forward feeding motion of the work feeding means and work.

The longitudinally disposed member 60, as shown in Fig. 5, serves as means to form a controller for the staple wire feeding devices, and this controller co-operates with the ratchet feed mechanism 23 and 24 by which the feed belts 7 are operated, to automatically control the action of the machine on the work. In other words, the controller 60 is not operative by itself to control the action of the machine on the work, for while this member 60 is actuated by the forward feeding motion of the work feeding means, nevertheless it is true that the automatic control over the wire feeding devices is exercised conjointly by this member 60 and the ratchet mechanism 43 and 49, which mechanism is operated by the ratchet 23 and 24 previously mentioned, inasmuch as the ratchet belt 23 is actuated by the pitman 21 which is reciprocated by the eccentric device 20 previously mentioned. In this way, therefore, the feeding motion employed to feed the work under the stapling mechanism is operative at two points to automatically control the action of the stapling mechanism on the work. In other words, the feeding motion employed to feed the work is operative where the elements 63 strike the member 60, and is also operative through the ratchet feed mechanism and through the roller 46, to automatically control the feeding of the wire from which the staples are made, thereby to automatically control the action of the stapling mechanism on the work.

Thus it will be seen that the machine shown and described is for the purpose of making articles which require cessation of stapling at different points in the feeding plane of the work, for it is not desirable to drive staples between the articles, of course, and as plainly shown and described it is not desirable to drive staples at certain points on the articles themselves, so that cessation of staple driving, controlled automatically or by hand, as shown and described, is a desirable feature of the invention, and improved instrumentalities are, therefore, shown and described, for controlling the stapling action in accordance with the requirements of the work passing under the staplers.

Inasmuch as the feed roll mechanism for feeding the wire for the staples is operated intermittently without interruption, by con-

stant intermittent rotation of the rolls on each device, it is obvious that the machine can be operated with considerable speed, without interfering with the proper feeding of the wire for the staples, for the intermittent rotation of the feed rolls causes intermittent feeding motion on the part of the wire. This intermittent feeding action, however, of the wire for the staples, is automatically controlled by the movement of one roll toward and away from the other, without interrupting the intermittent rotation of the rolls, in the manner shown and described, so that the intermittent feeding of the wire is automatically stopped when it is necessary or desirable to discontinue the insertion of staples at any desired or predetermined point or points in the work passing under the staplers. Preferably, as shown, the mechanism for moving one roll toward and away from the other is automatically controlled by the forward feeding motion of the work feeding means by which the work is given an intermittent forward feeding motion below the staplers.

What I claim as my invention is:—

1. In a machine for securing materials together, the combination of mechanism for performing successive operations on the materials to fasten them together, instrumentalities for maintaining the materials in properly assembled relation and for feeding the same relatively to said mechanism, so that said materials are presented to said mechanism for the necessary operations thereon, devices for causing said mechanism to first drive a transverse row of fasteners and to then drive two longitudinal rows and finally a transverse row of fasteners in the assembled materials, the four rows forming a rectangle, and a controller actuated in accordance with the forward feeding motion of the materials to automatically govern the action of said devices.

2. A structure as specified in claim 1, said mechanism having means for simultaneously driving all of the fasteners in each transverse row.

3. A structure as specified in claim 1, said mechanism comprising a row of staplers and means to actuate the staplers simultaneously, and said devices comprising means to feed wire to said staplers.

4. A structure as specified in claim 1, said instrumentalities comprising means to hold a plurality of lower strips in a horizontal plane with a plurality of upper strips imposed thereon, the upper strips extending transversely of the lower strips, thereby to form a rectangular structure with the four edges thereof extending along the four sides of the rectangle formed by said rows of fasteners.

5. A structure as specified in claim 1, said controller being disposed in position over

the path of travel of the materials, said mechanism comprising a plurality of staplers, and said devices comprising means for feeding the wire to said staplers for the formation of the staples, and connections between said controller and the wire feeding means of certain of said staplers.

6. In a stapling machine for making articles requiring cessation of staple driving at different points in the feeding plane thereof, the combination of a stationary non-rotary transverse shaft-like member, a transverse rotary shaft, a transverse rock shaft, work feeding means to feed the said articles in a plane below said shafts and member, a lower feed roll on said rotary shaft, a bracket-like support mounted on said shafts and member, an upper feed roll on said support, a stapler to receive the wire from said rolls, disposed above said plane, means on said rock shaft to control said upper feed roll, and means to turn the rock shaft to control the feeding of the wire to control the action of the stapler on the said articles.

7. A structure as specified in claim 6, in combination with means detachably engaging said shaft-like member to control the upper feed roll.

8. A structure as specified in claim 1, said instrumentalities including an endless traveling means having elements at intervals thereon to engage and actuate said controller.

9. A structure as specified in claim 1, said devices comprising rolls for feeding wire to said mechanism, means including a rock shaft to control the action of said rolls, rotary means to operate said rock shaft, a ratchet to operate said rotary means, and means operated by said controller to govern the action of said ratchet, thereby to automatically control the action of said mechanism on the work.

10. A structure as specified in claim 1, said devices comprising means to feed wire to said mechanism, and means operated by said controller to govern the action of said wire feeding means.

11. In a stapling machine for fastening materials together, the combination of a work feeding means, a stapling mechanism to insert staples in the work, means forming a controller, elements disposed at intervals on said work feeding means to engage said controller, wire feeding devices to feed wire to said mechanism, means including a movable element to control the action of said devices, rotary means to operate said movable element, a ratchet to actuate said rotary means, and means operated by said controller to govern the action of said ratchet and control the action of the machine on the work.

12. A structure as specified in claim 11, said wire feeding devices including upper

and lower rolls, the upper roll being movable up and down to control the wire feeding action of the rolls.

13. A structure as specified in claim 11, said rotary means including a wheel with cam notches therein.

14. A structure as specified in claim 11, said controller being pivoted to swing up and down above the work.

15. In a stapling machine for securing materials together, a tube forming a guide for the wire from which the staples are made, means operated by said machine to feed wire into said tube, a screw having its head shaped to form a seat for the side of said tube, a support in which said screw is adjustably supported, and a retainer for removably holding the tube against said head.

16. A structure as specified in claim 15, said retainer comprising a rod screwed into said support and bent to engage the tube.

17. In a stapling machine for making articles requiring cessation of staple driving at different points in the feeding plane thereof, a lower feed roll, an upper feed roll, an eccentric device for raising and lowering the upper feed roll to control the feeding action of the wire between the two rolls, means to feed the said articles in a place below said rolls, a stapler to receive the wire from said rolls, disposed above said plane, and means to control said eccentric device to control the action of the stapler on the said articles actuated by the work feeding means.

18. In a stapling machine for making articles requiring cessation of staple driving at different points in the feeding plane thereof, the combination of feed rolls to feed wire to said stapling machine, an eccentric device for controlling one roll to govern the feeding action of the rolls, means to feed said articles under the stapling means, and means actuated by the work feeding means to automatically control said eccentric device to control the stapling action on the said articles.

19. In a stapling machine for making articles requiring cessation of staple driving at different points in the feeding plane thereof, the combination of a rotary shaft, a shaft-like stationary member arranged parallel with said shaft, a bracket-like member supported on said stationary member and shaft, a feed roll on said shaft, a feed roll on said support, the two rolls co-operating to feed wire to said stapling machine, means to feed said articles under the stapling means, and means actuated by the work feeding means for controlling the operation of said shaft, thereby to control the stapling action on the work.

20. A structure as specified in claim 19, said bracket-like support being adjustable laterally on said shaft and member.

21. In a stapling machine, the combination of work feeding means, a group of staplers whereby to drive some staples simultaneously and other staples successively, and controlling means governed in accordance with the feeding motion of the work to cause operation of all the staplers for the simultaneously driven staples and operation of only certain staplers for the successively driven staples.

22. A structure as specified in claim 21, said staplers being arranged and controlled to insert the simultaneously driven staples in transverse rows and the successively driven staples in longitudinal rows.

23. In a stapling machine, means for feeding the work, stapler mechanism to perform the necessary operation on the work, wire feeding devices to feed wire to said mechanism for the making of the staples, means to automatically operate said devices by the operation of said machine, rotary mechanism to automatically govern the operation of said wire feeding devices, thereby to control the action of the machine on the work, means forming a controller for said rotary governing mechanism, means to automatically actuate said controller in accordance with the forward feeding motion of the work, and instrumentalities to operate said work feeding means and said stapler mechanism to cause the desired action on the work.

24. A structure as specified in claim 23, said rotary governing mechanism comprising a rotary cam wheel and means operated by the feeding motion of the work feeding means to intermittently rotate said cam.

25. A structure as specified in claim 23, said rotary governing mechanism being subject to intermittent rotation by the feeding motion of the work feeding means.

26. A structure as specified in claim 23, said rotary mechanism comprising a ratchet operated by the feeding motion of the work feeding means.

27. A structure as specified in claim 23, said controller being mounted to move up and down to exercise the desired control over said rotary governing mechanism.

28. In a work stapling machine, the combination of work feeding means, staple driving mechanism, a controller, means on said work feeding means to engage said controller, means whereby said controller is mounted to move up and down when engaged and released by said engaging means, and instrumentalities actuated by the work feeding motion and governed automatically

by said controller to automatically control the action of said staple driving mechanism on the work.

29. In a stapling machine, the combination of work feeding means, stapling mechanism to operate upon the work, wire feeding means to feed wire to said mechanism, said wire feeding means comprising feed rolls having an eccentric device to control the feeding action of the wire between the rolls, and instrumentalities actuated in accordance with the feeding motion of the work to automatically actuate said eccentric device, thereby to automatically control the action of the stapling mechanism on the work.

30. A structure as specified in claim 29, said eccentric device having means including a spring to maintain the rolls in feeding relation, said spring being connected in position to yield when said eccentric device is actuated to cause separation of said rolls to stop the feeding of the wire.

31. A structure as specified in claim 29, said eccentric device having means for manually causing separation of the two rolls.

32. A structure as specified in claim 29, said eccentric device having an arm, and means for normally holding said arm in position to maintain the two rolls in feeding relation to each other, said means for automatically actuating said eccentric device comprising a rock shaft, means for automatically operating said rock shaft and an arm on said rock shaft to engage said eccentric arm, thereby to cause separation of the two rolls.

33. In a stapling machine, a stapler, work feeding mechanism for feeding work beneath the stapler, rotary driven feed rolls for feeding wire to the stapler, mechanism for moving one roll toward and away from the other without stopping the rotary motion whereby to govern the intermittent feeding of the wire, and instrumentalities actuated by said work feeding mechanism to automatically control said last named mechanism.

34. In a stapling machine, a stapler, work feeding mechanism for feeding work beneath the stapler, rotary driven feed roll mechanism to feed wire to the stapler adapted by rotation to feed wire intermittently, and instrumentalities actuated by the work feeding means to automatically control the action of said last named mechanism without stopping the rotary motion thereof.

EDWARD CRAIG.