No. 830,303. PATENTED SEPT. 4, 1906.

W. J. COOMBS.

LACING HOOK OR STUD SETTING MACHINE.

APPLICATION FILED SEPT. 1, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

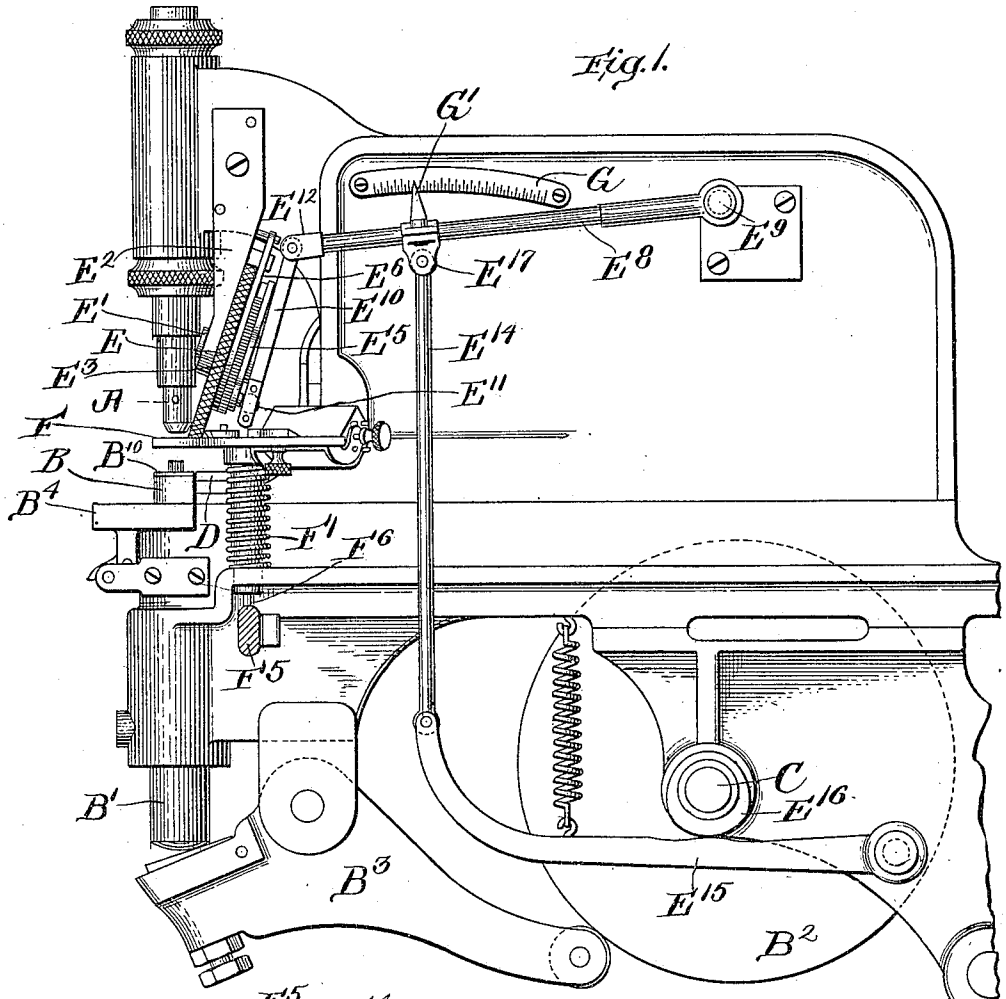
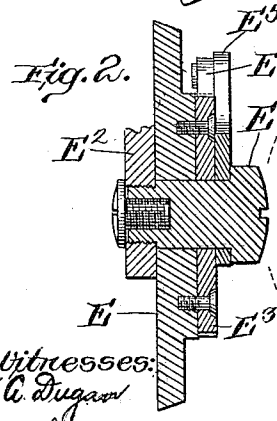


Fig. 2.



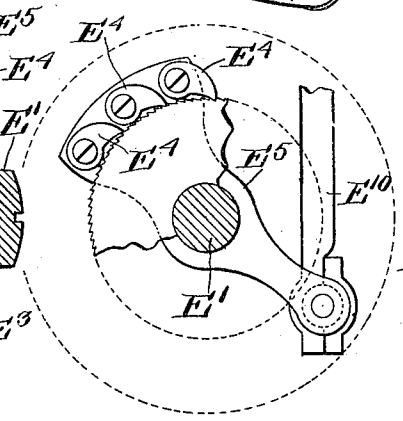


Fig. 3

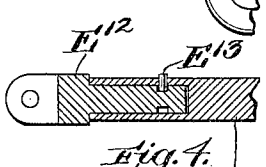


Fig. 4.

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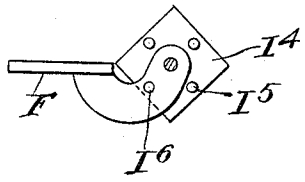
2 SHEETS—SHEET 2.

Fig. 8.



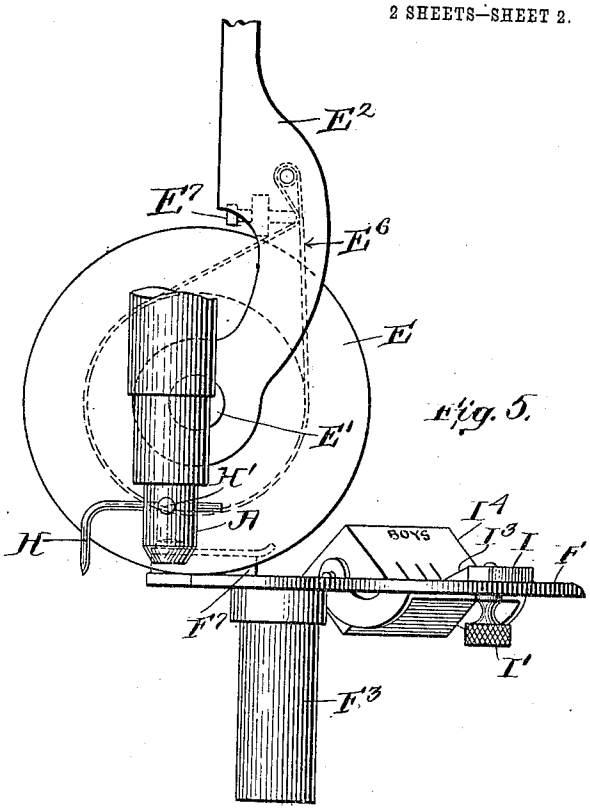


Fig. 5.

Fig. 7.

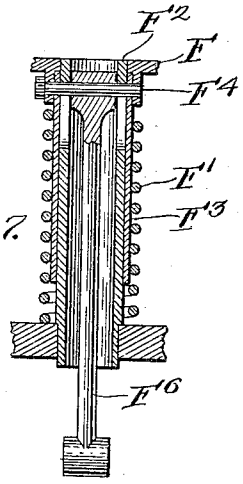
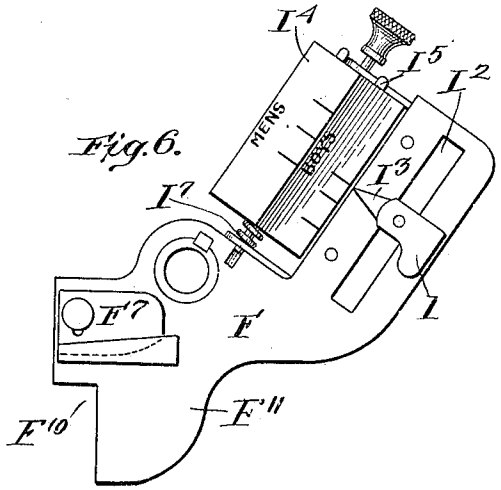


Fig. 6.



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UNITED STATES PATENT OFFICE.

WALTER J. COOMBS, OF QUINCY, MASSACHUSETTS, ASSIGNOR TO TUBULAR RIVET & STUD COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

LACING HOOK OR STUD SETTING MACHINE.

No. 830,303. Specification of Letters Patent. Patented Sept. 4, 1906.

Application filed September 1, 1904. Serial No. 222,945.

To all whom it may concern:

Be it known that I, WALTER J. COOMBS, of Quincy, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Lacing Hook or Stud Setting Machines, of which the following is a specification.

The invention relates to machines for setting lacing hooks or studs in shoe-uppers, and more especially to mechanism which is combined with the setting devices to effect the movement of the material between successive operations of the setting devices to properly space the hooks or studs along the edge of the shoe-upper.

The object of the invention is to provide a simple and efficient mechanism for automatically advancing the material between successive setting operations, so that the setting mechanism may be operated at a high rate of speed and at the same time the hooks or studs will be accurately spaced along the edge of the upper.

To this end the invention consists in the features and combinations set forth in the claims.

The features of the invention will be understood from the following detailed description of the mechanism shown in the accompanying drawings, in which—

Figure 1 is a side elevation of a hook or stud setting machine embodying the invention in its preferred form. Fig. 2 is a sectional detail through the spacing-wheel. Fig. 3 is a detail of the wheel-operating pawls and ratchet. Fig. 4 is a detail of a connection to be described. Fig. 5 is a front elevation of the spacing-wheel and pressure-plate, the setting devices being omitted for the sake of clearness. Fig. 6 is a plan view of the pressure-plate. Fig. 7 is a sectional view showing the pressure-plate and means for supporting it, and Fig. 8 is an end view of the gage-block.

In the machine shown in the drawings the setting devices consist of a stationary setting-anvil A and a vertically-reciprocating hook-supporting plate B^{10}. The hook-supporting plate is secured or formed on a post B, extending upward from a slide B^4, which is mounted for horizontal movement on the top of a vertically-reciprocating plunger B'. The plunger B' is operated by means of a cam B^2, secured to the cam-shaft C and engaging one end of a lever B^3, the other end of which engages the plunger B'. The slide B^4 is retracted after the hook has been set and as the pressure between the anvil and setting-plate is relieved by devices not shown and which may be of the construction fully shown and described in Patent No. 734,823, of July 28, 1903. This outward movement of the slide disengages the hook-supporting plate from the hook, so that the work is not carried downward with the hook-supporting plate, and allows the work to be immediately advanced preparatory to the next setting operation. As the plunger B' completes its downward movement the slide B^4 is advanced so as to bring the hook-supporting plate into position to receive a new hook from the guideway D. The devices for thus returning the slide and retaining it in advanced position on the plunger until after the next setting operation are fully disclosed in the above patent. After the hook has been set in the material and the hook-supporting plate has disengaged the head of the hook the material is advanced to bring it into position for the next setting operation. In order that the work may be thus advanced accurately and in such manner as to enable the rapid operation of the machine, I have combined with the hook-setting devices a spacing-wheel and pressure device so arranged and constructed that they will coöperate in an efficient and practical manner with the hook feeding and setting devices in securing a rapid setting and spacing of the hooks.

It is essential to the practical success of a hook-setting machine that the distance between the centers of the hooks and the edge of the upper shall in many instances be not more than three-eighths of an inch. It is also essential that the feeding devices shall be of such character that they will not crease or mark the outer finished surface of the upper and at the same time shall act to quickly advance the work without interfering with the operation of the hook feeding and setting devices. In combining a spacing-wheel with the hook-setting devices to meet the practical requirements of a hook-setting machine I have arranged the spacing-wheel E adjacent to the setting-anvil A and on the same

side of the work. The periphery of the wheel where it is to act upon the work is slightly below the end of the anvil, since the hook-supporting plate is disengaged from the hook and the shank is free from the anvil when the hook-supporting plate has moved slightly away from the anvil. The wheel is so arranged that its periphery engages the upper between its edge and the setting-anvil. As this space is very narrow, owing to the character and size of setting-anvil requisite for setting hooks, I prefer to arrange the wheel so that the wheel engages the work somewhat to the rear of the center line of the setting devices, as shown in Fig. 5. This arrangement, in connection with the inclination of the feeding-wheel, enables the tread of the wheel to be broadened somewhat. I have also found that the accurate feeding of the work is facilitated by this arrangement.

The inner surface of the upper is held against the periphery of the wheel by means of a pressure device which engages the outer finished surface of the upper. This pressure device must be of such character that it will not crease or mar the finished surface of the work and must also be so constructed and arranged that it will offer an effective support for the work without interfering with the hook-feeding devices or the operation of the setting devices. In the form shown this pressure device consists of a pressure-plate F, having a smooth upper surface over which the surface of the upper slips as the spacing-wheel is revolved. This plate F is recessed at F^{10} to allow the passage of the hook-carrying plate B^{10}, and in order that the work may be supported close up to the hook the hook-carrying plate is formed or secured upon the post B, which projects upward from the slide B^4. The inner side of the post is also formed as near the center of the hook as practicable in order to give sufficient bearing-surface on the plate beneath the wheel F and also to enable the tread of the wheel to act upon the work inside of the line of hooks without pressing the upper against the hook-setting plate during the setting operation in such manner as to mar the finished surface of the upper. The rear side of the post and plate are also formed as near the center of the hook as practicable, so that the forwardly-extending part F″ of the plate F may lie as close to the center line of the setting devices as practicable, and thus support the upper in setting the last hook near the top edge.

The mounting or forming of the setting-plate on the post is also of practical importance in enabling the pressure-plate to be embodied in the machine without danger of catching the fingers of the operator between the slide B^4 and the plate.

In order that the spacing-wheel may be arranged with the bearing portion of its periphery sufficiently close to the setting-anvil to operate efficiently upon the uppers and also for the purpose of effecting a feed in a curved path corresponding to the curve of the upper, the wheel is inclined and is provided with a conical periphery.

With the above construction and arrangement the spacing-wheel engages the inner surface of the upper and may be knurled or roughened to secure an effective feeding action, while the plate F, which engages the outer finished surface of the upper, presents a smooth surface over which the surface of the upper slips without any danger of creasing or marring the finished surface.

The spacing-wheel E is mounted upon a stud E′, secured in a bracket E^2, the stud being inclined so that the conical periphery of the wheel will properly engage the horizontal surface of the upper when held against it by the pressure-plate F. A ratchet-wheel E^3 is secured to the spacing-wheel E and is engaged by a series of pawls E^4, carried by a pawl-carrying arm E^5, which is intermittently operated to advance the spacing-wheel. The ratchet-wheel is provided with very fine teeth, and the series of pawls are arranged in varying relation to the ratchet-teeth, so that accurate and equal movements will be imparted to the spacing-wheel by the reciprocations of the pawl-carrying arm.

In order to prevent a forward movemetn of the wheel due to its momentum, I provide a friction-brake in the form of a strap E^6, engaging the hub of the wheel, as indicated in Figs. 1 and 5. The friction of this strap may be regulated by means of an adjusting-screw E^7, Fig. 5.

The pawl-carrying arm is operated through a lever E^8, pivoted at E^9 and connected with the pawl-carrying arm by a link E^{10}. The link E^{10} is connected with the pawl-carrying arm E^5 by a ball-and-socket joint E^{11}. The upper end of the link E^{10} is pivoted to a block E^{12}, free to turn in the end of the lever E^8 and connected therewith by a pin E^{13} engaging a groove in the cylindrical part of the block, which fits within a cylindrical recess in the end of the lever, Fig. 4. The lever E^8 is operated by means of an operating-rod E^{14}, one end of which is connected to the lever E^8 and the other end of which is connected to a lever E^{15}, operated by a cam E^{16} on the cam-shaft C. The operating-rod E^{14} is pivoted to the end of the lever E^{15}, and its upper end is pivoted to a block E^{17}, adjustably secured on the lever E^8. The movement of the rod E^{14} by the cam E^{16} is uniform; but the effect of this movement upon the lever E^8, and consequently upon the spacing-wheel E, may be varied by adjusting the block E^{17} along the lever E^8. The movement of the spacing-wheel at each operation may therefore be varied to effect the proper spacing of the hooks for different sizes and styles of shoes. In order that the adjustment for any style or

size of shoe may be quickly and accurately made, I provide a scale G, which coöperates with a pointer G′ on the block E^{17} in indicating the position of the block upon the lever E^8. This scale may be properly graduated and provided with readings indicating the proper adjustment of the block E^{17} for any given size or style of shoe.

The pressure-plate F is mounted upon the hollow stud F^2, secured in the frame of the machine, and is provided with a depending sleeve F^3, which surrounds the stud and accurately guides the plate and holds it in position, Fig. 7. A spring F′ is interposed between the hub of the pressure-plate and the frame of the machine, as indicated in Figs. 1 and 7, and tends to press the plate against the periphery of the spacing-wheel E. The plate is held from rotation on the stud F^2 by means of a bolt F^4, extending through slots formed in the stud. The plate may be depressed to enable the upper to be introduced between the plate and the wheel by means of a treadle or lever (not shown) connected with a lever F^5, which is in turn connected with the pin F^4 by means of a link F^6. The plate F is provided with a guide F^7, against which the edge of the upper is guided. This guide-plate is adjustably secured upon the pressure-plate, so that its position with relation to the setting devices may be varied according to the distance between the edge of the upper and the hooks. I also prefer to provide this guiding-plate with an overhanging upper edge, so that the edge of the upper will be held down against the pressure-plate and be accurately guided against the guiding-plate.

In order to enable the operator to properly position the left sides of the uppers for the first setting operation, a gage-finger H is mounted in the anvil A, which may be adjusted and then held in position by a screw H′. In placing the upper in position for setting the first hook the operator brings the top edge directly under the finger. As the spacing of the top hook from the top of the upper is usually the same for various styles and sizes, this gage does not require adjustment, except in exceptional cases, after once set.

The gage for enabling the operator to position the right side of the upper for the first setting operation must be adjusted for the different sizes and styles, since the first hook set is the lowest, and the spacing of the hook varies according to the style and size. This gage I is adjustably mounted on the pressure-plate F and is held in adjusted position by a thumb-screw I′, which extends through the slot I^2 in the plate. This gage is provided with a pointer I^3, which coöperates with scales on a scale-block I^4 in indicating the proper adjustment for any given size and style, the position of the gage I being varied to correspond to the position of the pointer G′ on the scale G. The block I^4 is provided with several scales corresponding to the different styles and is so mounted that any scale may be brought opposite the pointer I^3. The block is journaled on the pressure-plate and is provided with pins I^5, which engage a hole I^6 in one of the supports and hold the block in position. The block may be moved longitudinally against the tension of a spring I^7 to disengage a pin from the hole and then turned to bring any other pin into register with the hole. The upper is positioned by bringing the top edge against the gage I.

What I claim, and desire to secure by Letters Patent, is—

1. A stud or hook setting machine having in combination, a hook-setting anvil, a hook-supporting plate to which hooks are fed with the shank outside and the head inside the plate, a spacing-wheel arranged to engage the work on the anvil side adjacent to the setting-point, a pressure device arranged to engage the work and press it against the periphery of the wheel, and mechanism for advancing the wheel between successive setting operations.

2. A stud or hook setting machine having in combination, a hook-setting anvil, a hook-supporting plate adapted to enter between the head and shank of the hook, a carrier for the plate having an outward movement for disengaging said plate from the hook at the completion of the setting operation, a spacing-wheel arranged to engage the work on the anvil side adjacent to the setting-point, a pressure device arranged to engage the work and press it against the wheel, and mechanism for advancing the wheel between successive setting operations.

3. A stud or hook setting machine having in combination, a hook-setting anvil, a hook-supporting plate to which the hooks are fed with the shank outside and the head inside the plate, a spacing-wheel having a conical periphery arranged to engage the work on the anvil side adjacent to the setting-point, a coöperating pressure device having a smooth supporting-surface for engaging the finished side of the work, and mechanism for advancing the wheel between successive setting operations.

4. A stud or hook setting machine having in combination, a hook-setting anvil, a hook-supporting plate adapted to enter between the head and shank of the hook, a carrier for the plate having an outward movement for disengaging said plate from the hook at the completion of the setting operation, a spacing-wheel having a conical periphery arranged to engage the work on the anvil side adjacent to the setting-point, a pressure device arranged to engage the work and press it against the wheel, and mechanism for advancing said wheel between successive setting operations.

5. A stud or hook setting machine having in combination, a hook-setting anvil, a hook-

supporting plate adapted to enter between the head and shank of the hook, a carrier for the plate having an outward movement for disengaging said plate from the hook at the completion of the setting operation, a spacing-wheel arranged to engage the work on the anvil side adjacent to the setting-point, a pressure device arranged to engage the work and press it against the wheel, mechanism for advancing said wheel between successive setting operations, and means for varying the advancing movements of said wheel for different spacing of the hooks.

6. A stud or hook setting machine having in combination, a hook-setting anvil, a hook-supporting plate adapted to enter between the head and shank of the hook, a carrier for the plate having an outward movement for disengaging said plate from the hook at the completion of the setting operation, a spacing-wheel arranged to engage the work on the anvil side adjacent to the setting-point, a spring-supported pressure-plate for holding the material against the wheel, and mechanism for advancing the wheel between successive setting operations.

7. A stud or hook setting machine having in combination, a hook-setting anvil, a hook-supporting plate adapted to enter between the head and shank of the hook, a carrier for the plate having an outward movement for disengaging said plate from the hook at the completion of the setting operation, a spacing-wheel arranged to engage the work on the anvil side adjacent to the setting-point, a pressure-plate for holding the work against the wheel, a ratchet-wheel connected with the spacing-wheel, a pawl-carrying arm, a pawl carried thereby and engaging said ratchet-wheel, a lever connected with the pawl-carrying arm, and an operating-rod adjustably connected with said lever.

8. A stud or hook setting machine having in combination, a hook-setting anvil, a hook-supporting plate adapted to enter between the head and shank of the hook, a carrier for the plate having an outward movement for disengaging said plate from the hook at the completion of the setting operation, a spacing-wheel arranged to engage the work on the anvil side adjacent to the setting-point, a ratchet-wheel connected with the spacing-wheel, a pawl-carrying arm, a plurality of pawls mounted on said arm arranged in varying relation to the ratchet-teeth, and means for operating said pawl-carrying arm between successive setting operations.

9. A stud or hook setting machine having in combination, a hook-setting anvil, a hook-supporting plate adapted to enter between the head and shank of the hook, a carrier for the plate having an outward movement for disengaging said plate from the hook at the completion of the setting operation, a spacing-wheel adjacent to the setting-anvil, a ratchet-wheel connected with the spacing-wheel, a series of pawls arranged in varying relation to the teeth of the ratchet-wheel, means for operating the pawls between successive setting operations, and means for varying the throw of the pawls for different spacings.

10. A stud or hook setting machine having in combination, a hook-setting anvil, a hook-supporting plate adapted to enter between the head and shank of the hook and arranged at the end of a post, an edge-guide back of the setting-anvil, a feed-wheel having a conical periphery arranged to engage the work between the guide and setting-anvil, a pressure-plate for pressing the work against the wheel, and mechanism for advancing the work between successive setting operations.

11. A stud or hook setting machine having in combination, a hook-setting anvil, a hook-supporting plate adapted to enter between the head and shank of the hook, a spacing-wheel arranged to engage the work on the anvil side adjacent to the setting-point, a pressure device for pressing the work against the periphery of the wheel, a pawl-and-ratchet mechanism for operating the wheel, a lever E^8 connected to operate the pawl-and-ratchet mechanism, an operating-rod E^{14} adjustably connected to the lever and a scale G adjacent to the end of the operating-rod.

In testimony whereof I have affixed my signature in presence of two witnesses.

WALTER J. COOMBS.

Witnesses:
FRED T. HILL,
A. H. TABER.