(No Model.) 3 Sheets—Sheet 1.

E. F. GRANDY & G. W. COPELAND.

MACHINE FOR HEADING TACK STRIPS.

No. 385,753. Patented July 10, 1888.

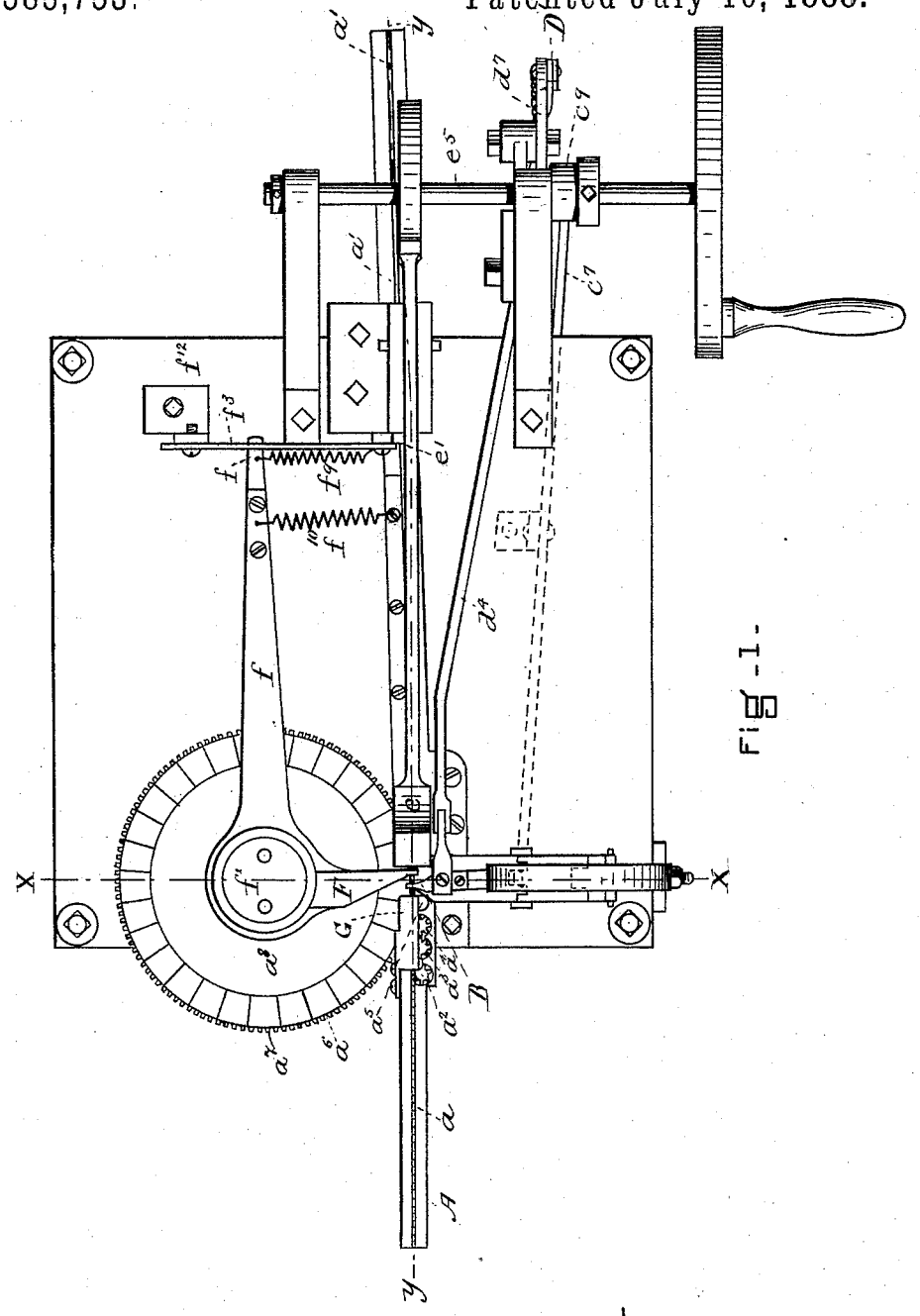

Fig. 1.

WITNESSES.

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(No Model.) 3 Sheets—Sheet 2.

E. F. GRANDY & G. W. COPELAND.

MACHINE FOR HEADING TACK STRIPS.

No. 385,753. Patented July 10, 1888.

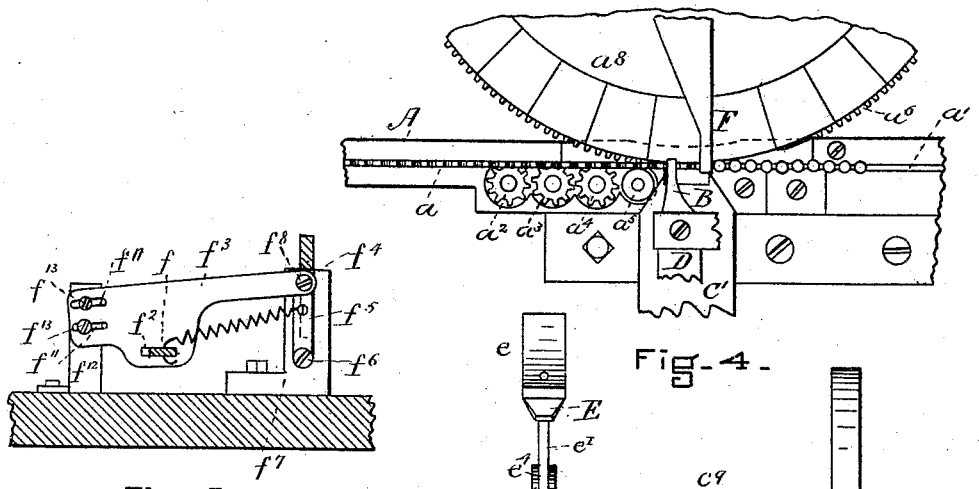

Fig. 4.

Fig. 5.

Fig. 2.

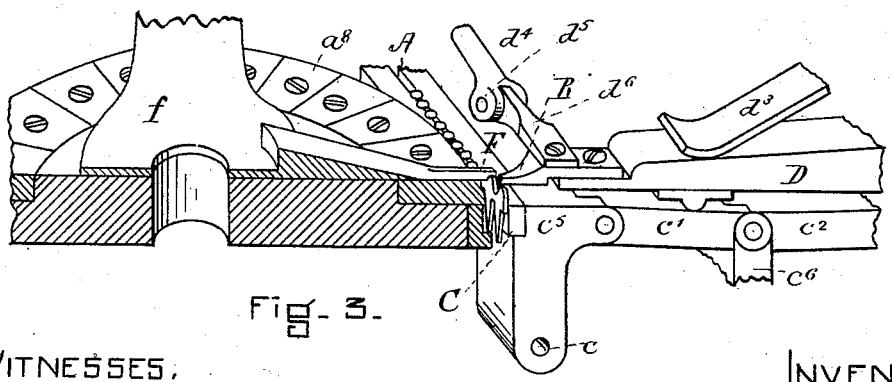

Fig. 3.

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(No Model.) 3 Sheets—Sheet 3.

E. F. GRANDY & G. W. COPELAND.

MACHINE FOR HEADING TACK STRIPS.

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Fig. 9.

Fig. 10.

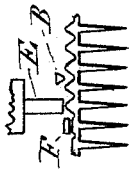

Fig. 11.

Fig. 12.

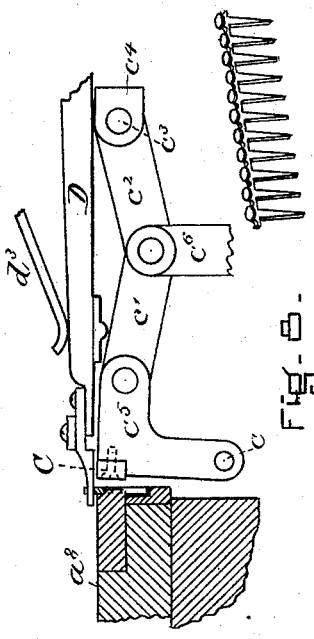

Fig. 8.

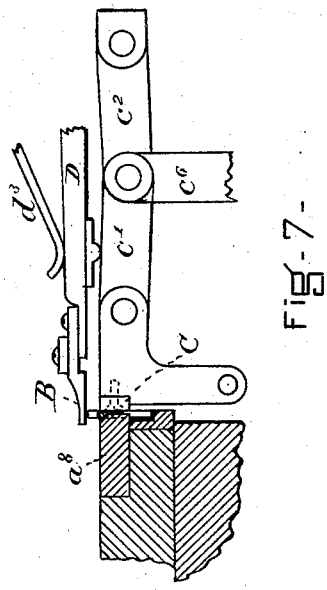

Fig. 7.

WITNESSES.

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UNITED STATES PATENT OFFICE.

EDWARD F. GRANDY, OF BOSTON, AND GEORGE W. COPELAND, OF MALDEN, MASSACHUSETTS, ASSIGNORS TO THE MUTUAL LASTING MACHINE COMPANY, OF PORTLAND, MAINE.

MACHINE FOR HEADING TACK-STRIPS.

SPECIFICATION forming part of Letters Patent No. 385,753, dated July 10, 1888.

Application filed June 26, 1884. Serial No. 136,049. (No model.)

To all whom it may concern:

Be it known that we, EDWARD F. GRANDY, of Boston, in the county of Suffolk, and GEORGE W. COPELAND, of Malden, in the county of Middlesex, both in the State of Massachusetts, citizens of the United States, have invented a certain new and useful Improvement in Machines for Heading Tack Strips, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature, in which—

Figure 1 represents a plan view of the machine. Fig. 2 is a cross-section on the line *x x* of Fig. 1. Fig. 3 is an enlarged view in perspective of portions of the mechanism hereinafter referred to. Figs. 4, 5, 7, and 8 illustrate various features hereinafter described. Fig. 6 is a view in vertical section upon the line *y y* of Fig. 1. Figs. 9 and 10 are views to further illustrate the operation of the machine, to which special reference will hereinafter be made. Figs. 11 and 12 represent in perspective two tack-strips, one of which represents the strip before heading and the other after it.

The invention comprises a machine for heading the tack-strip blank described in the application of Woodward and Copeland, filed December 31, 1883, or one which has head-forming sections extending from the main or continuous portions thereof. The strip before it is submitted to the head-forming devices is really a tack-strip blank, and after it has been headed it is a complete tack-strip; but for convenience of reference we shall apply the term "tack-strip" to the blanks as well as to the complete strip.

The elements which we deem as specially necessary in our invention are, first, the tack-strip-feeding device, or means whereby the tack-strip blank is fed regularly and uniformly to holding or clamping mechanism; second, means for holding the tack-strip and supporting the same while it is being submitted to the operation of the heading-tool; third, a reciprocating header; and, fourth, means for straightening the strip as it is fed.

Referring to the drawings, A represents the feedway or passage for receiving the tack-strip, and in which it is fed and straightened. This passage or feedway extends the entire length of the machine, and is of a depth and width sufficient to receive and hold the tack-strip in a vertical position with the head-forming portion projecting therefrom. It is well shown in Figs. 1 and 6.

The portion *a* of the feedway, or that part which is in front of the feed, is preferably straight, and the section *a'*, extending from or near the header to the end, is bent at an angle to the straight portion of the feedway both laterally and downwardly, for the purpose of straightening the strip after it leaves the feeding and heading devices. This change in the direction of the feedway is always made with special reference to the action of heading upon the strip, and if, for instance, said action tends to curl or curve the strip to the right and in an upward direction, then the feedway should be turned to the left and extend in a downward direction to counteract by bending the said tendency.

The feeding mechanism comprises the finger B, which closes into the notches between the head-forming sections and is moved forward. This finger has in substance four motions provided it. It is first moved downward into a notch between two head-forming portions or sections of the tack-strip, and preferably immediately behind the section which is next to be headed. It is then moved forward, thereby moving the tack-strip and bringing the section to be headed immediately under the header. It is then moved upward and backward to a position to again enter the next succeeding notch of the strip. These movements are in this instance imparted to the finger by means of mechanism which is used in part for clamping or holding the tack-strip during the heading manipulation, and before describing the devices for operating the finger we will describe this clamping mechanism.

We have ascertained that to properly head the strip it is desirable that the strip be supported by the connecting portion thereof. In order to bring the strip to the holding mechanism, so that it can be thus supported, we have arranged in the feedway the three rolls

a^2 a^3 a^4. These rolls have teeth or projections which extend into the feedway, and are of such width that they can easily enter the spaces between the shanks of the strip. The upper surface of these rolls or of the teeth thereon is a trifle higher than the length of the shanks of the strip, so that the strip is supported thereon as it is fed forward. Immediately in advance of the last roll, a^4, of the series is the roll a^5, which is unprovided with teeth, and is somewhat in the nature of a pressure or guide roll, its office being to guide or direct the tack-strip so that its shanks shall enter the spaces a^6 between the short arms a^7 of the disk a^8. This disk a^8 has a shoulder or surface upon which the head-forming portion of the strip is headed, and in that respect it forms a section of the bed upon which the heading operation takes place. It also forms one portion of the clamping device, the other section of the clamping device being the movable jaw C. This jaw is pivoted at c to the bed-plate of the machine, and is moved toward and from the edge of the roll or disk a^8 at regular intervals by means of the toggle c' c^2, the link c^2 of the toggle being pivoted at c^3 to the block c^4, and the link c' being pivoted to the arm c^5 of the jaw C. The toggle is operated by means of the link c^6, lever c^7, pivoted at c^8, eccentric c^9, and connecting-rod c^{10}.

The feed-finger B is secured to or supported by the arm D, which is pivoted at d to the block c^4, so as to swing vertically upon the horizontal pivot d' and horizontally upon the vertical pivot d^2. The spring d^3 bears upon the upper surface of the arms D, and serves to keep the finger in contact with the back edge of the head-forming section of the strip while it is feeding. The finger is reciprocated by means of the rod d^4, which is pivoted at d^5 to the arm d^6, projecting laterally from the finger, and to the lever d^7, which is pivoted at d^8, and is operated or oscillated by the link D', which is pivoted to an arm extending therefrom and to the end of the eccentric-rod c^{10}. The rod d^4 is attached to the lever d^7, or to a block secured thereto, by means of a horizontal pivot, d^9. The order and time of the movements of these parts in relation to each other are substantially as follows:

The finger B being at the end of its backward movement, the toggle c' c^2 has been moved downward and moved the jaw C away from the roll a^8. This position of the toggle permits the spring d^3 to press the finger B into a notch between two head-forming portions or sections, and the feedway is open to permit the forward movement of the tack-strip. The finger B is then moved forward, and at the instant it stops the toggle is operated to close the jaw C toward the disk or wheel a^8, and clamps the tack-strip firmly in position in the feedway. Upon the straightening of the toggle the arm D is lifted, thereby lifting the finger B, and it is immediately moved back by the rod d^4 and the mechanism which operates it.

We have now described the tack-strip-feeding and tack-strip holding or clamping devices. In addition to these elements it is necessary to employ a header or hammer which shall upset successively each head-forming section of the blank into a head of any form for its respective shank, and we have found it desirable to use for this purpose a spring-actuated header or hammer, because by it we are enabled to get a quick, forcible blow sufficient to form the head. This hammer or header must be operated while the tack-strip is held by the clamping mechanism and immediately after the feed-finger B has been moved backward, as above explained.

Referring to the drawings, E represents the header or hammer. It is secured in the block e by any suitable means, which is carried at the end of the lever or arm e'. This lever e' is pivoted at e^2, and it has at the end opposite the head the anti-friction roll e^3, which bears against the edge of the hammer-lifting cam e^4. This cam is carried by the shaft e^5. The cam is so shaped that it serves to elevate the header or hammer, and then at a given instant to permit it to drop or be drawn down by a spring. If a lever of sufficient length be used and a head of sufficient weight be employed, gravity alone will serve to actuate the hammer when thus released; but we prefer to use a somewhat lighter head and a shorter lever than would alone answer, and to use additionally a coil-spring, e^6, to more readily and forcibly actuate the header, and in order that the header may have the advantage which comes from mounting and swinging upon a long arm we prefer to arrange the spring nearer the pivot e^2.

When a spring is employed, it is desirable to provide for the support of the lever e' when in an elevated position, and also means for withdrawing such support immediately before the cam e^4 has cleared the end of the lever, in order that the drop of the hammer may be as sudden and forcible as possible; and this device is also used for preventing the movement of the header unless an unheaded section of the tack-strip is in position to be acted upon. The mechanism for doing this comprises the finger F, which extends over the feedway in front of the finger B and projects at right angles from the lever f, which is pivoted at f' to the stud on which the disk a^8 revolves. The end of this lever f enters the slot f^2 in the latching-plate f^3. This plate f^3 is moved, as will be hereinafter described, under the arm e' when it is at its highest or very nearly highest position, and remains there until the unheaded section is brought into position to be headed, when it is removed to permit the header or hammer to be drawn down, as above explained, and this is accomplished in the following manner:

The finger F extends over the feedway in line with the head-forming sections of the strip, and when in its normal condition just in line with the bed upon which the hammer or

header descends. Consequently upon the forward movement of the tack-strip the front edge of the forward unheaded section comes in contact with the finger F and moves it enough to cause the arm f to move the latch f^3 laterally sufficiently to throw its latching end f^4 from under the hammer or header lever e'. This is done not by moving the plate f^3 by the contact of the lever therewith, but by means of the spring f^9 and the hinged rod f^5, the movement of the lever causing a tension on the spring, which enables it to draw the latch from under the lever e' the instant the lifting-cam elevates the lever from the latch. As, however, it is desirable that the finger F should be moved sufficiently from the bed upon which the header or hammer strikes, and consequently from the head-forming section which is about to be upset, to permit said section to be spread or headed, and also to prevent injury to the finger, the downward-extending rod f^5, which is pivoted at f^6 to the bracket f^7 and to the slide-plate f^3 at f^8, is arranged with the pivot-point f^6 of this rod f^5 preferably in line with the vertical movement of the hammer or header lever e', so that after the latch f^4 has been withdrawn from under the lever e', to permit the spring e^6 to move the same forcibly downward, the lever e' comes in contact with the arm f^5 and throws the slide f^3 still farther away from the lever e', and sufficiently to cause it to actuate the lever f and move the finger F away from the head-forming section of the tack-strip which is about to be upset, and the finger F is thus moved out of the path of the header or hammer before it strikes the head-forming section of the tack-strip. The spring f^{10} serves to return the lever f, slide f^3, and rod f^5 to their normal positions upon the upward movement of the hammer-arm e'. The lever f extends through the slot f^2 in the plate f^3, and this slot is sufficiently long to provide the slight movement of the lever f. The slide f^3 also has slots f^{11}, and is fastened to the bracket f^{12} by the screws f^{13}, which pass through said slots and permit the horizontal movement of the slide thereon.

The feedway, preferably immediately in front and at the rear of the bed, is covered by the covering-plates G G, and the tack-strip is thus held from moving or jumping up from the feedway.

The shaft e^5 carries the eccentric and the lifting-cam and is operated by hand or by a belt.

In operation the tack-strip is fed into the feedway by hand, and is pressed forward until the front edge of the first head-forming section of the strip comes in contact with the finger B, the portion of the strip immediately behind the finger being supported by the teeth or projections upon the rolls a^2 a^3 a^4, and the roll a^5 guiding or directing the strip, so that the teeth upon the disk a^8 enter or mesh into the spaces between the shanks of the strip while the head connecting portion of the strip rests upon the upper surface of the teeth. The machine is then set in operation. The finger B moves over the first head-forming section of the strip and down behind the same and then forward. At the end of the forward movement the jaw C closes against the side of the strip and forces it in contact with the side of the disk a^8, so that its shanks are in the spaces between the teeth or projections thereon, and this head-connecting portion rests upon the upper surface thereof, and the upper surface of the jaw and the upper surface of the disk a^8 immediately adjacent form the bed or anvil upon which the head is upset. The tack-strip thus being rigidly clamped in position and the heading-bed being provided upon which the head-forming portion may be upset, the hammer or header E immediately descends and with one blow upsets the head-forming portion and forms the head. The feed of the tack-strip forward to a position for heading causes the operation of the hammer or header as each head-forming section of the strip in succession comes in contact with the finger F as it is moved forward by the feed-finger B, and thereby causes the latch f^4 to be withdrawn from under the hammer-lever e'. At the same instant, and before the hammer or header strikes the unheaded section, which is in place, the finger F is moved still farther forward and the finger B backward, so that the section to be headed is left exposed on all sides to the action of the header.

In Fig. 9 we represent the position of finger B and finger F of the tack-strip before the header or hammer is operated, and in Fig. 10 we represent these parts and the header or hammer at the instant the header comes in contact with a head-forming section of the strip.

It will be observed that by means of the finger F and connecting mechanism, as specified, if there is no head-forming section in place to be headed, the hammer or header is not operated; also, that it is not possible to obtain successive blows of the hammer upon the same head-forming section.

The shape of the head-forming section very largely determines the shape of the head, and the head may be made oval or round, according as it is desired.

We would not be understood as confining ourselves to the specific mechanism herein described for operating the fingers B F and the header E, but may use any mechanical equivalents therefor. Neither would we wish to be understood as limiting ourselves to the employment of the disk e^8. As an equivalent therefor we may use a block having teeth or projections and provided with a reciprocating movement in relation to the feedway.

Having thus fully described our invention, we claim and desire to secure by Letters Patent of the United States—

1. In a machine for heading tack-strips, the combination of the feedway with the four-motion feed-finger B, whereby it is adapted to engage successively with the head-forming

portions of the tack-strip and move it to the heading device, all substantially as and for the purposes described.

2. The combination of a feedway, the finger F, the hammer E, and intermediate connecting mechanism, substantially as specified, all substantially as and for the purposes described.

3. In a machine for forming heads in succession upon tack and other strips, the finger F, arranged to project over the feedway of the machine and to be moved by the advance or feed of the tack-strip, in combination with the header or hammer, whereby the header or hammer is caused to operate when a head-forming section is in position to be headed, all substantially as and for the purposes described.

4. In a tack-strip-heading machine, the combination of the feedway, a support upon which the tack-strip is headed, and a clamping device for holding the tack-strip rigidly in a perpendicular position, the feed-finger B, and the hammer or header operating or tripping finger F, arranged in relation to each other as set forth, and adapted to operate in feeding the tack-strip, holding and clamping the same during the heading operation, and to cause the automatic movement of the heading device, all substantially as and for the purposes specified.

5. The combination, in a tack-strip-heading machine, of the hammer or header E, its arm e', pivoted at e^2, as described, the lifting-cam e^4, and the drawing-spring e^6, attached to the lever or arm e' between the fulcrum-point and the hammer, all substantially as and for the purposes described.

6. The combination, in a machine for heading tack-strips, of a clamp and support for the tack-strip, the header E, the lifting-cam e^4, the spring e^6, and the latch f^4, all substantially as and for the purposes described.

7. The combination of the finger F, the hammer E, reciprocated substantially as described, the latch f^4, and connecting devices, all substantially as and for the purposes described.

8. In a tack-strip-heading machine, the combination of a disk, having arms or supports for holding or supporting the head-connecting portion of a tack-strip and notches for receiving the shanks thereof, with a reciprocating jaw, C, adapted to be moved against the head-connecting portion of the tack-strip and to clamp the same against the side of the disk, all substantially as and for the purposes described.

9. The combination of the feedway, one or more of the rolls a^2 a^3 a^4, the disk a^8, adapted to be revolved by the tack-strip, and the jaw C, all substantially as and for the purposes described.

10. The combination of the feedway of the machine, the roll a^5, notched disk a^8, and the jaw C, all substantially as and for the purposes described.

11. The combination of the feedway of the machine and one or more spacing and supporting rolls, a^2 a^3 a^4, substantially as and for the purposes described.

12. The combination of the feedway of the machine with the tack-strip support and the covering-plates G G, or either, all substantially as and for the purposes described.

13. As an anvil or support for the portion of the tack-strip submitted to the heading operation, the arms or fingers projecting from a movable section, a^8, and adapted to support the tack-strip and to form a rest for the head-connecting portion of the tack-strip, and spaces arranged between said arms or projections for the reception of the shank of the tack-strip, with a jaw, C, adapted to be moved against the tack-strip when so supported and to hold it firmly in position upon said fingers or rests, and in connection therewith and their support to form an anvil or bed upon which the tack is headed, all substantially as and for the purposes described.

14. The feed-finger B, arranged in relation to the feedway as specified, and provided with means, substantially as set forth, whereby it is brought in successive contact with the head-forming sections of the strip, and then moved forward to feed the same, all substantially as and for the purposes described.

15. The combination of the feedway of the machine, the supporting roll or rolls a^2 a^3 a^4, and the feed-finger B, all substantially as and for the purposes described.

16. The combination of the jaw C and the toggles c' c^2 c^6, all substantially as and for the purposes described.

17. The combination of the finger B, its supporting-arm D, spring d^3, and the reciprocating connecting-rod d^4, all substantially as and for the purposes described.

18. The feedway bent beyond the bed or anvil in a direction to straighten the tack-strip after it has been submitted to the heading operation, all substantially as and for the purposes described.

19. In a tack-strip-heading machine, the combination of a support for the tack-strip, consisting of a disk having peripheral teeth to engage the shanks of the strip, a clamping-jaw, and a header.

20. In a nail-strip-heading machine, the bent guideway provided with a covering-plate to retain the strip in place.

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