

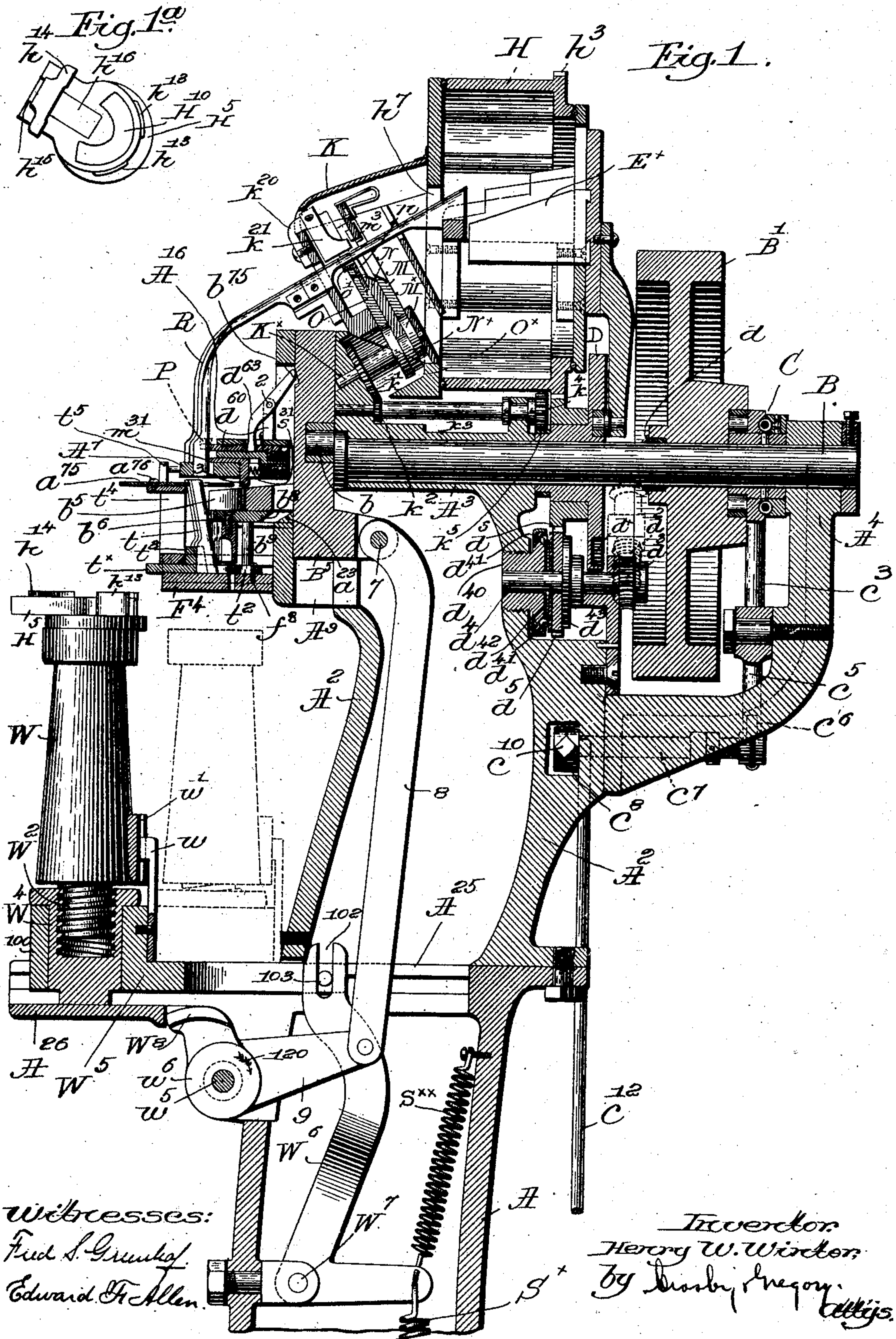
H. W. WINTER.
MACHINE FOR SETTING HEEL AND SOLE PROTECTORS.

973,605.

APPLICATION FILED MAY 22, 1899.

Patented Oct. 25, 1910.

4 SHEETS—SHEET 1.



Witnesses:
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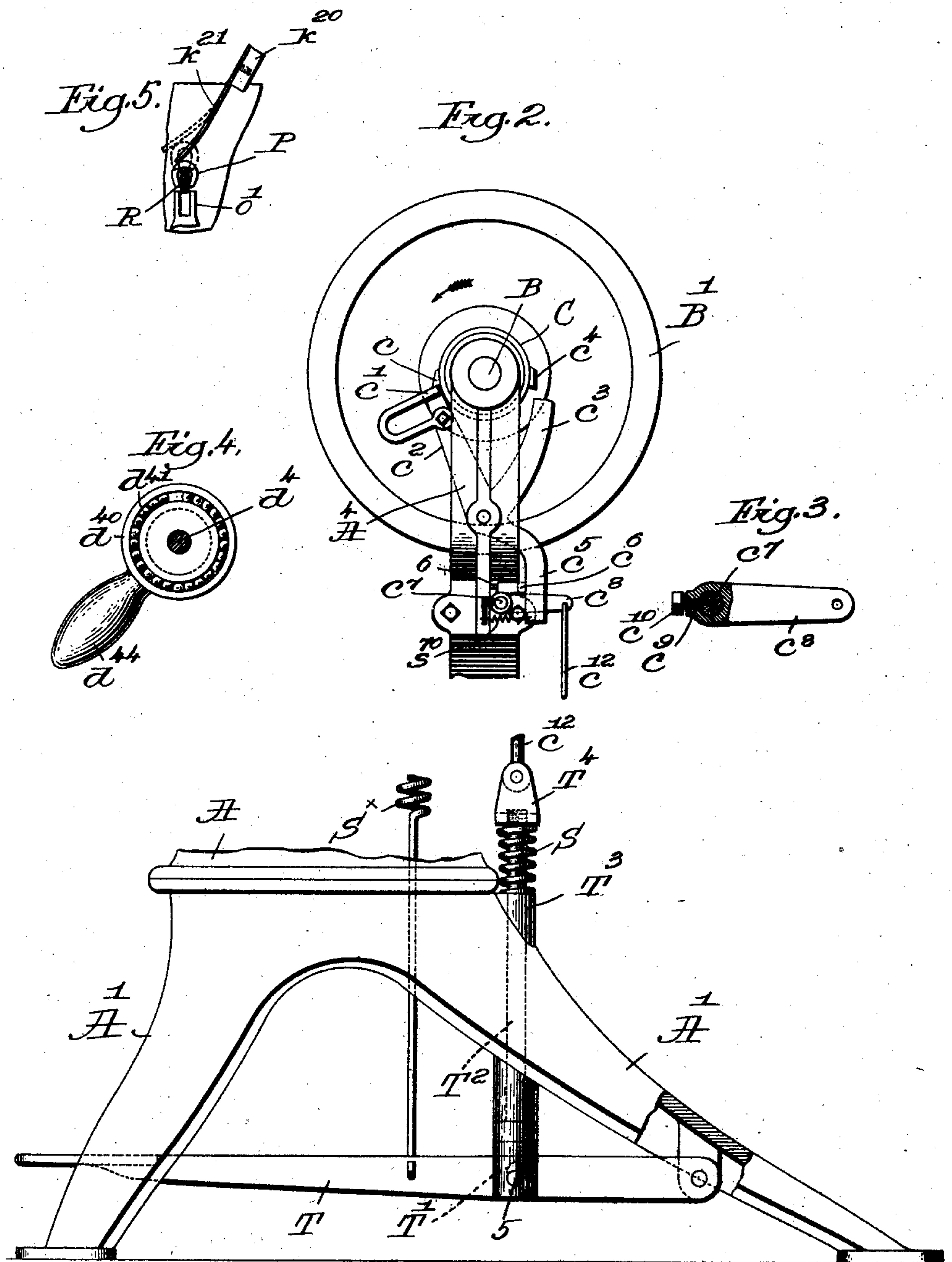
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Fig. 6.

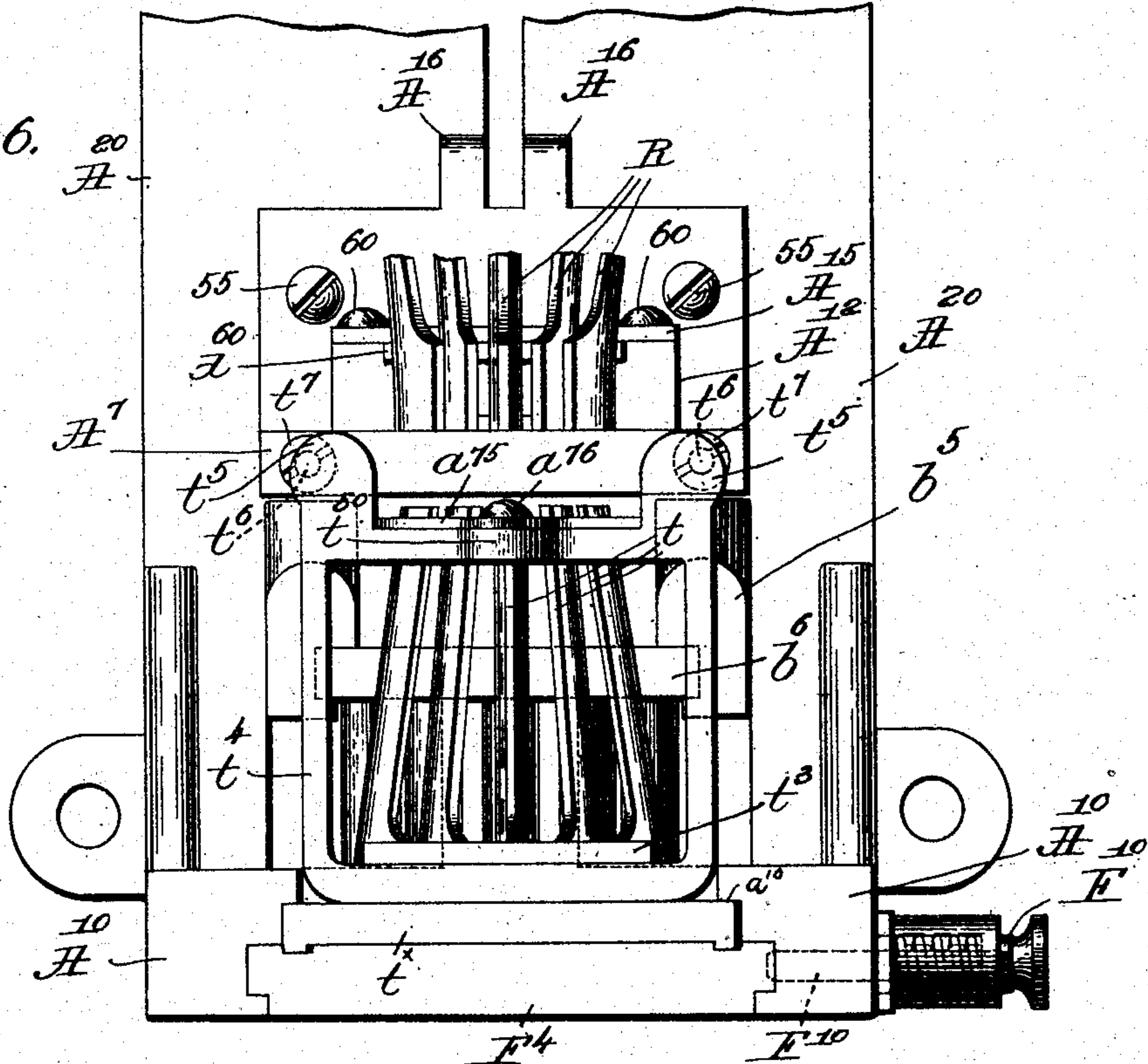
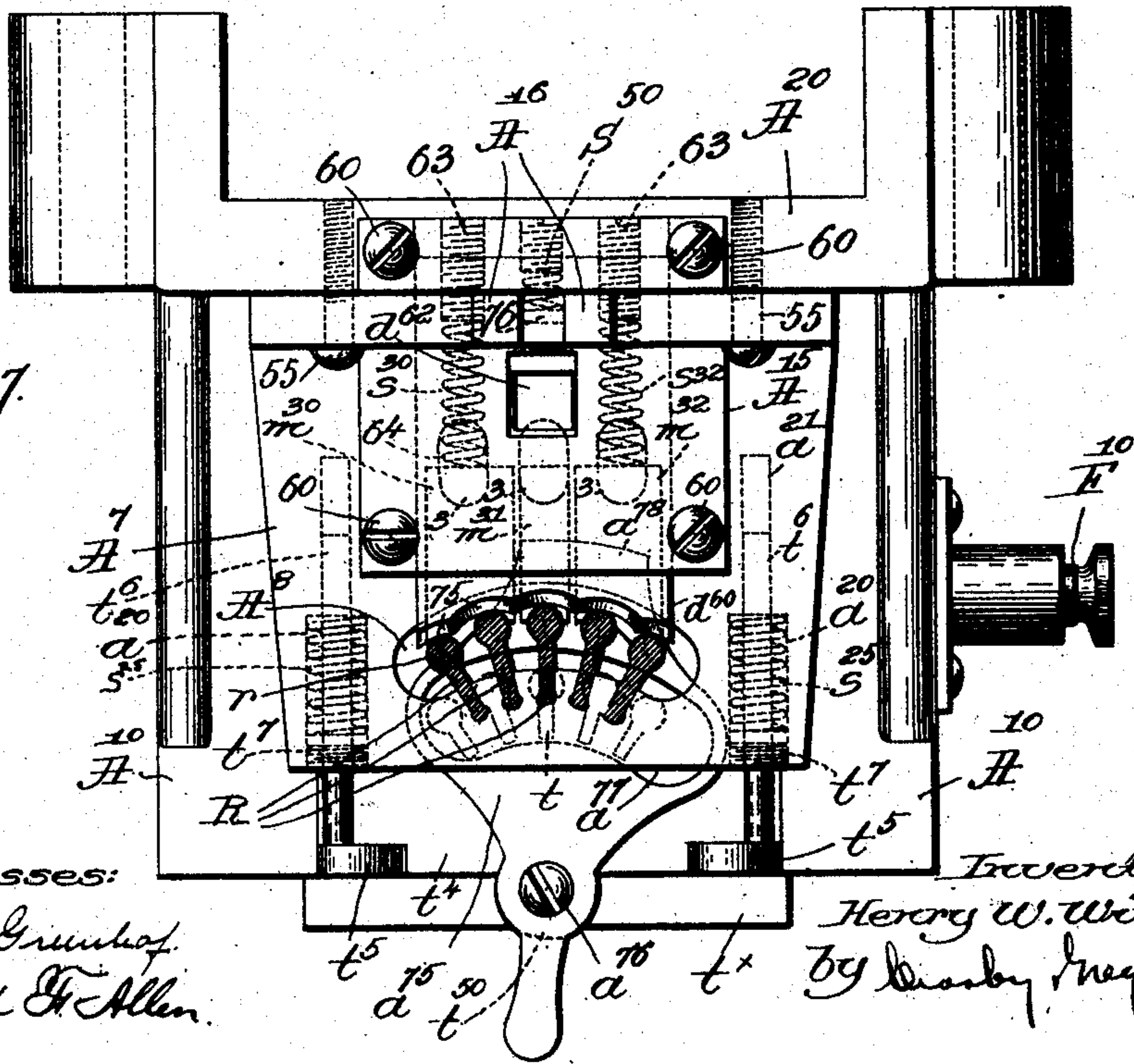


Fig. 7.



Witnesses:

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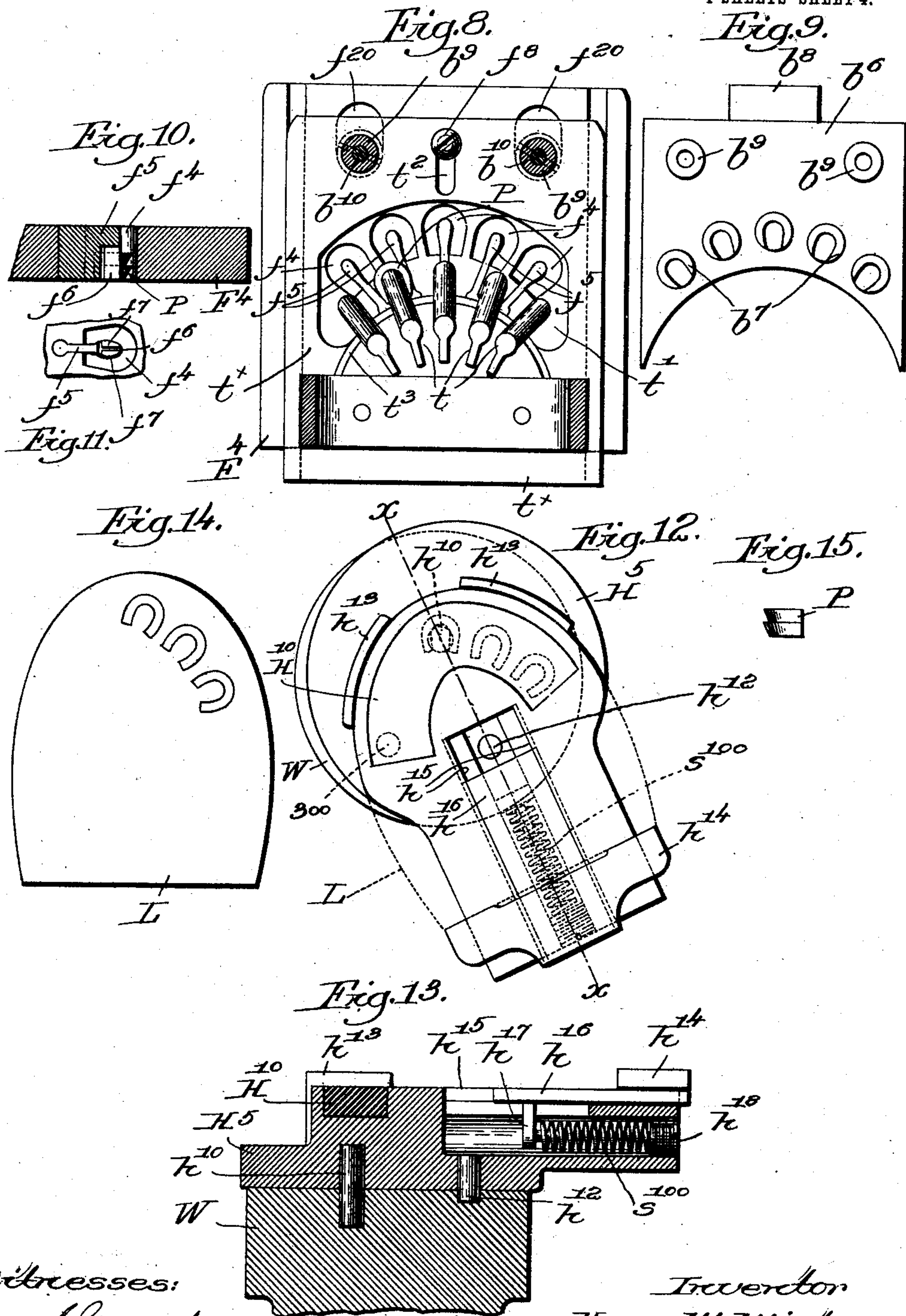
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4 SHEETS-SHEET 4.



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UNITED STATES PATENT OFFICE.

HENRY W. WINTER, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, AND BOSTON, MASSACHUSETTS, A CORPORATION OF NEW JERSEY.

MACHINE FOR SETTING HEEL AND SOLE PROTECTORS.

973,605.

Specification of Letters Patent.

Patented Oct. 25, 1910.

Application filed May 22, 1899. Serial No. 717,674.

To all whom it may concern:

Be it known that I, HENRY W. WINTER, of Lawrence, county of Essex, State of Massachusetts, have invented an Improvement in Machines for Setting Heel and Sole Protectors, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object the production of a machine for setting heel or sole protectors for boots or shoes, such protectors being made of metal bent or curved into substantially horse-shoe shape in cross section, and driven into the work in such manner as to leave the exposed or wearing end of the protector substantially flush with the adjacent surface. In another application Se. No. 695,540, filed by me November 5, 1898, I have shown and described a machine for setting such protectors, and my present invention discloses certain changes in construction and novel devices whereby the operation is improved, the mechanism simplified, and the action made more rapid.

I have also herein provided means for preventing accidents due to the failure of a protector to be properly transferred to the driver block, such improper transfer being herein indicated promptly to the operator before the driving mechanism is operated.

Various other novel features will be hereinafter described in the specification and particularly pointed out in the following claims.

Figure 1 is a central vertical sectional view of the upper portion or head of a machine embodying one form of my invention; Fig. 1^a is a top or plan view of the work-support shown in Fig. 1; Fig. 2 is a right hand end elevation of a portion of the machine shown in Fig. 1, with the lower portion of the base or standard also shown, illustrating the starting and stopping mechanism; Fig. 3 is an enlarged detail, partly in section, of a portion of the starting and stopping mechanism; Fig. 4 is a detail in elevation of the throw-off device for disconnecting the hopper and adjacent mechanism from the driving means; Fig. 5 is an enlarged detail of one of the deflectors, to be described; Fig. 6 is an enlarged front elevation of the driver block, transferring means,

and the lower or discharge ends of the main raceways; Fig. 7 is a top or plan view thereof, the main raceways being shown in section; Fig. 8 shows in plan view the driver block and the transferring device above it, the latter partially in section; Fig. 9 is an underside view of the driver carrier or head, omitted from Fig. 8; Fig. 10 is a sectional detail through one of the passages of the driver block, with the protector guide therein; Fig. 11 is an underside view of the guide shown in Fig. 10; Fig. 12 is an enlarged top or plan view of the work-support; Fig. 13 is a sectional view thereof on the line *x—x*, Fig. 12; Fig. 14 shows a heel lift provided with protectors; and Fig. 15 is a side elevation of a protector adapted to be set by the machine herein shown.

In the machine herein shown the work-support is adapted to receive a heel lift, into which one or more protectors are set, the lift being thereafter attached to the heel in usual manner, but from the description it will be manifest that by adapting the work-support to receive a last the protectors may be set into heels or soles directly. Provision is made for setting one protector, or a series of protectors simultaneously, and to set the same for either a "right" or a "left" shoe.

The working parts of the machine are herein shown as mounted on an upright standard or column A of suitable construction, and which may be provided with feet A' to form a firm and extended base, the standard being surmounted by a head A² of suitable shape to provide bearings for the operative parts.

As in my said application referred to the main shaft B, suitably supported in bearings A³, A⁴, has at its forward end a wrist pin *b* provided preferably with a roll, said shaft having loosely mounted upon it a pulley B' that is adapted to be connected with the shaft at times by suitable clutch mechanism C, which I have herein illustrated as one form of the well known Horton clutch.

Referring to Fig. 2, the lug *c* pertaining to the clutch is controlled by a stop or detent *c'* on the upper end of the three armed lever *c*², one of the upturned ends of the lever, as *c*³, being at times engaged by a cam lug *c*⁴ to throw the detent or stop *c'* into the path of the lug *c* to release the clutch. The

third arm c^5 of the lever is connected by a spring s^{70} with a fixed part of the apparatus to normally hold the parts in the position shown in Fig. 2, said arm c^5 being adapted to be moved in opposition to the spring by a dog c^6 , fast on a short rock shaft c^7 mounted in the head. The said rock-shaft has mounted upon it an arm c^8 frictionally connected to the shaft by means of a fibrous or other friction pad c^9 , see Fig. 3, the pressure of the pad upon the shaft being regulated by a suitable set screw c^{10} , the friction being great enough to rock the shaft c^7 when the arm c^8 is depressed to thereby, through the dog c^6 , throw the detent or stop c' out of engagement with the lug c to thereby permit the clutch to operate.

The base of the standard has mounted upon it a treadle T normally held elevated by springs S^x , S^{xx} to be hereinafter referred to, said treadle being slotted at T', see dotted lines Fig. 2, to receive a pin 5 extended through the slotted and enlarged end of a rod T². The said rod T² extends lengthwise through a sleeve-like guide T³, Fig. 2, which is connected with the fixed base of the standard A. The upper end of the said rod, above the top of the said sleeve or guide, has attached thereto a coupling T⁴ to which the lower end of the link c^{12} is connected pivotally. The rod is encircled, between the coupling T⁴ and the top of the sleeve or guide, by an expanding spiral spring S acting with a tendency to hold the rod elevated with its enlarged lower end in contact with the bottom of the sleeve or guide T³. The treadle is shown in Fig. 2 in its normal position, and when the operator desires to start the apparatus he depresses the treadle, but it will be noted that owing to the slot and pin connection between the treadle and the rod T² the link c^{12} will not be drawn down until after the treadle has moved through a part of its full stroke, and, as will be hereinafter described, the first part of the stroke of the treadle is utilized to move into operative position the work-support before the machine is started. When the arm c^8 is depressed the dog c^6 acts to withdraw the detent c' and thereby permit the clutch to operate, and in this machine one rotation of the main shaft completes the cycle of operation, and in order to prevent the main shaft from making more than one revolution at a time, should the operator fail to release the treadle after starting the machine, I have provided for automatically stopping the machine. After the rotation of the main shaft has been started, as described, the engagement of the cam lug c^4 with the arm c^3 will operate to throw the detent or stop c' automatically into the path of the lug c to release or disconnect the clutch after the completion of one revolution. Supposing that the arm c^8 is main-

tained depressed through failure of the operative to release the treadle, the positive return of the arm c^3 to the position shown in Fig. 2 will tend, through the arm c^5 , to move the dog c^6 into its normal position, and this is permitted by the slip of the shaft c^7 in the arm c^8 . This prevents breakage or smashing of the parts. After the machine has been stopped and the operator releases the treadle the expansion of the spring S operates to lift the link c^{12} longitudinally sufficiently to return the arm c^8 to normal position. Undue movement of the dog c^6 in returning may be prevented by stops 6 on the frame.

Referring now to Fig. 1, the beveled gear d on the hub of the pulley B' in mesh with a similar gear fast on one end of a worm d^2 , see dotted lines, the said worm being in engagement with a worm gear d^3 , the short shaft d^4 , the gear d^5 upon said shaft and meshing with a gear d^6 secured to or forming part of the cam disk D, having in its outer face a cam groove d^x ; the hopper H mounted on the head of the machine, the elevators E^x vertically reciprocable within the hopper by or through the rotation of the cam D, and the annular gear h^3 on the hopper body in mesh with the gear d^6 , are and may be all as in my said application referred to and operating as therein set forth. A series of raceways R, at their upper ends, enter the hopper through the opening h^7 in its end wall, said raceways being formed as thin plate-like bodies set on edge and closely adjacent the paths of movement of the outer ends of the elevators E^x, the lower ends of the raceways being rigidly secured to a bracket A⁷ on the head of the machine and being twisted or given a half turn between their upper and lower ends to convey the protectors down on the inner faces of the raceways, a protector being shown in dotted lines in Fig. 1. As in my application referred to a selecting device removes from the raceway such protectors as present themselves wrong end foremost, while a detent acts to hold the series of protectors above it stationary upon the raceway, let-off mechanism at such time operating to prevent the passage beyond it of a protector until a selecting device has been moved into operative position, the relative movement of the detent and let-off being such that one moves out of and into operative position again before the other moves into inoperative position again, and vice versa. Such devices are substantially as shown in the application referred to, and will not be described in detail herein, it being sufficient to say that the casing K attached to the front wall of the hopper and inclosing the opening h^7 in the wall thereof incloses the selecting detent and let-off devices, the raceways passing through the chamber or space within the said casing.

The detents m^3 are mounted on a plate M controlled by a cam M^x , while immediately in front of and adjacent the plate M a second plate N controlled by a cam N^x carries the selecting devices shown as upturned fingers n , the fingers being shaped to pass by properly presented protectors on the raceway, and to engage and lift from the raceway improperly presented protectors, that is to say protectors which are presented wrong end foremost, the protectors herein shown having a head end and an entering or pointed end. The let-off mechanism includes the plate O controlled by the cam O^x and pairs of lugs O' to slide upward at each side of the raceway and act as a stop to prevent the passage of a protector all as in said application. The three cams are mounted on the shaft K^x rotated by means of a bevel gear k' meshing with a pinion k^2 on a shaft k^3 having a gear k^4 driven by a ring gear k^5 on the hub of the cam D. I have herein shown the shaft d^4 as extended through an exteriorly threaded bushing d^{40} , see Fig. 1, set into a correspondingly threaded opening in the head of the machine, and provided at its inner face with a raceway for a series of antifriction balls d^{41} , the latter being adjacent to a disk d^{42} splined to the shaft d^4 . A second disk d^{43} is fast on said shaft, and between the disks the gear d^5 is mounted loosely relatively to the shaft. The bushing d^{40} is provided with a handle d^{44} , Fig. 4, to turn the bushing in its threaded support, movement of the handle in one direction acting to press the balls against the disk d^{42} to press it so firmly against the gear d^5 that the latter is held firmly between the two friction disks d^{42} , d^{43} , and thereby is made to rotate with the shaft d^4 .

When it is desired to throw out of operation the hopper rotating mechanism the elevators E^x , and the means inclosed within the chamber K for controlling the passage of the protectors, along the raceways R it is only necessary to turn the handle d^{44} sufficiently to retract the bushing and decrease the friction upon the gear d^5 . The operation of the rest of the apparatus is not interfered with by such operation of this throw-off device.

The front wall of the casing K has attached to it suitable stands k^{20} on which are mounted deflectors k^{21} , shown as elastic plates or fingers, which in their normal position, as shown in Fig. 5, extend over the adjacent raceway and a little to one side of the center thereof, the length of the deflector at its lower edge being sufficient to extend above the selecting device and the let-off members o' . When a protector, as P, is improperly presented to the selecting device, said protector is raised above the raceway, and as it is so lifted it engages and pushes

to one side the free end of the deflector. As soon however as the protector is lifted clear of the raceway the resiliency of the deflector causes it to spring back to normal position, thereby snapping the protector to one side of the raceway and into the bottom of the chamber within casing K from which it can return to the hopper. The operation of the deflectors is the same when a protector is lifted from the raceway by the let-off fingers o' by reason of the raceway below the let-off device having become filled or loaded with a series of protectors. The raceways are enlarged or beaded along their upper edges above the twist or turn, and below the latter along their inner edges, as at r Fig. 7, to prevent the protectors from dropping off.

The head is vertically grooved at A^9 to receive a plunger B^5 having a transverse groove in its rear face to be entered by the roll on the wrist pin of the main shaft, whereby said plunger will be reciprocated. An ear on the lower portion of the plunger has pivotally connected to it at 7 a link 8 in turn connected with an arm 9, by or through which the relative movement of the work-support and driver block is effected. An overhanging projection b^5 of the plunger is grooved to receive a driver plate or carrier b^6 to which is secured a series of depending drivers b^7 , the plate being movable horizontally in the projection b^5 and provided at its inner end, Figs. 1 and 9, with an ear b^8 beveled on its under face, for a purpose to be described. Depending hollow guide bars b^9 secured to the plate b^6 by screws b^{10} enter and pass through elongated slots f^{20} , Fig. 8, in the driver block F^4 , which is detachably mounted in arms A^{10} extended from the head A^2 , said arms being grooved on their inner faces, Fig. 6, to receive the block, which is held in position by a suitable catch F^{10} , the block forming a fixed rest for the work during the insertion of the protectors. A series of driver passages f^4 are formed in the block, Figs. 10 and 11, of such shape and size as to permit the protectors to pass through as they are driven into the work, a guide rib f^5 projecting centrally into each passage to position and guide the protector, the lower end of the rib being enlarged laterally, and slotted at f^6 , to form spring projections f^7 , Fig. 11, which yieldingy press upon the interior of the protector and serve to retain it in the passage until positively driven therefrom. The arms A^{10} above the block F^4 are undercut on their inner faces, at a^{10} , to receive a slide plate t^x forming part of the transferrer, having an opening t' therein through which the lower ends of a series of transfer-raceways t extend almost to the top of the block F^4 . A headed stop pin f^8 in the block passes through a slot t^2 in the plate at its inner end, see Fig. 8, and the bars b^9 pass up through

and move easily in suitable holes in the plate t^x , so that the horizontal movement of the said plate and the driver carrier b^6 will be in unison. The upper face of the plate is provided with a curved rib b^2 to which the transfer-raceways t are secured, the latter being so arranged that when in operative position they will register at their upper ends with the extremities of the main raceways R, and at their lower ends with the driver passages f^4 , to thereby complete the path between the latter and the main raceways. A substantially rectangular, open frame t^4 is secured in an upright position to the plate t^x near its outer end, and having upturned ears t^5 against which rest the outer ends of plungers t^6 , provided with heads t^7 , see dotted lines Fig. 7, which move freely in recesses a^{20} in the bracket A^7 , said recesses being reduced in diameter at a^{21} to receive the inner ends of the plungers. Strong springs S^{25} in the recesses a^{20} bear at their outer ends against the plunger heads, and keep the plungers normally pushed out, with the transferrer plate t^x in inoperative position shown in the drawings.

When it is desired to transfer one or more protectors to the driver passages the operator pushes the plate t^x inward, bringing the transfer-raceways into operative position, and at the same time the driver carrier b^6 will be pushed in, by virtue of the bars b^9 , and a protector can pass directly from its main raceway R down the section t to the driver passage. After the driver block is loaded the operator releases the plate t^x and if the protectors have cleared the ends of the sections t the spring plungers t^6 will return said plate and the driver carrier to normal position. Should a protector hang part way in a driver passage and part way on a transfer raceway t the plate t^x will not return to normal position, and the operator is then made aware of the fact that something is wrong, and the fault is corrected. When the carrier b^6 is pushed in, as described, the beveled under part of its ear b^8 engages a correspondingly beveled shoulder a^{23} on the head A^2 , and if the spring plungers should fail to retract the transferrer the descending movement of the driver carrier causes the ear b^8 to wipe over the shoulder a^{23} and positively force the carrier and the transferrer into proper outward position. The protectors as they slide down the raceways R must be held upon them until such time as the transfer-raceways are in operative position, and I have provided detent and let-off mechanism located at or near the discharge or delivery ends of the raceways to operate at the proper time to permit the passage of the lowermost protector from a raceway, and to permit the protector next above it to pass down into po-

sition to be engaged by the let-off mechanism.

The arms A^{10} secured to the head of the machine are substantially L-shaped, and their upturned portions A^{20} have secured upon their faces, as by suitable screws 55, Figs. 6 and 7, the shelf or bracket A^7 to which the main raceways are secured, the shelf being cut out at A^8 , see Fig. 7, to permit free passage of the protectors. A guide block A^{12} is suitably secured to the top of the bracket A^7 , as by screws 60, said block being horizontally recessed to receive a series of sliding let-off members m^{30}, m^{31}, m^{32} shown in dotted lines Fig. 7, the central member m^{31} being shown in section in Fig. 80 1. The main raceways are herein shown as five in number, and the central let-off device m^{31} is normally held at its outer end against the central raceway by a spring s^{31} , see Fig. 1, set into a recess in the bracket A^7 and bearing against a downturned lug on the let-off m^{31} . The let-off m^{30} is adapted to cooperate with the two left hand raceways and it is maintained in position by a spring s^{30} see Fig. 7, a similar spring s^{32} controlling the let-off m^{32} which cooperates with the two right hand raceways. These springs are let into recesses in the bracket A^7 , and are held in place by suitable screw plugs 63, the downturned lug 3 on or attached to each let-off device passing through a suitable slot, at 64, Fig. 7 in the bracket. These downturned lugs 3, only one of which is shown in Fig. 1, are adapted to be engaged by an actuator shown as a plate a^{75} pivoted on a suitable boss t^{50} on the open upright frame t^4 , said plate being slotted segmentally, as at a^{77} , Fig. 7, to receive freely therethrough the several transfer-raceways t , the inner end of the plate being reduced in width, as at a^{78} , to engage all of the let-off lugs 3 or the center and either side one. In Fig. 7 the actuator is shown in position to engage the lugs of the central and right hand side let-off, so that the endmost protectors on the central and two right hand main raceways R will be permitted to pass therefrom when the let-off devices are retracted. As the actuator is mounted upon and moves with the transferrer carriage t^x the movement of the latter into operative position will bring the actuator into engagement with the desired let-off devices, moving the same into inoperative position as the transfer-raceways are moved into operative position. When the transferring means is returned to normal position the springs s^{31}, s^{32} , return the let-off devices to normal operative position. The top of the guide-block A^{12} is recessed to receive therein a detent plate d^{60} , held in place by the cover A^{15} of the block, the front edge of the detent d^{60} being shaped, as shown in Fig. 7, to present a series of

slightly beveled scallops or indentations 75, which are respectively opposite to the several raceways R, a spring S^{50} acting on a depending lug 76 on the detent plate normally maintaining the latter in operative position with its front edge engaging the next to the lowermost protector on each raceway, it being understood that the leading end of the lowermost protector rests upon its let-off device m^{31} . After the let-offs have been retracted, as described, and returned to normal position the detent will be retracted to permit such protectors as have been held by it to pass down to and to rest upon the respective let-offs, thus bringing the next to the endmost protector on each raceway into position to be engaged by the detent when it is in turn moved back to normal operative position.

A slot d^{62} is made in the plate d^{60} to receive the lower end of a lever d^{63} , pivotally mounted at 2 on ears A^{16} forming a part of the shelf or bracket A^7 , the upper end of the lever d^{63} resting in a notch or depression b^{75} in the plunger B^5 when the latter is elevated, as shown in Fig. 1. As the plunger descends the upper end of the lever d^{63} is forced out and the inner end thereof acting upon the detent plate d^{60} retracts the same and releases those protectors which have been held between the plates and raceways. When the plunger returns to its elevated position the spring S^{50} returns the detent to normal position and causes the upper end of the lever d^{63} to again enter the recess in the plunger.

The operation of the let-off devices is, it is manifest, dependent upon the movement of the transferrer mechanism into operative position, and as the detent mechanism is operated by or through the driver actuating means it will be obvious that the detent will not be moved to release protectors until after the transferrer mechanism has resumed its normal inoperative position. The actuator for the let-offs determines which raceway shall contribute protectors to the transfer-raceways according as the heel is for a "right" or a "left" shoe, the actuator a^{75} being swung to one side or the other accordingly, and if the full number of protectors is to be inserted simultaneously then the actuator occupies mid-position.

The work-support is shown as a spindle W, threaded at its lower end at W^2 to enter a plunger W^4 vertically movable in a bearing 100 forming part of a slide W^5 mounted to slide horizontally in guideways A^{25} at the upper end of the column A and extended beyond the same, as shown at A^{26} Fig. 1. An upturned finger w attached to the bearing 100 engages a rib w' on the spindle to prevent rotation of the latter when its supporting plunger is reciprocated. The inner end of the slide W^5 is connected by a slot

and pin connection 102, 103, with the upper end of a bell crank lever W^6 fulcrumed at W^7 within the column or standard A, the other end of said bell crank lever being connected by strong springs S^x with the treadle T, so that when the latter is depressed the rocking of the lever will move the slide and the spindle W into the dotted line position shown in Fig. 1 with the spindle below the driver block F^4 . When in such position the lower end of the plunger rests upon a cam W^8 loosely mounted on a shaft w^5 mounted in suitable bearings on a part of the guide A^{26} it may be, the shaft being extended through disk-like hubs w^6 of two arms 9, as in my said application referred to. The hub of the cam W^8 is located between the said disk-like hubs, and makes frictional contact with the latter. When the driver plunger B^5 descends the disk hubs w^6 will be turned in the direction of the arrow 120, Fig. 1, and by frictional engagement with the cam will rock upon the latter and elevate the plunger W^4 thus raising the work toward the fixed driver block F^4 , the pressure continuing while the drivers operate to insert the protectors into the work.

The spindle or standard W has mounted upon it a laterally swinging head H^5 , provided with a depending pivot pin h^{10} which enters a suitable hole in the top of the standard, a second pin h^{12} eccentrically located on the head entering either one of two symmetrically placed holes 300, the position of one of which is shown in dotted lines Fig. 12, the head overhanging the top of the standard, as will be seen by reference to Figs. 12 and 13, and at one end the head is provided with ribs or projections h^{13} curved to position the back end of a heel lift, while at the opposite end of the head a movable breast gage or stop h^{14} is provided to engage the breast of the lift, such a lift being shown at L in Fig. 14 and in dotted lines Fig. 12. The head is longitudinally slotted at h^{15} and grooved to receive a slide plate h^{16} to which the breast stop h^{14} is attached, a depending lug h^{17} on the slide plate bearing against one end of a spring s^{100} , the other end of the spring being held by a screw plug h^{18} screwed into a threaded hole in the end of the head. The breast stop h^{14} is thus yieldingly controlled and is readily adjustable for lifts of different lengths; to insert protectors in a lift, as in Fig. 14, the head H^5 is swung into the position shown in Fig. 12 with the pin h^{12} in the corresponding hole in the standard. Were the protectors to be inserted near the other edge of the lift the head would be swung to the left, viewing Fig. 12, until the pin h^{12} could enter the hole 300, it being understood that the head is lifted slightly from the standard sufficiently to disengage the stud h^{12}

from either one of the holes in the top of the standard when it is desired to swing the head to one side or the other. As this head is particularly adapted for driving
 5 protectors into top lifts which are thereafter to be applied to a heel, and as the protectors, one of which is shown in side elevation in Fig. 15, are of a greater length
 10 it is necessary to provide a soft impact surface into which the leading ends of the protectors may sink as they are driven through the top lift and flush with the outer face thereof. For this purpose the head is re-
 15 cessed and provided with a block H¹⁰ of fibrous material, such as indurated rubber fiber or other suitable yielding material into which the projecting ends of the protectors can sink without damage.

20 By merely changing the character of the head the apparatus herein shown can be utilized for inserting protectors directly into the heels or into soles rather than into the heel lifts.

25 I have shown one practical embodiment of my invention herein without attempting to show or describe the various modifications or rearrangements which may be made therein, and my invention is not restricted
 30 to the construction, arrangement and operation of parts as herein shown, as it will be manifest that various deviations therefrom can be made without departing from the spirit and scope of my invention.

35 Having described my invention, what I claim and desire to secure by Letters Patent is:—

1. In a machine for setting heel or sole protectors, a fixed raceway, a cooperating
 40 device to control the discharge of a protector therefrom, a fixed block having a driver passage therein to receive the protector to be driven, a driver, a movable transfer raceway section to receive a protector from the
 45 fixed raceway and deliver it to the driver passage, and means controlled by movement of the transfer raceway to operate the discharge controlling device to release the protector when said raceway is in operative
 50 position.

2. In a machine for setting heel or sole protectors, a fixed raceway and a block having a driver passage out of alinement with the raceway end and adapted to receive the
 55 protector to be driven, a driver, a movable transfer raceway to at times complete the path from the fixed raceway to the driver passage, and means controlled by movement of said transfer raceway to govern the delivery of a protector thereto from the fixed
 60 raceway.

3. In a machine for setting heel or sole protectors, a driver, a raceway, a transferrer to deliver protectors singly from the raceway into the driver path, a block having a

driver passage therein to receive the protector to be driven, and a spring-guide within the passage, to yieldingly engage within the protector while it is being driven.

4. In a machine for setting heel or sole
 70 protectors, a fixed raceway, and a fixed block below it, having a driver passage out of alinement with the raceway end, to receive a protector, a driver, a transferrer movable between and to at times complete
 75 the path from the raceway to the driver passage, a discharge-controlling device cooperating with the raceway, and means to cause said device to release a protector when the transferrer is in operative position,
 80 whereby the said protector may travel along the completed path to the driver passage.

5. In a machine for setting heel or sole protectors, a fixed raceway, and a fixed
 85 block below it, having a driver passage to receive a protector, a driver, an inclined, movable transfer raceway adapted to at times complete the path from the end of the fixed raceway to the driver passage, whereby
 90 a protector may travel to the said passage to be driven, a let-off and a discharge-detent, to cooperate respectively with the endmost and the next protector on the raceway, means controlled by movement of the transfer
 95 raceway to actuate the let-off, and independent controlling means for the detent.

6. In a machine for setting heel or sole protectors, a fixed raceway, a fixed block separated therefrom and having a driver
 100 passage to receive the protector to be driven, a driver, a transferrer having a raceway-section adapted to at times convey directly a protector from the raceway to the driver passage, and means to move said transferrer
 105 into inoperative position before the driver operates.

7. In a machine for setting heel or sole protectors, a fixed raceway, a fixed block separated therefrom and having a driver
 110 passage to receive the protector to be driven, a driver, a movable transferrer to at times complete the path from the raceway to the driver passage, and means controlled by the driver to insure the movement of the transferrer to inoperative position before the protector is driven.
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8. In a machine for setting heel or sole protectors, a fixed raceway, a fixed block separated therefrom and having a driver
 120 passage to receive the protector to be driven, a driver, a transferrer manually movable into operative position to complete the path from the raceway to the driver passage, retracting means for the transferrer, and independent means controlled by the driver to
 125 positively move the transferrer into inoperative position before the protector is driven.

9. In a machine for setting heel or sole protectors, a fixed raceway, a fixed block separated therefrom and having a driver
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passage to receive the protector to be driven, a driver, a transferrer manually movable into operative position to complete the path from the raceway to the driver passage, and yielding retracting means to return the transferrer to inoperative position when a protector has been properly transferred to the driver passage.

10. In a machine for setting heel or sole protectors, a plurality of fixed raceways, a fixed block having a series of driver passages to receive protectors to be driven simultaneously, a gang of drivers, a transferrer having a plurality of transfer raceways movable into and out of position to complete the several paths between the fixed raceways and driver passages, and discharge controlling devices to engage and hold the endmost protectors on the raceways until the transfer raceways register therewith.

11. In a machine for setting heel or sole protectors, a plurality of fixed raceways, a fixed block having a series of driver passages to receive protectors to be driven simultaneously, a gang of reciprocating drivers, a group of simultaneously movable transfer-raceways adapted to complete the paths from the fixed raceways to the driver passages, means actuated by movement of the transfer-raceways into operative position to release the endmost protector from each fixed raceway, and a controller for said means, to effect the release of protectors from a sub-group of the fixed raceways.

12. In a machine for setting heel or sole protectors, a plurality of fixed raceways, a fixed block having a series of driver passages to receive protectors to be driven simultaneously, a gang of reciprocating drivers, a group of simultaneously movable transfer-raceways adapted to complete the paths from the fixed raceways to the driver passages, a discharge controlling device for each fixed raceway, and a common actuator movable with the transfer-raceways and also having a positioning movement relatively thereto, to effect the actuation of the discharge controlling devices of a sub-group of the fixed raceways, for a "right" or a "left" heel or sole.

13. In a machine for setting heel or sole protectors, a series of main raceways, a gang of reciprocating drivers, a fixed block having driver passages therein, out of alinement with and separated from the ends of the said main raceways, a movable carriage provided with a plurality of transfer-raceways adapted to complete the paths between the main raceways and the driver passages, operative movement of the carriage bringing all of its raceways into position to receive protectors singly from the raceways and convey them to the driver passages, and means to permit the discharge of protectors from pre-

determined main raceways to the transfer-raceways.

14. In a machine for setting heel or sole protectors, an odd number of main raceways, a block having a series of driver passages arranged in a curve with the side passages disposed symmetrically relative to the center one, a corresponding number of drivers, a movable carriage, transfer-raceways mounted upon said carriage and adapted when in loading position to register at their ends with the main raceways and the driver passages respectively, to convey protectors to said passages, means to permit the discharge of protectors from the central and either side group of main raceways to the transfer raceways and thence to the driver passages, and yielding retaining devices to hold the protectors in said passages until they are driven therefrom.

15. In a machine for setting heel or sole protectors, a block having a series of driver passages to guide the protectors while being driven into the work, a gang of drivers corresponding in number and arrangement to said passages, a plurality of movable transfer raceways to deliver each a single protector to a selected number of passages, and means to determine which of the transfer raceways shall receive and transfer protectors.

16. In a machine for setting heel and sole protectors, a series of drivers, a fixed driver block having passages therein to guide the protectors while being driven into the work; a hopper, main raceways leading therefrom, detaining means near the delivery end of each; means controlled by the drivers to operate said detaining means; a carriage movable above the driver block and provided with a series of transfer-raceways to at times convey protectors from the main raceways to the driver passages; a let-off for and at the delivery end of each main raceway, and actuating means therefor controlled by movement of the carriage, said means including a device to determine which let-offs shall be operated.

17. In a machine of the class described, a blade-like raceway to receive upon it horse-shoe shaped protectors, a selecting device to engage and lift from the raceway such protectors as present themselves wrong end foremost, means to prevent the passage of a protector while the selecting device is operative, and a resilient deflector to engage a protector lifted from the raceway and to move it laterally away from the raceway.

18. In a machine of the class described, a blade-like raceway to receive upon it horse-shoe shaped protectors, a selecting device to engage and lift from the raceway such protectors as present themselves wrong end foremost, let-off means to form a temporary stop for the protector during operative

movement of the selecting device, and also serving to strip protectors singly from the raceway when the latter is fully loaded beyond the let-off means, and a resilient deflector to engage and move laterally from the raceway a protector lifted therefrom by the selecting device or let-off means.

19. In a machine of the class described, a blade-like raceway to receive upon it horse-shoe shaped protectors, a selecting device to engage and lift from the raceway such protectors as present themselves wrong end foremost, means to prevent the passage of a protector while the selecting device is operative, and a deflector located above and movable transversely to the raceway, to engage and remove from the proximity of the raceway a protector lifted by the selecting device.

20. In a machine of the class described, a plurality of raceways, a casing having a chamber through which they pass, selecting devices to engage and lift above the raceways protectors presented wrong end foremost, let-off means located below the selecting devices and within the chamber, to form temporary stops for the protectors during operative movement of the selecting devices, and also serving to strip protectors singly from a raceway fully loaded below said let-off means, and resilient deflectors adapted each to yield when engaged by a protector lifted from the raceways and to thereafter return to normal position and throw such protector to one side of the raceway, to fall to the bottom of the chamber.

21. In a machine of the class described, a block having a driver passage therein to receive a protector to be driven, a driver, actuating means therefor, a manually controlled starting device for the said means, a work-support, connections between it and the starting device, to move the work-support into operative position before the driver is actuated, and mechanism controlled through the driver actuating means to effect relative movement of the work-support and block when the former is in operative position.

22. In a machine of the class described, a driver block, a driver, actuating means therefor, a manually operated starting device for said means, a work-support, and means controlled by operation of said starting device to move the work-support horizontally into position below the driver block.

23. In a machine of the class described, a work-support, means for vertically adjusting the height thereof, a slide-block in which it is vertically movable, a fixed driver-block, a gang of drivers, a reciprocating plunger to actuate them, a cam to lift the work-support when in operative position to carry the

work against the driver-block, connections between the plunger and cam to operate the latter, including means to automatically accommodate the work-support to the thickness of the work, and means to move said slide-block to bring the work-support into position to be lifted.

24. In a machine of the class described, in combination, driving means comprising one or more driver-passages and a driver or drivers adapted to work in the said driver-passage or passages, and a work-support comprising a standard, a laterally swinging head thereupon, and means to lock said head in opposite angular positions with relation to the said driving means, to present the work to the driving means in opposite positions for a "right" or a "left" heel, respectively.

25. In a machine of the class described, in combination, a gang of drivers arranged in a curved series, and a work-support comprising a standard, a laterally swinging head thereupon, and means to lock said head in opposite angular positions with relation to the said drivers, to present the work to the driving means in opposite positions for a "right" or a "left" heel, respectively.

26. In a machine of the class described, a fixed block having passages for the protectors to be driven, a gang of drivers, means to control the driving of protectors for a "right" or a "left" heel, a work-support comprising a standard, a laterally swinging head thereupon to support the work when the protectors are to be driven thereinto, and means to lock the head in opposite angular positions for a "right" or a "left" heel respectively.

27. In a machine of the class described, in combination, driving means, and a work-support comprising a standard, a laterally-swinging head thereupon, means to lock said head in opposite angular positions with relation to the said driving means to present the work to the driving means in opposite positions for a "right" or a "left" heel, respectively, and fixed back-stops and a yielding breast-stop on said head to hold the work between them.

28. In a machine of the class described, in combination, a gang of drivers arranged in a curved series, and a work-support comprising a standard, a laterally-swinging head thereupon adjustable into opposite angular positions with relation to the said driving means, to enable the driving to be performed for a "right" or a "left" heel, respectively, and fixed back-stops and a yielding breast-stop on said head to hold the work between them.

29. In a machine of the class described, in combination, driving means, and a work-support comprising a standard, a head upon

said standard mounted to swing transversely, a non-metallic impact member mounted in said head, and means to lock the head in opposite angular positions with relation to the said driving means, for a "right" or a "left" heel, respectively.

30. In a machine for setting heel or sole protectors, a driver, a block having a driver passage therein to receive the protectors to be driven, and a guide fixed within said passage to enter and position the protector, the lower portion of the guide being slotted to form spring arms which engage and hold the protector in the passage until positively driven therefrom.

31. In a machine of the class described, a raceway and means to deliver protectors to the raceway, combined with a throw-off device, whereby when the raceway is full, delivery of more protectors to the same is prevented.

32. In a machine for setting heel or sole protectors, a work-support, mechanism for inserting a protector in the work, actuating means therefor, including a clutch having a lug and a throw-off cam rotatable therewith, a stop for said lug mounted on an arm, manually operated means to move said

work-support into operative position and also withdraw the stop and release the clutch, the arm being engaged by the throw-off cam to move the stop into the path of the lug.

33. In combination, a work-support movable horizontally into position beneath the driver-block and also into a position to permit application and removal of work, a driver-block, a driver, a main shaft, a continuously rotated actuator, a clutch intermediate the said shaft and actuator, manually controlled means whereby at the will of the operator the clutch may be thrown into operation and the work-support simultaneously moved into line with the driver-block, means acting to compress the work between the work-support and the driver-block, and means to adapt the work-support to differences in the thickness of the work.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

HENRY W. WINTER.

Witnesses:

JOHN C. EDWARDS,
AUGUSTA E. DEAN.