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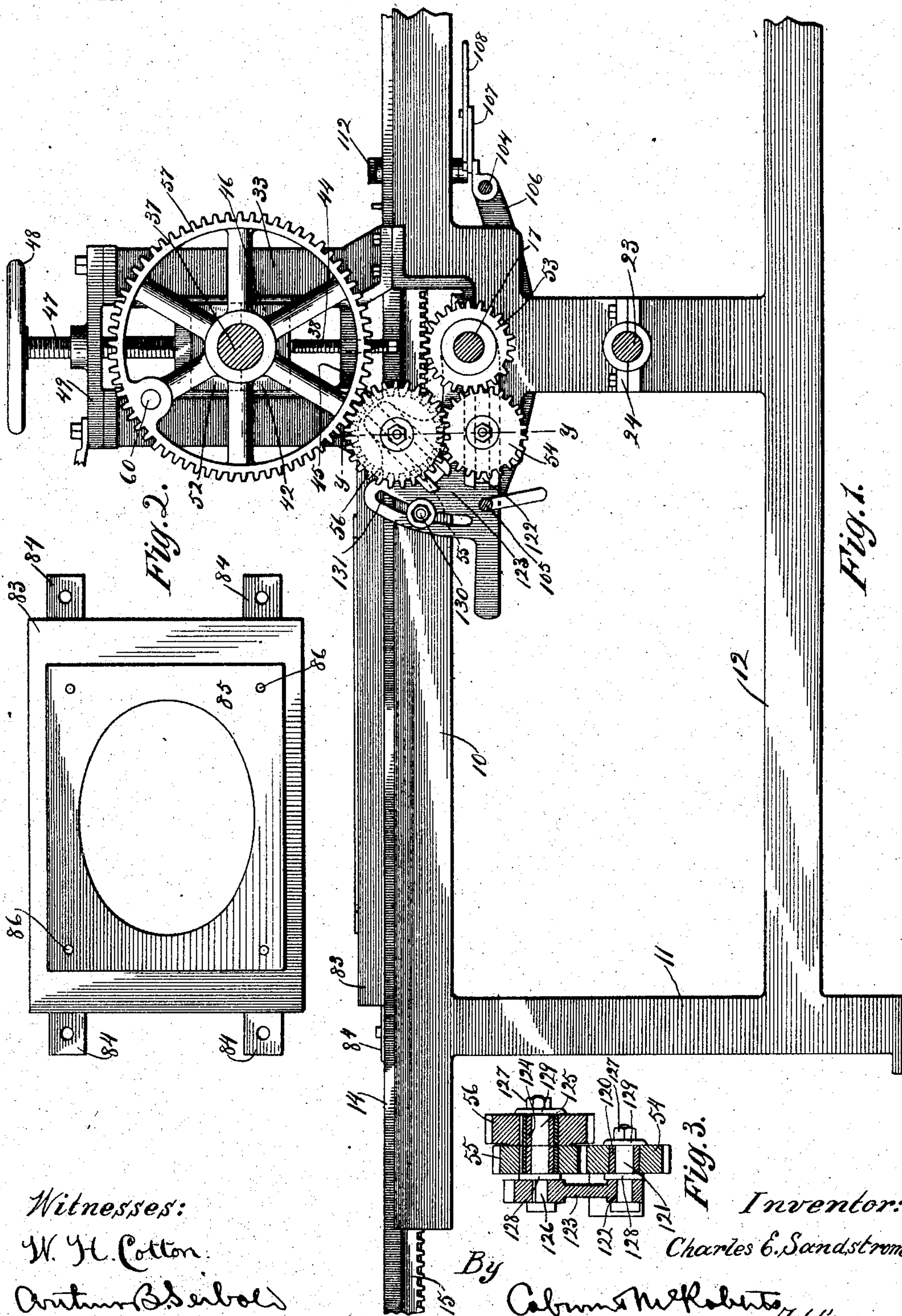
PATENTED OCT. 18, 1904.

C. E. SANDSTROM.
PICTURE FRAME PUTTYING MACHINE, &c.

APPLICATION FILED SEPT. 12, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



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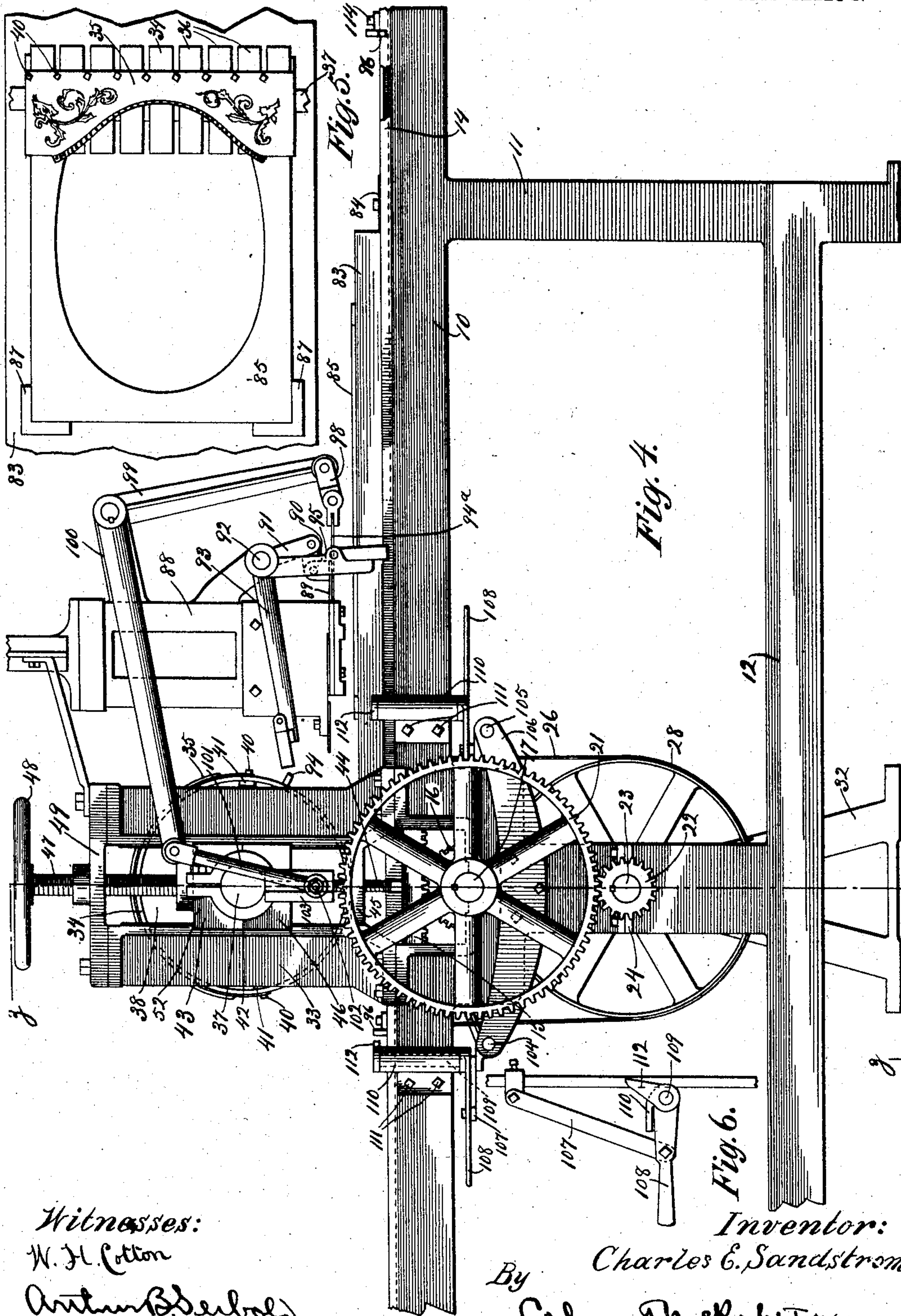
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3 SHEETS—SHEET 2.



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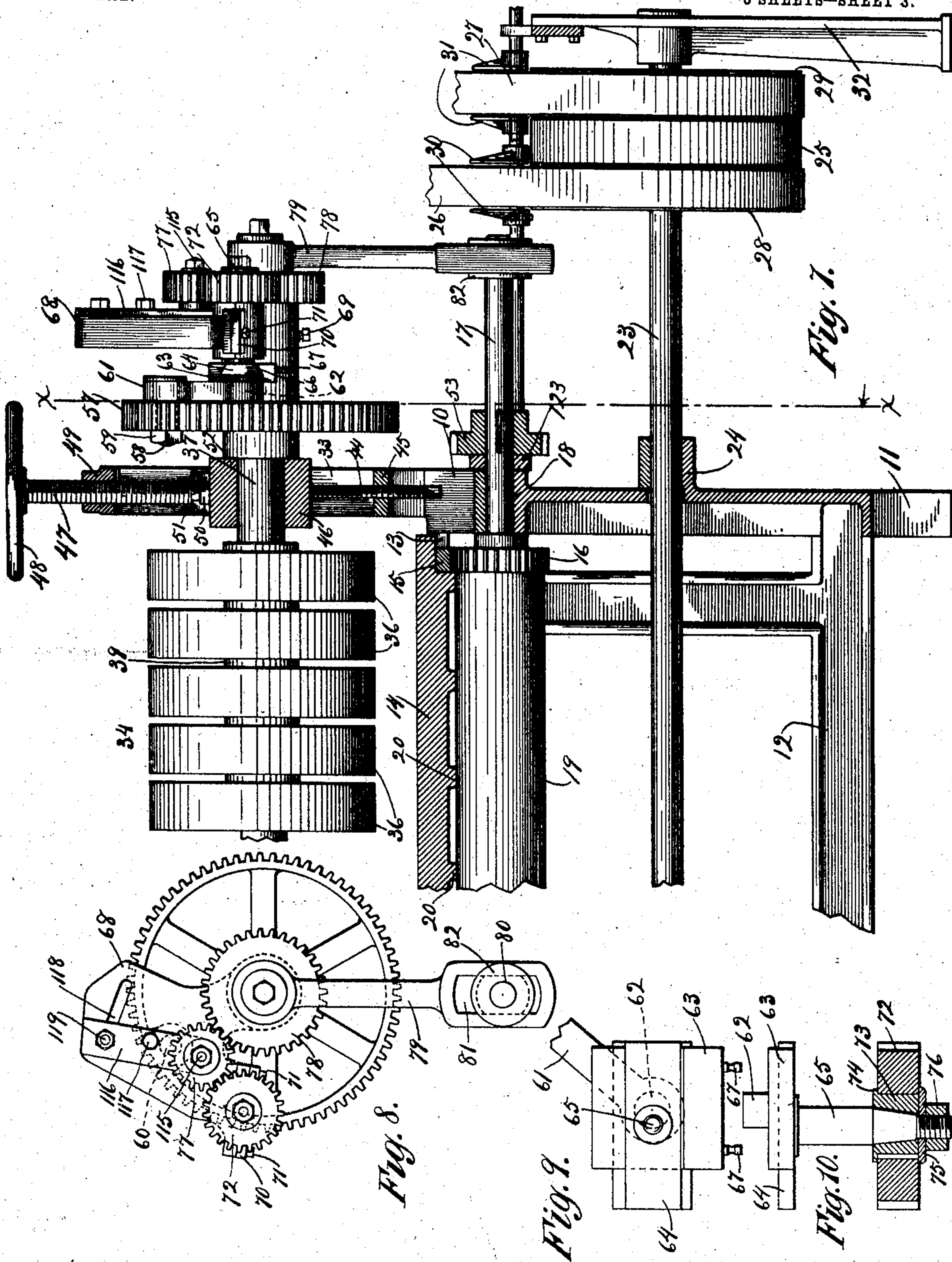
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NO MODEL.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

CHARLES E. SANDSTROM, OF CHICAGO, ILLINOIS.

PICTURE-FRAME-PUTTYING MACHINE, &c.

SPECIFICATION forming part of Letters Patent No. 772,433, dated October 18, 1904.

Application filed September 12, 1903. Serial No. 172,880. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SANDSTROM, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Picture-Frame-Puttying Machines, &c., of which the following is a specification.

This invention relates to machines for puttying and decorating picture-frames and similar articles.

The invention comprises, in general terms, a reciprocating bed designed to support the picture-frame or other article to be decorated and move the same under a roll to which is secured an embossing-die for imparting the desired design to the putty, suitably applied to the frame. To avoid changing the die in operating on frames of different lengths, I preferably provide means whereby the same die may be employed within certain limits for frames of varying sizes, and this is accomplished by mechanism for drawing out the design to the extent necessary. To accomplish this result, provision is made for changing the relative speeds of the reciprocating bed and the embossing-die. In the embodiment of the invention herein set forth the desired end is attained by providing means for changing the speed of the roller, which under normal conditions moves at the same speed as the reciprocating bed during its movement, so that while the speed of the frame carried by the reciprocating bed is constant and uniform the movement of the die-roll is retarded or made to lag behind the frame at a certain period or point in its rotation, to the end that the design is drawn out to the extent necessary to compensate for the difference in the lengths of the frame and the particular die being used.

The invention further contemplates the provision of means for automatically throwing out of operation the driving mechanism to arrest the movement of the reciprocating bed and die-roll and means for adjusting the machine to accommodate frames of different thicknesses.

The above and other features of the invention are fully set forth in the accompanying de-

scription and particularly designated in the appended claims.

In the drawings, Figure 1 is a sectional elevation on the line *x x* of Fig. 7 of a picture-frame puttying and decorating machine constructed in accordance with my invention. Fig. 2 is a plan of a table designed to be secured to the reciprocating bed and showing a picture-frame mounted thereon and means for securing the same in place. Fig. 3 is a section on the line *y y* of Fig. 1. Fig. 4 is a side elevation of the machine viewed from the side opposite to that seen in Fig. 1 and showing a feeding device for supplying the putty to the frame. Fig. 5 is a detail of the embossing-die and the roll upon which the die is secured, together with a portion of the frame-supporting table, and showing a different manner of holding the frame. Fig. 6 is a detail of the lever and sliding rod for shifting one of the driving-belts. Fig. 7 is a sectional elevation of one side of the machine, taken on the line *z z* of Fig. 4. Fig. 8 is a side elevation of the mechanism for varying the speed of the die-roll. Fig. 9 is a side elevation of the slide-block and slide for regulating the variation in speed; and Fig. 10 is an edge view of the same, showing in section the stationary gear employed therewith.

The machine may be supported upon any suitable frame, such as that shown in the drawings, and consisting of the side rails 10, supported by legs 11, connected by cross bars or braces 12. Secured to the inner faces of the rails 10 or cast integral therewith are tracks 13, one of which is shown in Fig. 7, and reciprocating on and partially supported by such tracks at its side edges is a bed 14. This bed is provided on its under face, adjacent the side edges thereof, with rack-bars 15, with which mesh, so as to reciprocate the bed 14, pinions 16, fixed on a horizontal shaft 17, journaled on the supporting-frame of the machine, as at 18. The shaft 17 has fixed thereon between the pinions 16 a roller 19, which assists the track in supporting the reciprocating bed, which bed is preferably provided on its under face with longitudinal ribs 20, resting and passing over the roller 19 during the reciprocation of the bed, as shown

in Fig. 5. One end of the shaft 17, projecting beyond the side of the frame, has secured thereon a large gear 21, to which motion is communicated by a pinion 22, meshing there-
 5 with and fixed on the adjacent end of the driving-shaft 23, journaled in the sides of the supporting-frame, as at 24, and extending parallel with the shaft 17. The end of the shaft 23 opposite the pinion 22 is extended
 10 beyond the side of the frame and has fixed thereon a driving-pulley 25, to which motion is communicated by a pair of belts 26 and 27, driven from any suitable source of power and which are designed to be moved onto the
 15 said pulley in alternation, and in order to reverse the movement of the shaft so as to impart a reciprocating movement to the bed 14 one of such belts is intended to be crossed. The belts 26 and 27 normally run over a pair
 20 of idle pulleys 28 and 29, journaled on the drive-shaft 23, and are shifted onto and off the active pulley 25 by means of belt-shifters 30 and 31, hereinafter to be more fully described. The extended end of the shaft 23
 25 may be journaled in a standard 32, located beyond the side of the machine, as shown in Fig. 7, in order to properly support the same.

Mounted on each of the side rails 10 and extending above the roller 19 is a vertical
 30 standard or support 33, and carried by these standards is a roll 34, designed to have attached thereto the embossing-die 35, as shown in Fig. 5. In the construction illustrated the roll 34 comprises a series of disks or drums
 35 36, fixed on a shaft 37, which is located directly over and parallel with the roller 19 and journaled in bearings carried by the standards 33. The disks 36 are spaced apart a slight distance in any suitable manner, as by means
 40 of the extended hubs 39 thereof.

The embossing or decorating die 35 is shown in Fig. 5 and is of the required shape to impress the design thereof on the putty laid on the frame around the opening thereof or on
 45 the surface of other articles to be decorated. The die may be made of wood or cast from metal or a suitable composition and is curved to conform to the roll and may be fastened to the roll in any suitable manner and by any
 50 preferred means. In the construction illustrated the die-plate is provided with apertures near each edge thereof, and through these apertures are passed cap-screws 40, entering between the disks 36, which are spaced apart
 55 for this purpose and engage threaded apertures in strips or blocks 41, located on the inner face of the rims of the disks. When the screws are tightened up, the die is rigidly clamped on the roll and between the screw-
 60 heads and the strips 41. These strips are not secured to the disks, but are designed to be adjusted around the inner face of the disk-rims. With the construction shown a die of any desired size up to the length and circum-
 65 ference of the roll may be employed.

Means are preferably, though not necessarily, provided for varying the distance between the reciprocating bed and the die-roll 34 in order to adapt the machine to frames or other
 70 articles of different thicknesses, and this end may be attained by making the bearings in which the shaft 37 turns vertically adjustable, as shown. In the construction illustrated the standards 33 are provided with vertical slots
 75 38, and suitably mounted in such slots, so as to slide therein, are the bearings 42, which for convenience in assembling the parts are made in two sections and provided with flanges 43,
 80 which engage the sides of the standards 33 to prevent lateral displacement. Each of the bearings 42 is adjusted and held by a screw-bolt 44, which passes through an internally-threaded aperture in a cross-piece 45 of the
 85 standard 33 and engages the under section 46 of the bearing 42, and a screw-rod 47, having a hand-wheel 48 and passing through a yoke or cross-piece 49 at the top of the standard and having a head 50 at its lower end, swiveled in a socket 51 in the top of the bearing-
 90 sections 52.

The die-roll 34 and bed 14 may be driven at the same surface speed through the medium of any suitable means when the die employed is of such size as to complete a frame moving
 95 at the same speed as the die. Inasmuch, however, as picture-frames vary in the length of the oval opening, to avoid a change of gears to vary the relative speed of the die-roll and reciprocating bed in order to draw out the design or the use of different dies with each va-
 100 riation in the size of the frames I provide in one machine means now to be described for varying the relative speeds of the die-roll and reciprocating bed as desired within certain limits, so that a die employed under normal
 105 conditions for a certain size frame may be used for a frame of the same width, but considerably longer.

Secured on the end of the shaft 17, opposite the gear 21, is a pinion 53, which meshes with
 110 and drives an idle pinion 54, which in turn imparts motion to a second idle pinion 55. This latter pinion has fixed to it a larger gear-pinion 56, which engages and drives a large gear-wheel 57, loosely journaled on the ex-
 115 tended end of the die-roll shaft 37, as shown in Figs. 1 and 7. The gear 57 is provided with a crank-pin 58, secured by a nut 59 in an aperture 60, and pivoted at one end on such pin is a link 61, whose other end is piv-
 120 oted on a stud 62, fixed on a slide 63. The slide 63 is designed to be adjusted on a block 64, fixed on a stub-shaft or spindle 65, as shown in Figs. 9 and 10, and to this end may be provided with a dovetailed groove 66 to
 125 receive the block 64, which is shaped to fit into the groove. Set-screws 67, passing through one side of the slide and engaging the block, are designed to set the parts and hold the slide in its adjusted position.
 130

The spindle 65 is journaled in and passes through an arm or bracket 68, which is fixed, as by means of a set-screw 69, to the shaft 37, and its bearing may be formed by the arm and a cap or removable section 70, secured by bolts 71, as shown in Figs. 7 and 8. Fixed to the end of the spindle 65, opposite the block 64, is a gear 72, and to facilitate the removal of this gear when necessary the end of the spindle may be tapered, as shown, to receive a sleeve 73, having a correspondingly-tapered bore and which is held to the gear 72 by a key. The gear is clamped between a flange 74 on the sleeve and a collar 75 on the spindle by means of a nut 76, screwing onto the threaded end of the spindle. Meshing with the gear 72 is an idle pinion 77, which in turn meshes with a stationary gear 78, mounted on the shaft 37, which is free to turn therein. The gear 78 may be held against movement in any suitable manner, as by an arm 79, to the upper end of which the gear 78 is fixed or cast and whose lower end engages a collar 80, loose on the extended end of the shaft 17. To permit of the vertical adjustment of the die-roll in the manner hereinbefore explained, the lower end of the arm 79 is provided with a vertical slot 81, and the collar 80, which is held against movement longitudinally of the shaft 17 by flanges 82, which embrace the opposite sides of the arm 79, is provided with flat sides fitting against the side walls of the slot. The collar is therefore held against rotation, but permits of the vertical movement of the arm as the die-roll 34 is raised or lowered.

Located on the reciprocating bed 14 is a table 83, which is secured thereto in any suitable manner, as by bolts passing through flanges or clips 84 on the table. The table 83 is designed to receive the picture-frame, (shown in Figs. 1, 2, 4, and 5 and designated 85,) which is positioned thereon and held against movement by any suitable means. Such means may consist of pins or studs 86, projecting from the upper face of the table and adapted to engage suitable openings in the frame, as shown in Fig. 2, or, if desired, the table may be provided with properly-spaced corner-blocks 87 to engage the picture-frame, as shown in Fig. 5.

Any suitable feeding means may be employed for delivering the putty to the frames. In Fig. 4 I have illustrated a device for the purpose and which, briefly described, consists of a tank or reservoir 88, supported above the bed and containing putty of the desired consistency, which is forced from the tank by mechanism which is not shown. The outlet of the tank, located across the bottom of the same, is normally closed by a slide-valve 89, which is connected by a link 90 to one end of an arm 91, fixed on a rock-shaft 92. The slide-valve is designed to be controlled automatically, to accomplish which the shaft 92 is

provided with an arm 93, which is engaged by a trip 94, so positioned on the die-roll 34 as to open the valve just prior to the time when the forward end of the frame moves under the outlet of the tank, and a second arm, 95, which projects in the path of a trip 96 on the reciprocating bed and acting after the frame has passed from under the delivery-outlet of the putty-feeding device. A second or regulating valve, 94^a, designed to follow the movement of the frame and effect delivery of the putty only onto the frame, is also provided, and consists of a suitable sliding plate located under the valve 89 and connected by a link 98 to one end of a bell-crank lever 99, pivoted on an arm 100, projecting from the tank. The other end of the lever 99 is pivoted to one end of a link 101, whose other end is pivoted on a crank-pin 102, adjustably mounted on a crank-arm 103, fixed on the shaft 37. As the shaft 37 turns the valve 89 is moved through the medium of the connections described and effects a delivery of putty only onto the frame between the exterior edge and the opening.

The operation of the machine will be readily understood. A picture-frame having been placed on the table 83 and one of the belts 26 or 27, depending on the position of the bed, shifted onto the active pulley 25, motion is thereby communicated to the reciprocating bed and die, and as the frame is moved under the tank 88 the feeding mechanism delivers putty to the frame, and such putty is pressed upon the frame and embossed with the design of the roller as the frame passes under the latter. As soon as the frame has passed the die the frame is removed and the driving-belt then shifted to its associated idle pulley and the other belt moved onto the active pulley, thereby returning the bed and die to their original position ready for a repetition of the puttying and embossing operation. When the stud 62 and spindle 65 are on the same center and the gearing so related or proportioned as to move the reciprocating bed and die-roll at the same surface speed, the machine will then be operated with a die adapted to a particular size of frame—that is, one of such size as to properly putty and ornament a frame of the same area as the die. As thus operated, the motion communicated by the shaft 17 through the medium of pinion 53 and idle pinions 54 and 55 to the gear 57 drives the arm 68 by means of the link 61, and although the gear 72 and idle pinion 77 are moved around the stationary gear 78 they exert no influence over the movement of the roll, which is then synchronous with the reciprocating bed. When, however, it is desired to employ the same die with a frame longer than the die, the slide-plate 63 is moved a distance on the block 64, depending on the difference in the length of the die and frame and which may be readily determined by ex-

periment. This sets the stud 62 eccentric-
ally with reference to the spindle 65 and results
in a crank action between end of the link 61
about the spindle, due to the turning of the
5 gear 72 about the stationary gear 78, and is pro-
ductive of a dragging or lagging of the arm 68,
and consequently of the die-roll 34, to which
the arm is keyed at certain periods in its move-
ment. Assuming that the die used has a sur-
10 face length of two feet and the frame to be put-
tied is two feet two inches, the slide 63 is ad-
justed sufficiently to effect a retardation of the
movement of the roll to compensate for this
difference. Starting with one end of the frame
15 at the advanced edge of the die, the surface
speed of the bed and die are at the beginning of
their movement synchronous; but owing to the
eccentric disposition of the stud 62 and spindle
65 the stud is turned around the spindle as a
20 center by the pinions 72 and 77 and stationary
gear 78, exerting a gradually-increasing lag-
ging effect on the die-roll until the center of
the frame is reached, when the movement of
the drum is gradually accelerated to the op-
25 posite end of the frame, where it attains the
surface speed of the reciprocating bed again,
or the position of the parts may be so adjusted
that the die-roll moves slowly at the begin-
ning of its movement, then increases in speed
30 to the center of the frame, and then decreases
in speed from the center to the other end of
the same. The die-roll never makes more
than one rotation and usually less than a com-
plete rotation, so that it will be seen that the
35 movement of the arm is, in effect, oscillatory.
The machine is started by means of the belt-
shifters 30 and 31, heretofore referred to,
and each of which is carried by a sliding rod
104 and 105, supported at one end by an ex-
40 tension of the support 32, as shown in Fig. 7,
and at the other end by brackets 106, fixed to
the frame, as seen in Fig. 4. Each rod has a
collar, to which is pivoted one end of a link
107, whose other end is pivoted to a hand-
45 lever 108. The inner end of the lever 108 is
fixed to a vertical spindle 109, turning in a
sleeve 110, secured by bolts 111 to the side
rails 10 of the frame. By moving either lever
108 the belt controlled thereby may be moved
50 onto or off the active pulley 25 at will to start
or stop the machine. Preferably, however,
means are provided for stopping the machine
automatically. For this purpose the spindles
109, to which the levers 108 are fixed, are lo-
55 cated at opposite sides of the die-roll, as shown
in Fig. 4, and each spindle is provided with a
finger 112, which when the belt controlled by
the shifter associated with such spindle is on
the active pulley 25 projects in the path of
60 one of the trips 96, adjustably mounted in
guide-slots in one of the side rails and secured
in position by bolts 114. In the operation of
the machine when one of the fingers 112 is
engaged by its associated trip 96 the spindle
65 109 of such finger is turned, thereby sliding

its belt-shifting rod and moving the active
belt onto its idle pulley. By adjusting the
trips 96 the movement of the bed may be va-
ried, as necessary.

The gearing of the machine is preferably 70
so mounted and arranged as to be capable of
removal or adjustment in order to effect any
desired variation in the speed, and it will be
obvious that the relative speed of the die-roll
and reciprocating bed may be readily changed 75
by substituting other gears for those commu-
nicating motion from the shaft to the die-roll.
The idle pinion 77 is preferably journaled on
a stud 115, secured to a plate 116, pivoted at
117 to the arm 68, so as to be capable of ad- 80
justment in case other gears are substituted
for the gears 72 and 78. To secure the plate
116 against movement, the arm 68 may be pro-
vided with a slot 118, in which moves a bolt
119, passing through the plate, and by means 85
of which the latter may be clamped to the
arm. The idle pinions 54 and 55 are mounted
in such manner upon a movable member as
to permit of the adjustment thereof when the
die-roll is raised or lowered. To this end the 90
pinion 54 is journaled on a sleeve 120, which
is carried by a stud 121, suitably mounted in
a slot 122, formed in a bracket 123, pivoted
on the shaft 17, and the pinions 55 and 56 are
pinned together and similarly mounted, as 95
shown in Fig. 3, on a sleeve 124 on a stud 125,
movable in a slot 126 in the said bracket.
Both studs 121 and 125 are secured by nuts
127, and the pinions are retained on the sleeves
associated therewith by collars 128 and 129. 100
The pinions are capable of independent ad-
justment, and the bracket 123 may be moved
as necessary to adjust the pinions carried
thereby. The bracket is held against move-
ment by a bolt 130, which passes through a 105
slot 131 in the bracket and serves to clamp the
same to the adjacent rail of the frame. By
moving the bracket 123 and adjusting the pin-
ions journaled thereon the driving connection
may be readily established irrespective of the 110
adjustment of the die-roll.

Having described my invention, I claim—

1. In a machine of the class described, in
combination, a reciprocating bed, a die-roll,
means for positively moving the bed and 115
die-roll, and means for changing the relative
speeds of the bed and roll during the move-
ment of the same.

2. In a machine of the class described, in
combination, a reciprocating bed, a die-roll, 120
means for positively moving the bed and die-
roll, and means for automatically arresting
such movement.

3. In a machine of the class described, in
combination, a reciprocating bed, a die-roll, 125
means for positively moving the bed and die-
roll, and means controlled by the bed for ar-
resting such movement.

4. In a machine of the class described, in
combination, a reciprocating bed, a die-roll, 130

driving means, positive connections between the driving means and the bed and die-roll, and means controlled by the bed for throwing the driving means out of action.

5 5. In a machine of the class described, in combination, a reciprocating bed, a die-roll, a drive-shaft, driving connection between the shaft and the bed, means for imparting motion to the die-roll, means for driving the shaft, 10 and a trip carried by the bed for throwing the driving means out of action.

6. In a machine of the class described, in combination, a reciprocating bed provided with rack-bars on its under face, a shaft, pin- 15 ions on such shaft and meshing with the rack-bars, a die-roll, gearing for transmitting motion from the shaft to the die-roll, means for driving the shaft, and a trip carried by the bed for throwing the driving means out of 20 action.

7. In a machine of the class described, in combination, a reciprocating bed provided with rack-bars on its under face, a shaft, pin- 25 ions on the shaft meshing with the rack-bars, a drive-shaft, gear connection between the said shafts, a die-roll, gear connection between the first-mentioned shaft and the die-roll, a pair of idle pulleys on the drive-shaft, a pair 30 of oppositely-moving belts normally running over the idle pulleys, belt-shifters for moving the belt onto and off of the fixed pulley, a trip at each end of the bed, and an arm associated with each belt-shifter and engaged by one of 35 the trips to shift its belt from the fixed to one of the idle pulleys.

8. In a machine of the class described, in combination, a reciprocating bed, a vertically-adjustable die-roll, an adjustable driving connection between the die-roll and bed, and means 40 for driving the bed and roll.

9. In a machine of the class described, in combination, a reciprocating bed, a vertically-adjustable die-roll, a shaft for driving the bed, and an adjustable gear connection between 45 the die-roll and the shaft.

10. In a machine of the class described, in combination, a frame, a shaft journaled on the frame and having pinions, a reciprocating bed 50 having rack-bars engaged by the pinions, a die-roll, a shaft therefor and journaled on the frame, an adjustable gear connection between the said shafts, and means for adjusting the die-roll shaft vertically.

11. In a machine of the class described, in 55 combination, a frame, a reciprocating bed, standards mounted on the frame at opposite sides thereof and having vertical ways, bearings slidably mounted in the bearings, a screw for adjusting and securing each bearing, and 60 a die-roll having a shaft journaled at its ends in the bearings, and means for driving the bed and die-roll.

12. In a machine of the class described, in 65 combination, a reciprocating bed and die-roll cooperating therewith, and means for moving

the said bed and roll and for changing the speed of one of such parts during its movement.

13. In a machine of the class described, in combination, a reciprocating bed and a die- 70 roll cooperating therewith, and means for imparting variable movement to one of such parts.

14. In a machine of the class described, in combination, a reciprocating bed and a die- 75 roll cooperating therewith, and means for moving the said bed and roll and for varying the speed of the roll during its movement.

15. In a machine of the class described, in combination, a reciprocating bed and a die co- 80 operating therewith and means for imparting variable movement to the die-roll.

16. In a machine of the class described, in combination, a reciprocating bed and a die- 85 roll cooperating therewith, means for driving the bed at constant speed, connection for driving the die-roll and for imparting variable movement to the roll.

17. In a machine of the class described, in combination, a reciprocating bed and a die- 90 roll cooperating therewith, a drive-shaft, a shaft driving the bed and driven by the drive-shaft, and an adjustable driving connection between the bed-driving shaft and the die- 95 roll during its rotation.

18. In a machine of the class described, in combination, a reciprocating bed, a die-roll having a shaft, an arm fixed to the shaft, a gear loose on the shaft, and a link connecting 100 the gear and arm, and means for driving the loose gear.

19. In a machine of the class described, in combination, a reciprocating bed, a die-roll 105 having a shaft provided with an arm fixed thereon, a gear loose on the shaft, a spindle journaled on the arm, a link pivoted to the gear and having a pivoted eccentric connection with the spindle, and means for turning 110 the spindle independently of the arm.

20. In a machine of the class described, in combination, a reciprocating bed, a die-roll having a shaft provided with an arm fixed 115 thereon, a gear loose on the shaft, means for driving the gear, a link pivoted at one end to the gear and having a slide pivoted to its other end, a spindle journaled on the shaft-arm and having a block fixed thereto on which the slide is adjustably mounted, a setting device 120 for holding the slide in its adjusted position, a gear on the spindle, a stationary gear concentric with the die-roll shaft, and an idle gear-pinion carried by the arm and meshing with the spindle-gear and the stationary gear.

21. In a machine of the class described, in 125 combination, a reciprocating bed, a die-roll having a shaft provided with an arm fixed thereon, a gear on the shaft and means for driving the same, a spindle journaled on the arm and an eccentric link connection between 130

the gear and the spindle, a gear on the spindle, a stationary gear eccentric with the shaft, and an adjustable idle pinion meshing with the spindle-gear and stationary gear.

5 22. In a machine of the class described, in combination, a reciprocating bed, a die-roll having a shaft provided with an arm fixed thereon, a gear on the shaft and means for driving the same, a spindle journaled on the
10 arm and an eccentric link connection between the gear and the spindle, a gear on the spindle, a stationary gear eccentric with the shaft, a plate pivoted on the arm and carrying an idle pinion meshing with the spindle-gear and
15 stationary gear, and means for holding the pivoted plate against movement.

23. In a machine of the class described, in combination, a reciprocating bed, a shaft for moving the bed, a pinion on the shaft, a ver-
20 tically-adjustable die-roll having a shaft provided with a gear, and an adjustable gear connection between the pinion and the gear.

24. In a machine of the class described, in combination, a reciprocating bed, a shaft for
25 moving the bed, a pinion on the shaft, a vertically-adjustable die-roll having a shaft provided with a gear, an adjustable bracket, and gear-pinions journaled on the bracket for communicating motion from the bed-moving-
30 shaft pinion to the gear on the die-roll shaft.

25. In a machine of the class described, in combination, a reciprocating bed, a shaft for moving the bed, a pinion on the shaft, a ver-
35 tically-adjustable die-roll having a shaft provided with a gear, an adjustable bracket, and adjustable gear - pinions journaled on the bracket for communicating motion from the bed-moving-shaft pinion to the gear on the
40 die-roll shaft.

26. In a machine of the class described, in

combination, a reciprocating bed, a shaft for moving the same, a vertically-adjustable die-roll having a shaft, a gear loose on the latter shaft, adjustable gear connection between the
45 bed-moving shaft and the die-roll shaft, an arm fixed on the die-roll shaft, a spindle journaled on the arm and having a gear, a link connection between the die-roll gear and the spindle, a gear concentric with the die-roll
50 shaft, an arm to the upper end of which the latter gear is fixed and the lower end of which is provided with a slot through which the bed-moving shaft passes, and an idle gear-pinion meshing with the spindle-gear and the fixed
55 gear.

27. In a machine of the class described, in combination, a reciprocating bed, a die-roll having a shaft, an arm fixed to the shaft, a gear loose on the shaft, a connection between
60 the gear and arm, and means for driving the loose gear.

28. In a machine of the class described, a die-roll comprising a shaft, a plurality of disks secured on the shaft and spaced apart, and a
65 die mounted on the roll and having securing means passing between the disks.

29. In a machine of the class described, a die-roll comprising a shaft, a plurality of disks secured on the shaft and spaced apart, strips
70 extending longitudinally of the roll and located within the rims of the disk, a die conforming to the curvature of the roll, and screws passing through the die and between the disks and engaging the strips.

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

CHARLES E. SANDSTROM.

Witnesses:

ARTHUR B. SEIBOLD,
ELIZABETH MOLITOR.