E. E. WINKLEY.

AUTOMATIC SHOE MACHINE.

APPLICATION FILED JULY 3, 1908.

1,018,860.

Patented Feb. 27, 1912.

5 SHEETS—SHEET 1.

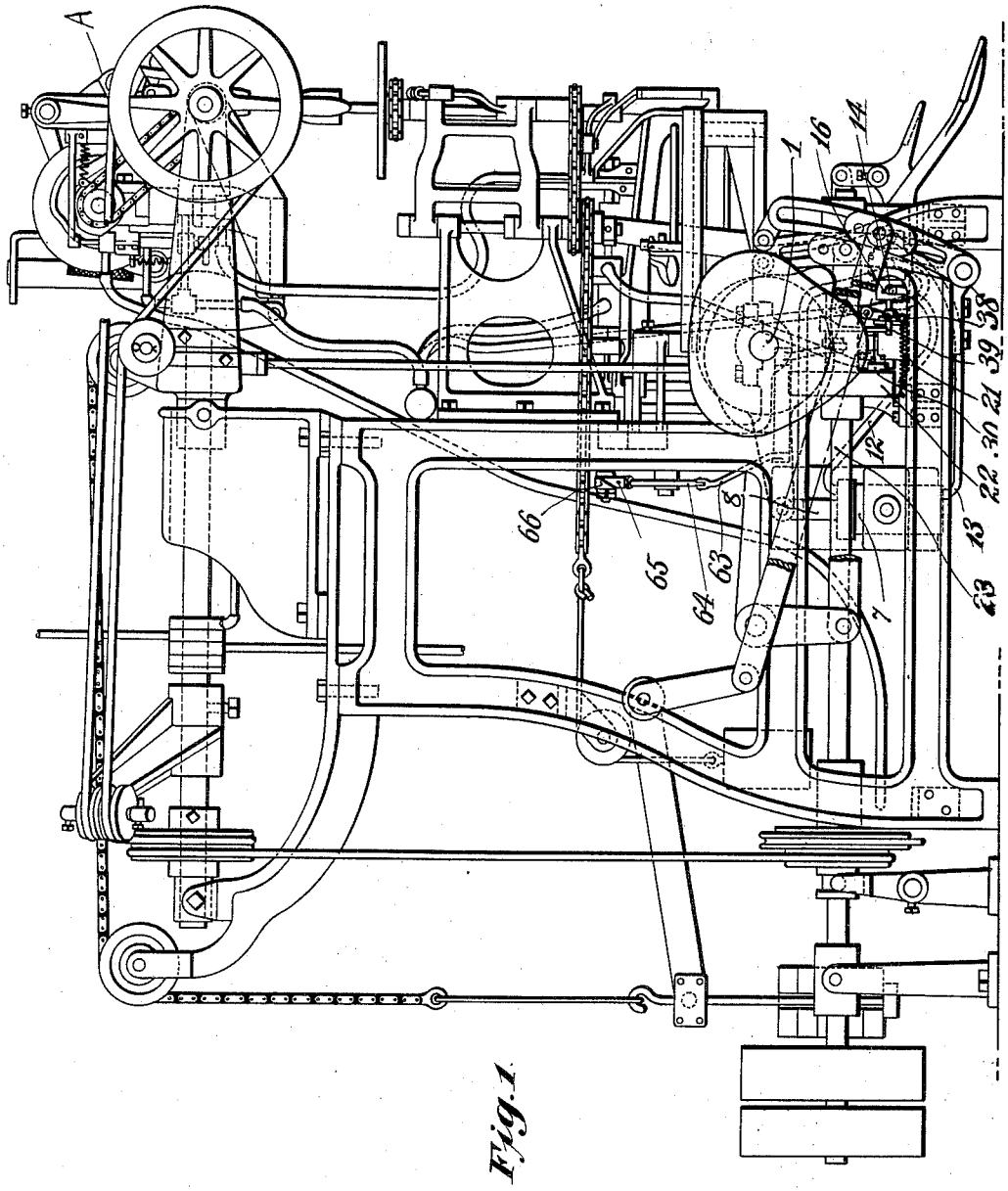


Fig. 1.

Witnesses:

E. C. Wurdeman

N. D. McPhail

Inventor:

Erastus E. Winkley

by Phillips Van Everen & Fish

Attys

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

E. E. WINKLEY.

AUTOMATIC SHOE MACHINE.

APPLICATION FILED JULY 3, 1908.

1,018,860.

Patented Feb. 27, 1912.

5 SHEETS—SHEET 2.

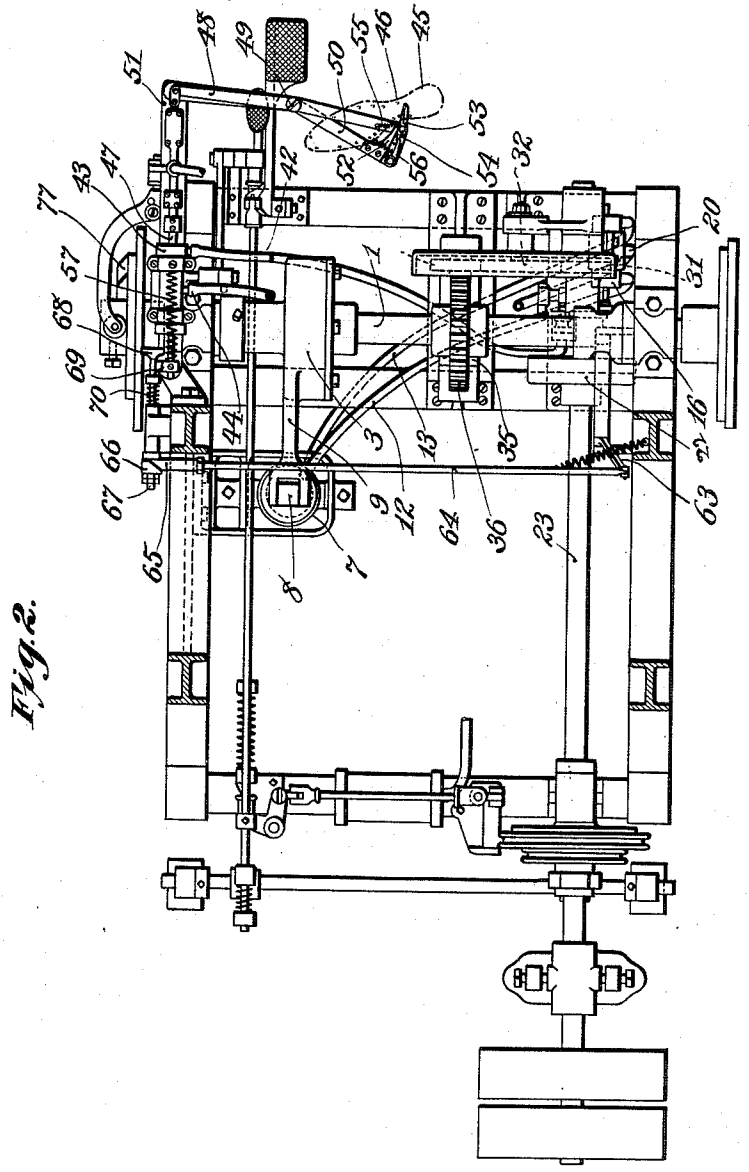


Fig. 2.

Witnesses:

E. C. Burdeman

N. D. McPhail

Inventor:

Erastus E. Winkley

by

Phillips Van Everen & Fish

Attys

E. E. WINKLEY.

AUTOMATIC SHOE MACHINE.

APPLICATION FILED JULY 3, 1908.

1,018,860.

Patented Feb. 27, 1912.

5 SHEETS—SHEET 3.

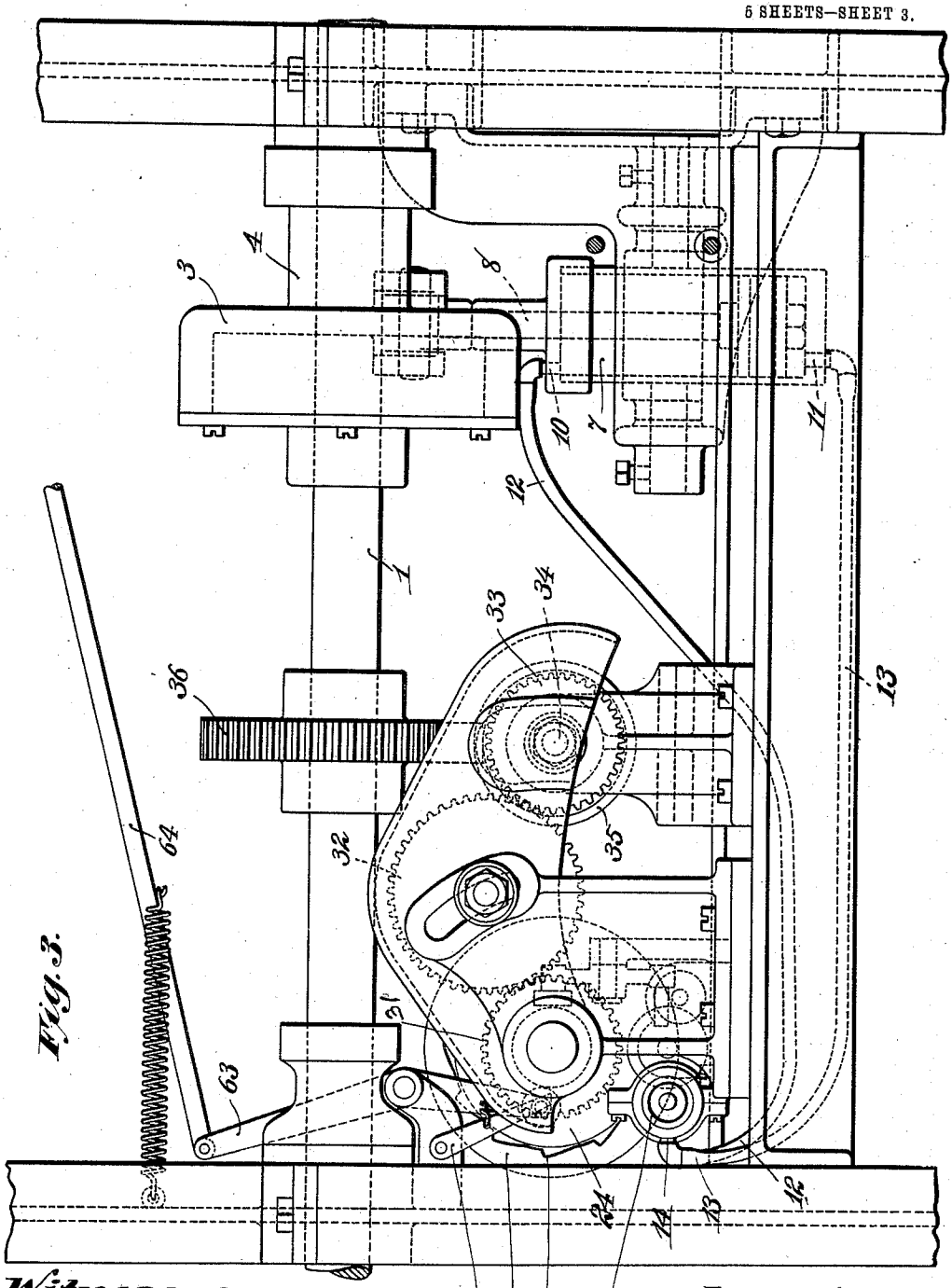


Fig. 3.

Witnesses:

E. C. Wurdeman

N. D. McOhail

Inventor:

Erastus E. Winkley

by Phillips Van Everen & Fyfe

Attys

E. E. WINKLEY.

AUTOMATIC SHOE MACHINE.

APPLICATION FILED JULY 3, 1908.

1,018,860.

Patented Feb. 27, 1912.

5 SHEETS—SHEET 4.

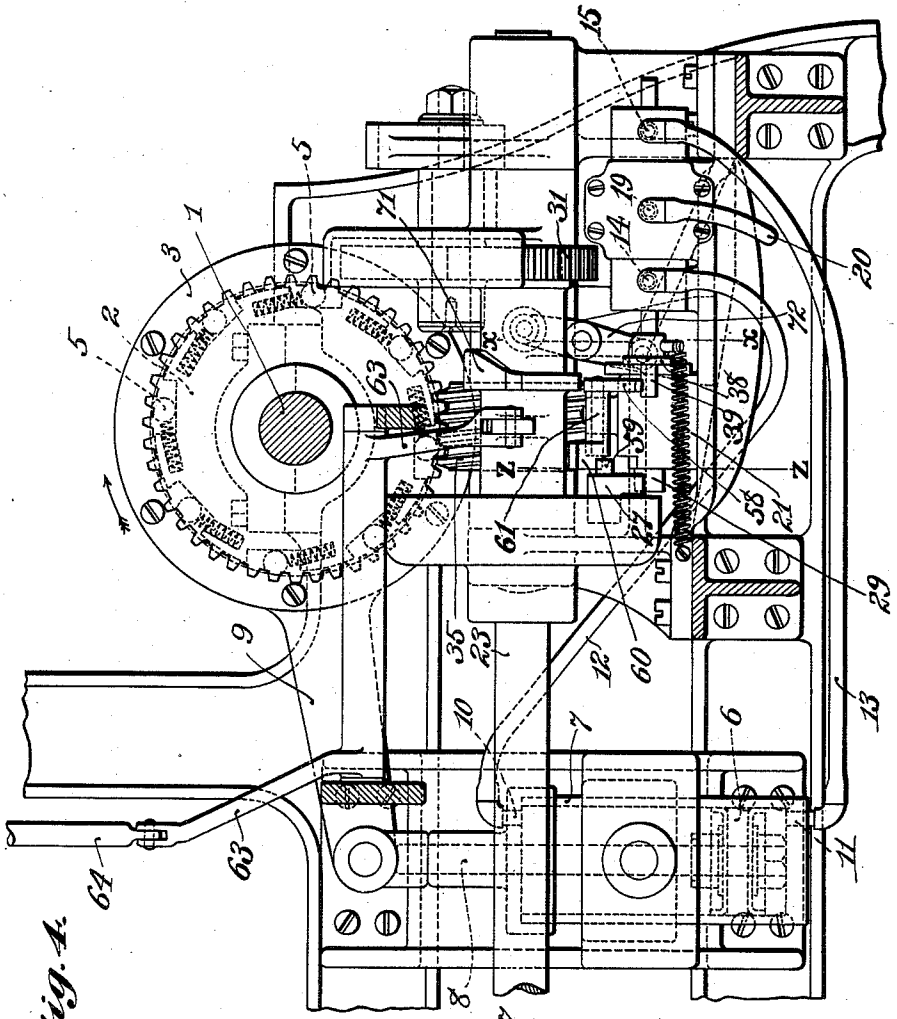


Fig. 4.

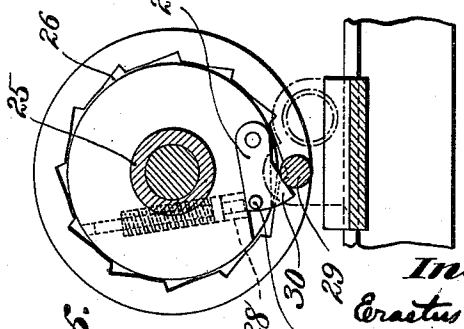


Fig. 5.

Witnesses:

E. C. Wurdeman

K. D. McPhail

Inventor:

Erastus E. Winkley

by

Phillipps Van Everen & Fish

Attys.

E. E. WINKLEY.

AUTOMATIC SHOE MACHINE.

APPLICATION FILED JULY 3, 1908.

1,018,860.

Patented Feb. 27, 1912.

5 SHEETS—SHEET 5.

Fig. 7.

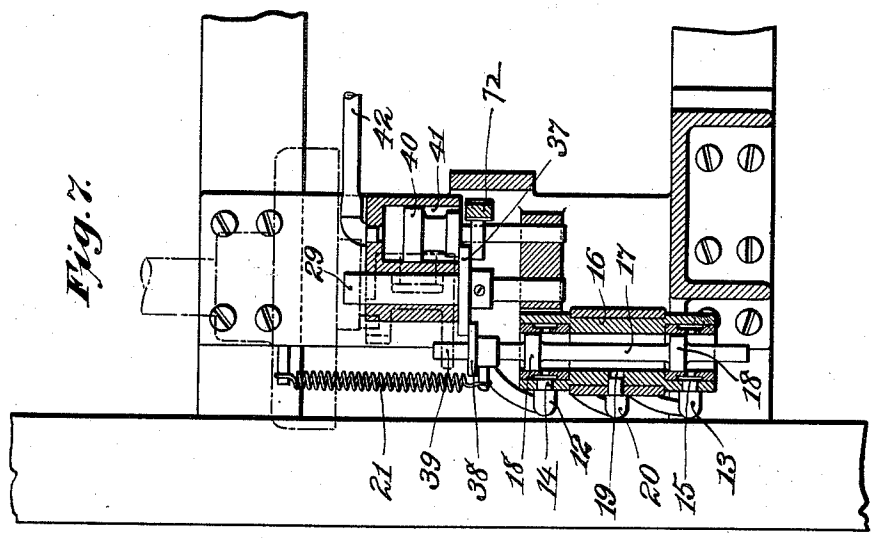
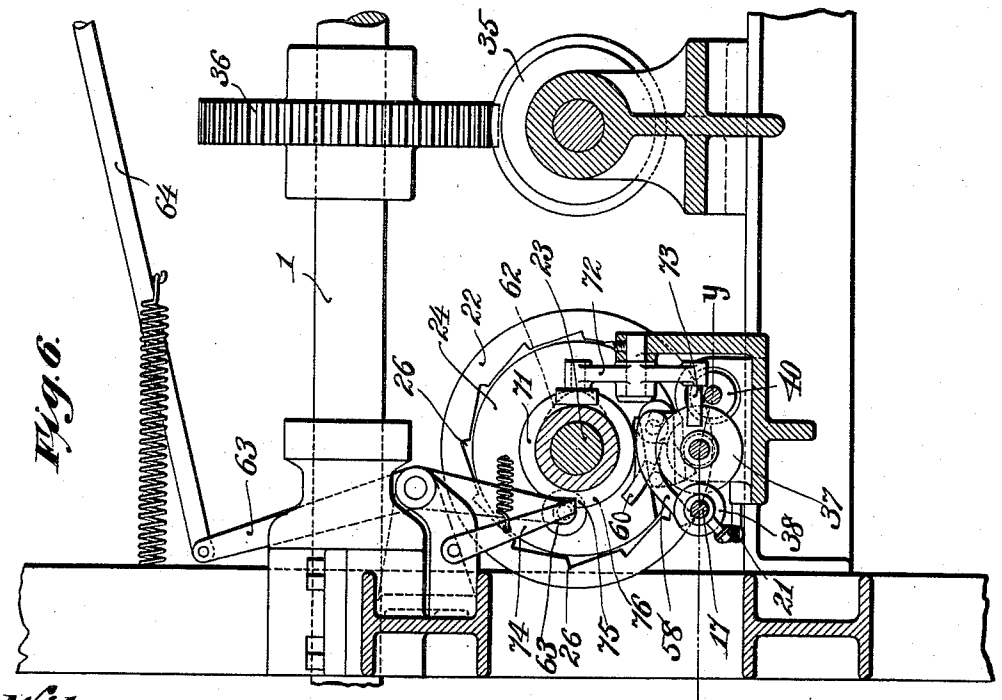


Fig. 6.



Witnesses:

E. C. Wurdeman

N. D. McOhail

Inventor:

Erastus E. Winkley

by Phillips Van Everen & Fiske

Attys.

UNITED STATES PATENT OFFICE.

ERASTUS E. WINKLEY, OF LYNN, MASSACHUSETTS.

AUTOMATIC SHOE-MACHINE.

1,018,860. Specification of Letters Patent. Patented Feb. 27, 1912.

Application filed July 3, 1908. Serial No. 441,724.

To all whom it may concern:

Be it known that I, ERASTUS E. WINKLEY, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Automatic Shoe-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to machines for operating upon boots and shoes in which the relative movements between the shoe and operating means are automatically effected and controlled as the point of operation of the operating means is transferred around the shoe so that the shoe is acted upon automatically without any attention on the part of the operator. In machines of this type the shoe is supported upon a jack and mechanism is provided for automatically correcting the relative position of the jack and the instrumentalities operating upon the shoe as the point of operation is transferred about the shoe.

The object of the invention is to provide a mechanism for controlling and operating the correcting mechanism of this type of machine which shall be simple in construction, and which shall operate in a certain and reliable manner and with little strain and wear upon the parts.

To this end the invention consists in certain features and combinations set forth in the claims, the advantages of which will be obvious to persons skilled in the art from the following detail description of a machine which embodies the various features of the invention in their preferred forms.

The invention will be readily understood from an inspection of the accompanying drawings, in which—

Figure 1 is a side elevation of a machine embodying the invention; Fig. 2 is a sectional plan view with certain of the parts removed to show the mechanism for operating and controlling the movements of the shaft which carries the cams of the correcting mechanism; Fig. 3 is a detail elevation looking toward the left in Fig. 2; showing parts of the operating and controlling mechanism; Fig. 4 is a sectional elevation looking toward the right in Fig. 3; Fig. 5 is a sectional detail on line *z*—*z*, Fig. 4; Fig. 6 is a sectional detail on line *x*—*x*, Fig. 4; and Fig. 7 is a sectional view on line *y*—*y*, Fig. 6.

In the drawings the invention is shown embodied in a machine similar in many respects to the machine illustrated in my prior application No. 301,578, filed February 17, 1906, and application No. 325,567, filed July 11, 1906, and in British Patent No. 14,139, of 1905. In this machine the means for operating upon the shoe consists of a sewing mechanism indicated at "A" in the drawing which is the same in construction as the well known Goodyear welt and turn shoe sewing machine disclosed in Patent No. 412,704 October 8, 1889. The shoes to be operated upon are carried upon a jack, and correcting mechanism is provided for changing the relative position of the sewing mechanism and the shoe as the sewing operation progresses. This correcting mechanism includes a series of cams secured upon a cam shaft to which intermittent movements are imparted at proper intervals during the transfer of the point of operation of the sewing mechanism about the shoe. The construction and arrangement of these parts of the machine are the same as in the machine shown and fully described in the above applications.

In the machine shown in the drawings the shaft to which the cams of the correcting mechanism are secured is indicated at 1, and this shaft is intermittently actuated through a driving clutch, one member of which consists of a disk 2 secured to the shaft, and the other member of which consists of a drum 3 surrounding the member 2, and provided with hubs 4 mounted to turn freely upon the shaft. The member 2 is provided with a series of recesses in which the spring pressed balls 5 of the clutch are mounted so that they will act to bind the two members of the clutch together when the member 3 is moved in the direction of the arrow, Fig. 4, and will allow free movement of the member 3 with relation to the member 2 when moved in the reverse direction. The mechanism for operating the clutch member 3 consists of a piston 6 mounted in a cylinder 7 and connected by means of a piston rod 8 with an arm 9 which projects from the clutch member 3. Compressed air or other motive fluid is alternately admitted to the ends of the cylinder 7 through ports 10 and 11 which are connected by means of pipes 12 and 13 with ports 14 and 15 formed in a valve casing 16.

The supply and exhaust of compressed air through the pipes 12 and 13 is controlled by a valve 17 mounted in the valve casing and provided with pistons 18. The interior of the valve casing between the pistons 18 is connected with an air compressing device (not shown) through a port 19 and pipe 20. The valve 17 is held normally in the position indicated in Fig. 7 by a spring 21. When in this position, the port 15 is open to the atmosphere, and the port 14 is in communication with the air supply, so that the piston 6 is normally held at the lower end of the cylinder 7 as indicated in Fig. 4. When the valve 17 is advanced against the tension of the spring 21, the port 14 is opened to the atmosphere, and the port 15 is put into communication with the air supply, so that the piston 6 is forced upward in a direction to actuate the driving clutch. When the valve is returned to normal position, the port 15 is opened to the atmosphere, and air pressure is supplied to the upper end of the cylinder through the port 14, so that the driving clutch is thrown out of action and the piston 6 returned to the lower end of the cylinder. The devices for operating the valve to throw the driving clutch into and out of action will be described later.

The extent and duration of the movements imparted to the correcting mechanism by the driving clutch is determined by a timing mechanism. The timing mechanism comprises an intermittently acting clutch, one member of which consists of a disk 22 secured to the main driving shaft 23 of the machine, and the other member of which consists of a disk 24 formed on a sleeve 25 loosely mounted on the driving shaft. The clutch member 22 is provided with ratchet teeth 26, and the clutch member 24 carries a pawl 27 which is yieldingly forced in a direction to engage the teeth 26 by a spring pressed pin 28 (Fig. 5). The pawl 27 is normally held out of engagement with the teeth 26 by a controlling pin 29 arranged to be engaged by a projection 30 on the pawl 27. When the pin 29 is withdrawn, the pawl 27 immediately moves outward so that it engages one of the teeth 26 of the clutch member 22, and the sleeve is driven by the clutch until the pin 29 is moved into the path of the pawl 27, when the projection 30 on the pawl rides against the pin, lifting the pawl out of engagement with the ratchet teeth 26, and holding it out of engagement until the pin is again withdrawn. The sleeve is provided with a gear 31 which is connected through an intermediate gear 32 with a gear 33 secured on a worm shaft 34. The worm shaft 34 carries a worm 35 which engages a worm wheel 36 secured to the shaft 1. By these connections the movements of the cam shaft 1 will be accurately timed and determined by the rotation of the sleeve 25, while the driving of the cam shaft is effected through the driving clutch mounted on the cam shaft. Comparatively little work is put upon the clutch of the timing mechanism, therefore, and this clutch may be quickly thrown into and out of action in a certain and reliable manner, and with little strain or wear upon the parts.

The controlling pin 29 through which the timing clutch is thrown into and out of action is provided with a collar 37 (Fig. 7) arranged to engage a collar 38 secured to the stem 39 of the valve 17, so that both the timing clutch and driving clutch are thrown into action by the movement of the pin 29 in a direction to release the pawl 27. The controlling pin 29 is operated to throw the driving and timing clutches into action through a piston 40 mounted in a cylinder 41, and engaging the collar 37 on the pin. The piston 40 is operated by means of compressed air admitted to the cylinder 41 through a pipe 42 which leads from the cylinder to the casing 43 of a controlling valve. This valve is similar in construction to the corresponding valve shown and described in the applications and patent above referred to. The valve casing 43 is connected through a pipe 44 with an air compressing device (not shown), and the valve within the valve casing is normally held in such position that the pipe 42 is in communication with the atmosphere.

The movement of the controlling valve within the casing 43 in a direction to open communication between the pipe 42 and the pipe 44, and thus throw the timing and driving clutches into operation, is controlled by a tripping mechanism which is operated at intervals as the point of operation of the sewing mechanism is transferred around the shoe. This tripping mechanism is the same in construction as the tripping mechanism shown and described in the applications above referred to, and is illustrated in Fig. 2. The tripping mechanism comprises a controller plate 45 having the general form of a shoe sole, and connected to move with the shoe supporting jack. The controller plate is provided with a series of pins 46 which act as trips to intermittently cause the shifting of the controller valve to throw the timing and driving clutches into operation. The stem 47 of the controller valve is connected to a valve lever 48 which is pivoted at 49 to a supporting arm 50. The supporting arm is pivoted on an arm 51 which carries the controlling valve, and is forced yieldingly in a direction to bear against the controller plate 45 by a spring (not shown) which surrounds its pivot. The supporting arm is provided at its free end with an extension 52 which rides against the edge of the controller plate during the sewing operation. By this arrangement the valve lever

48 is normally held in such position that the trip pins 46 will engage a latch 53 pivoted on the valve lever, and held normally in position against a stop pin 54 by a spring 55. In this position the latch engages a detent 56 pivoted on the arm 50, and thus the valve lever is held in position to prevent the movement of the controlling valve by the spring 57 which tends to move the valve in a direction to open communication between the air compressing device and the pipe 42. Upon the engagement of the latch 53 by one of the trip pins, the latch is swung so as to disengage the detent 56, and the valve lever is released, so that the spring 57 may move the controlling valve toward the right in Fig. 2, thus connecting the pipe 42 with the air supply, and operating the controlling pin 29 to throw the timing and driving clutches into operation.

When the valve 17, which controls the operation of the driving clutch, is shifted by the movement of the pin 29 to throw the driving clutch into operation, a latch 58 drops down behind the end of the valve stem 39, and prevents the return of the valve to normal position under the influence of the spring 21. Compressed air will therefore be supplied to the cylinder 7 below the piston 6, and will tend to force the piston upward, and to advance the cam shaft 1 until the latch 58 is operated to release the valve 7 and allow it to be returned to normal position by the spring 21. The latch 58 is operated to thus release the valve 17 when the timing clutch is thrown out of action. For this purpose the clutch pawl 27 is provided with a projecting pin 59 arranged to engage an arm 60 which is secured to the rock shaft 61 which carries the latch 58. When the clutch pawl is disengaged by its engagement with the pin 29, the pin 59 on the pawl lifts the arm 60 and thus lifts the latch 58 out of engagement with the valve stem 39 so that the valve 17 may return to its normal position.

When the controlling valve is tripped by one of the pins on the controlling plate, the valve and tripping mechanism is re-set before the timing clutch has made a complete revolution. The re-setting mechanism comprises a cam 62 formed on the sleeve 25 of the timing mechanism, and arranged to engage a roll on the lower end of a lever 63, the upper end of which is connected by a link 64 with a cam block 65. The cam block is provided with a wedge shaped end arranged to engage a corresponding surface formed on a collar 66 which is secured to a rod 67 (Fig. 2). The rod 67 carries a collar 68 arranged to engage a collar 69 secured to the stem 47 of the controller valve. The rod 67 is normally forced forward by a spring 70. After the timing clutch and sleeve have made a partial revolution, the re-setting cam 62 engages the lever 63 and advances the cam block 65, thus retracting the rod 67 so that the collar 68 engages the collar 69 and draws the controller valve toward the left in Fig. 2 against the tension of the spring 57, thus re-setting the tripping mechanism and returning the valve to normal position.

During the revolution of the timing clutch and sleeve the controlling pin 29 is returned to normal position, so that the timing clutch is thrown out of operation after it has made a single revolution. The devices for thus returning the controlling pin comprises a cam 71 formed on the sleeve 25 and arranged to engage a roll carried by the upper end of a lever 72. The lower end of the lever 72 is provided with a laterally projecting pin 73 arranged to engage the collar 37 which is secured to the controlling pin. After the sleeve has partially completed a revolution, the cam 71 engages the roll on the upper end of the lever 72, and rocks the lever in a direction to advance the pin so that its forward end projects into the path of the extension 30 on the pawl 27. As the clutch and sleeve completes its revolution, therefore, the pawl 27 rides against the pin 29 so that the clutch is disengaged and the rotation of the sleeve and timing mechanism is arrested. The sleeve 25 is held against rebound by a locking pawl 74 arranged to engage a notch 75 formed in the cam flange 76.

In addition to the tripping mechanism already described, the machine is provided with mechanism for tripping the controller valve stem 47 during each cycle of operations performed by the sewing machine when sewing around the toe. This mechanism is the same in construction as the corresponding mechanism shown and described in the applications above referred to, and is controlled by a cam 77 secured to the cam shaft 1, and acting through connections which are fully described in said applications and patent.

Although the invention has been described as embodied in a machine for sewing shoes, it will be understood that it is applicable to machines for performing operations of various kinds where the services of a skilled operator are usually necessary to guide the shoe, and it will also be understood that the invention is not limited to the details of construction and arrangement illustrated and described, and that the specific construction and arrangement of the parts may be varied or modified without departing from the invention.

Having set forth the nature and object of the invention, what I claim is:—

1. An automatic shoe machine, having, in combination, means for operating on a shoe, a jack, mechanism for correcting the relative position of the operating means and jack, a driving mechanism therefor, a timing mechanism actuated independently of the

driving mechanism for controlling the movements imparted to the correcting mechanism by the driving mechanism, and controlling mechanism acting to intermittently throw the timing mechanism into operation, substantially as described.

2. An automatic shoe machine, having, in combination, means for operating upon a shoe, a jack, mechanism for correcting the relative position of the operating means and jack, a driving mechanism therefor, timing mechanism actuated independently of the driving mechanism for controlling the movements imparted to the correcting mechanism by the driving mechanism, and controlling mechanism acting to intermittently throw the driving mechanism and the timing mechanism into operation, substantially as described.

3. An automatic shoe machine, having, in combination, means for operating upon a shoe, a jack, mechanism for correcting the relative position of the operating means and jack, a driving mechanism therefor, a timing mechanism actuated independently of the driving mechanism for controlling the movements imparted to the correcting mechanism by the driving mechanism including a clutch, controlling means acting to throw the clutch into action at intervals as the point of operation of the operating means is transferred around the shoe, and means acting automatically to re-set the controlling means and to throw the clutch out of action, substantially as described.

4. An automatic shoe machine, having, in combination, means for operating on a shoe, a jack, mechanism for correcting the relative position of the operating means and jack, a driving clutch for operating the correcting mechanism, and a timing mechanism actuated independently of the driving clutch for controlling the movements imparted to the correcting mechanism through the driving clutch, and controlling mechanism acting to throw the timing mechanism into and out of action at intervals as the point of operation of the operating means is transferred around the shoe, substantially as described.

5. An automatic shoe machine, having, in combination, means for operating on a shoe, a jack, mechanism for correcting the relative position of the operating means and jack, a driving clutch connected to operate the correcting mechanism, a timing mechanism for controlling the movements imparted to the correcting mechanism through the driving clutch including a clutch, and controlling mechanism acting to throw the timing clutch into action at intervals as the point of operation of the operating means is transferred around the shoe, and means acting automatically to re-set the controlling means and throw the timing clutch out of action, substantially as described.

6. An automatic shoe machine, having, in combination, means for operating on a shoe, a jack, mechanism for correcting the relative position of the operating means and jack, a driving clutch therefor, a timing mechanism including a clutch, controlling mechanism acting to throw the clutches into action at intervals as the point of operation of the operating means is transferred around the shoe, and means acting automatically to re-set the controlling means and to throw the clutches out of action, substantially as described.

7. An automatic shoe machine, having, in combination, means for operating on a shoe, mechanism for correcting the relative position of the operating means and jack, a ratchet clutch for driving the correcting mechanism, mechanism actuated independently of the clutch for controlling the movements imparted to the correcting mechanism by the ratchet clutch, and means for intermittently operating the controlling mechanism during the transfer of the point of operation around the shoe, substantially as described.

8. An automatic shoe machine, having, in combination, means for operating on a shoe, a jack, mechanism for correcting the relative position of the operating means and jack, mechanism for intermittently operating the correcting mechanism, including a clutch, a pin for controlling the engagement and disengagement of the clutch, controlling mechanism for moving the pin into clutch engaging position at intervals, and a cam driven by the clutch for moving the pin into clutch disengaging position, substantially as described.

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

ERASTUS E. WINKLEY.

Witnesses:
N. D. McPHAIL,
ANNIE C. RICHARDSON.