(No Model.) 4 Sheets—Sheet 1.

F. W. COOPER.

MACHINE FOR ATTACHING SWEAT LEATHERS AND BANDS TO HATS BY MEANS OF WIRE STAPLES.

No. 519,885. Patented May 15, 1894.

Fig. 1.

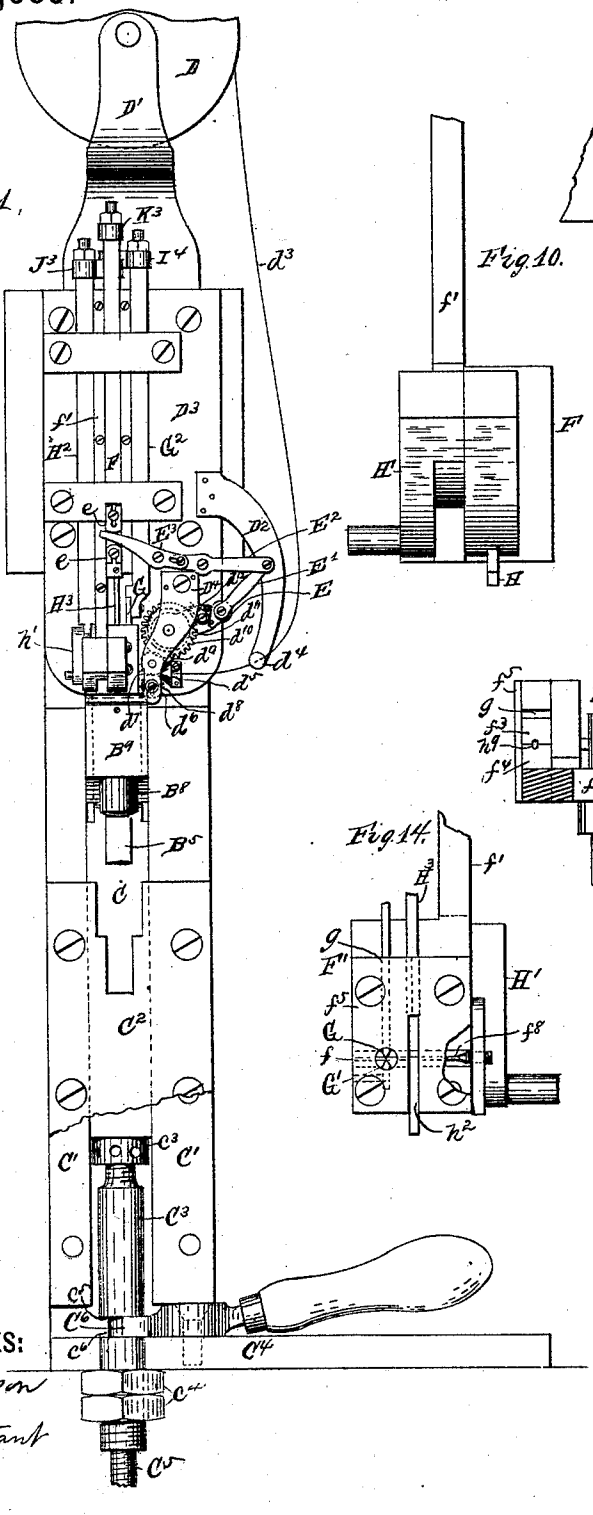


Fig. 10.

Fig. 11

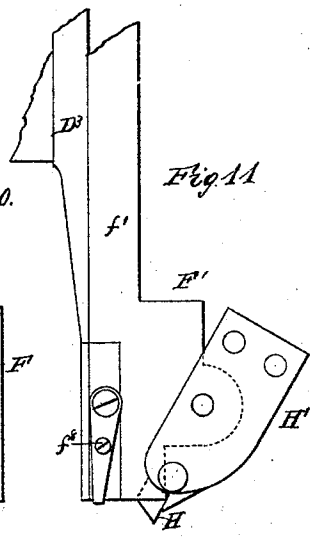


Fig. 12

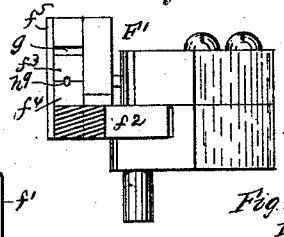
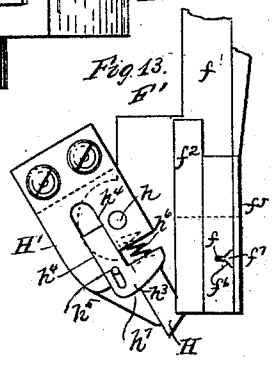


Fig. 14.

Fig. 13.



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(No Model.) 4 Sheets—Sheet 2.

F. W. COOPER.

MACHINE FOR ATTACHING SWEAT LEATHERS AND BANDS TO HATS BY MEANS OF WIRE STAPLES.

No. 519,885. Patented May 15, 1894.

Fig. 2.

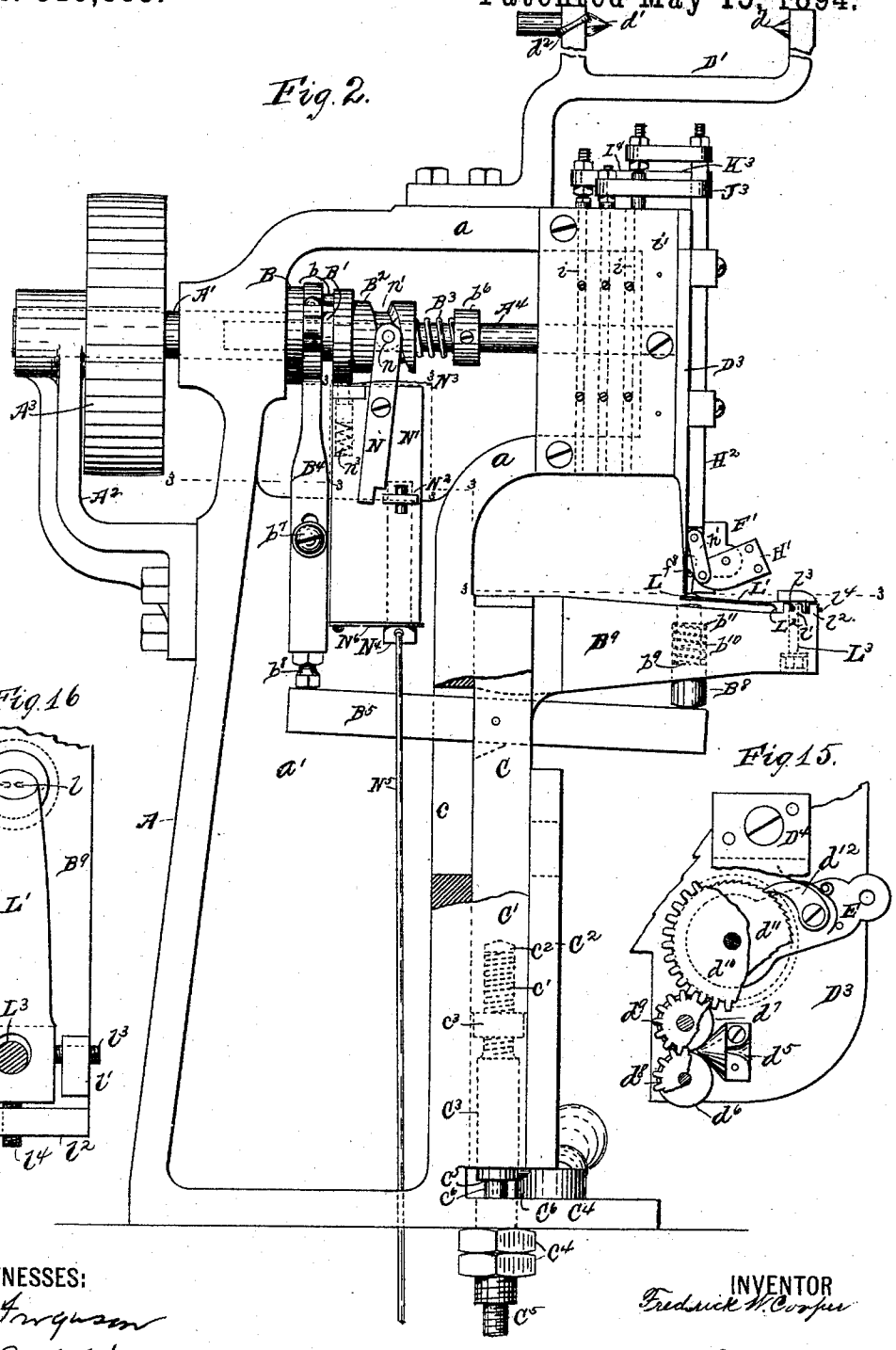

Fig. 16

Fig. 15.

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(No Model.) 4 Sheets—Sheet 3.

F. W. COOPER.

MACHINE FOR ATTACHING SWEAT LEATHERS AND BANDS TO HATS BY MEANS OF WIRE STAPLES.

No. 519,885. Patented May 15, 1894.

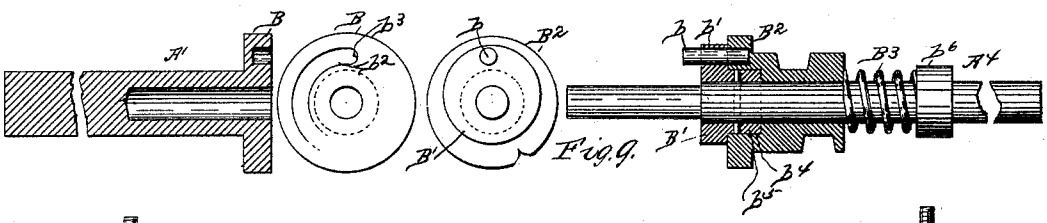


Fig. 9.

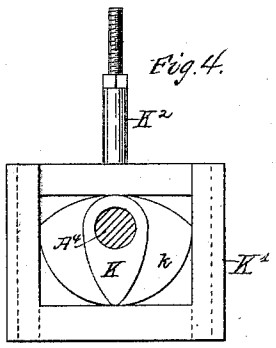


Fig. 4.

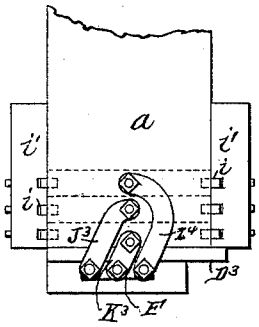


Fig. 8.

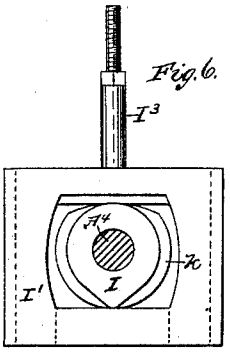


Fig. 6.

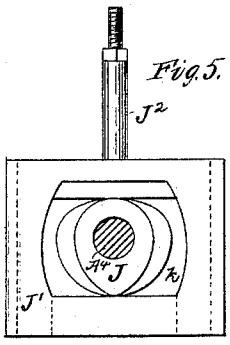


Fig. 5.

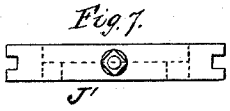
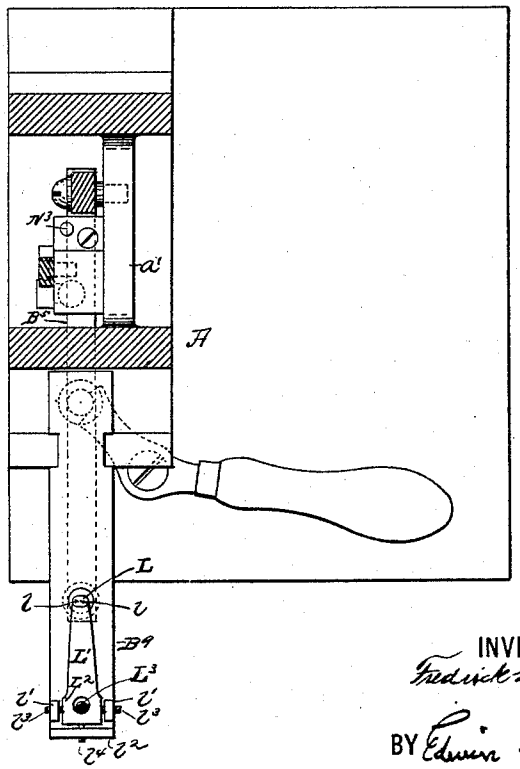


Fig. 7.

Fig. 3.



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(No Model.) 4 Sheets—Sheet 4.

F. W. COOPER.

MACHINE FOR ATTACHING SWEAT LEATHERS AND BANDS TO HATS BY MEANS OF WIRE STAPLES.

No. 519,885. Patented May 15, 1894.

Fig. 17.

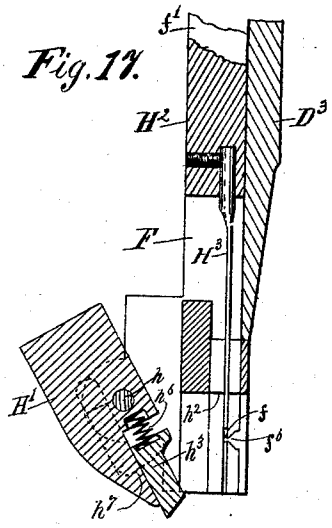


Fig. 18.

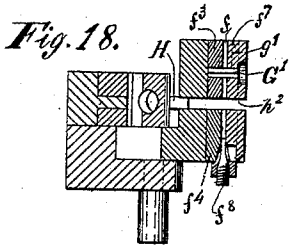
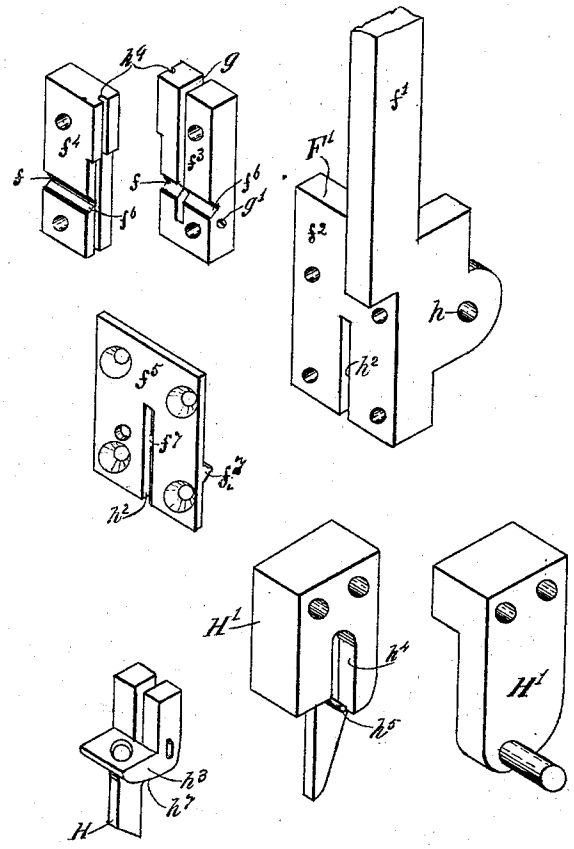


Fig. 19.



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UNITED STATES PATENT OFFICE.

FREDRICK W. COOPER, OF DANBURY, CONNECTICUT, ASSIGNOR OF ONE-HALF TO CHARLES H. MERRITT, OF SAME PLACE.

MACHINE FOR ATTACHING SWEAT LEATHERS AND BANDS TO HATS BY MEANS OF WIRE STAPLES.

SPECIFICATION forming part of Letters Patent No. 519,885, dated May 15, 1894.

Application filed June 16, 1892. Serial No. 436,999. (No model.)

To all whom it may concern:

Be it known that I, FREDRICK W. COOPER, of Danbury, county of Fairfield, and State of Connecticut, have invented a certain new and useful Improvement in Machines for Attaching Sweat Leathers and Bands to Hats, of which the following is a specification.

This invention relates to machines for attaching sweat leathers and bands to hats, by means of wire staples which are automatically formed in the machine, and it consists in the construction and novel arrangement of parts, as hereinafter set forth.

I will describe a machine embodying my invention, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a front elevation of a machine embodying my improvement. Fig. 2 is a side elevation thereof. Fig. 3 is a plan view below the line 3, 3 of Fig. 2. Figs. 4, 5 and 6 show certain cam mechanism on an enlarged scale. Fig. 7 is an edge view of a cam yoke. Fig. 8 is a top view of the upper portion of the machine showing, among other things a number of cross-bars or cross-heads which connect pairs of rods and thereby transmit motion produced upon one of the cross-heads of each pair by a cam. Fig. 9 is a longitudinal section of a driving shaft and clutch mechanism. Fig. 10 is a front view of certain parts which contribute to bend a staple. Fig. 11 is a side view of the same. Fig. 12 is a top view of the same. Fig. 13 is a side view of parts represented in Fig. 11, but shown from the opposite side. Fig. 14 is a rear view showing the parts represented in Fig. 10, but being a rear view, it of course represents them from the reverse side. Fig. 15 is an enlarged view of a feeding mechanism employed. Fig. 16 is an enlarged plan view of a clinching head employed. Fig. 17 is a vertical section taken parallel with a tang marked f' in Fig. 14. Fig. 18 is a horizontal section taken on the plane of the dotted line 18—18, in Fig. 17. Fig. 19 is a perspective view, showing detached from one another, various parts composing a block marked F′ in Fig. 14.

Referring by letter to the drawings, A designates the main frame of the machine, having at the top forwardly extending arms a, and a web portion or side wall a' extending, as here shown, from the lower end to the lower arm a. A main shaft A′ has a bearing through the rear portion of the frame A and also in a bracket A^2 attached to the frame A. A power wheel A^3 is mounted on the shaft A′. A shaft A^4 for operating certain mechanism hereinafter described, is driven from the main shaft A′, but as it is required to stop the rotation of the shaft A^4, at certain intervals, while the shaft A′ is rotating, I provide a clutch mechanism between the two shafts, consisting of the section B rigidly attached to the shaft A′, the section B′ rigidly attached to the shaft A^4 and the section B^2 movable longitudinally on the shaft A^4 and provided with a pin b, movable through a hole b' in the section B′ into an arc shaped slot b^2 in the section B. This slot b^2 increases in depth from its entrance end to a shoulder or abutment b^3 at its opposite end. The movable section B^2 is chambered at its end as at b^4 to receive the hub like portion b^5 of the section B′. A spring B^3 surrounds the shaft A^4 between the clutch section B^2 and a collar b^6 adjustably secured to the shaft A^4 by means of a set screw. This spring serves to move the section B^2 longitudinally of the shaft A^4 to engage the pin b with the section B. The pin b is moved out of engagement with the section B by means hereinafter described. It will be observed that the one end of the shaft A^4 projects into the hollow end of the shaft A′ so that the shaft A′ forms a bearing for one end of the shaft A^4. The section B′ is not only a section of the clutch mechanism, but is an eccentric for vertically reciprocating an eccentric rod B^4 which is guided by a stud or screw b^7 extending through a slot in the rod B^4 into the web a'. The lower end of the eccentric rod B^4 bears upon or engages with a rock lever B^5 fulcrumed at about its center to a downwardly extending portion C of a bracket B^9, and extending underneath an anvil B^8 movable by said rock lever vertically through a hole in a forwardly extending portion of the bracket B^9. The eccentric rod B^4 is adjustable longitudinally to accommodate it to the adjustment of the bracket B^9 and as

a means for such adjustment I provide it with a screw bolt b^8 inserted in a tapped hole in the end of the rod, and I employ a check nut on the screw bolt as shown, to hold it as adjusted. The lower portion of the hole in the bracket B^9, through which the anvil B^8 passes is enlarged to form a shoulder at its upper end and the anvil is provided with a shoulder b^9. A spring b^{10} surrounds the anvil between the shoulder b^9 and the shoulder b^{11} and serves to return the anvil to its downward position. The bracket B^9 is rendered adjustable vertically to accommodate the machine to the thickness of a hat material to which a sweat band is to be applied, and as a means therefor the vertical portion C is movable in a guide way formed by flanges C′ projecting from the frame A, and a front plate C^2 secured by screws or otherwise to the flanges C′. The plate C^2 is slotted or forked at its upper end and the frame A is provided with a vertical slot c so that the bracket B^9 and rock lever B^5 may be moved down out of the way when desired, and also to manipulate the finer adjustments of the bracket, which may be done by the following means. A bolt C^3 has its upper screw threaded portion c' engaged in a tapped hole c^2 in the end of the portion C of the bracket and a jam nut c^3 is engaged with the threaded end c' beneath the end of the portion C. The lower portion of the bolt C^3 is movable through an opening in a plate C^4 extending from the frame A and this lower portion is screw threaded and provided with jam nuts c^4. A rod C^5 screw threaded at its upper end engages in a tapped hole in the bolt C^3 and has its lower end engaging with a foot lever, not shown. Obviously the bracket may be lowered so that the nut c^3 will appear between the lower ends of the flanges C′ and the top of the plate C^4. The jam nut c^3 may then be adjusted by any suitable tool so that the screw thread c' may be turned in the tapped hole c^2 in any desired direction. At this time the jam nuts c^4 must also be adjusted. After the required adjustment as described, the bracket is forced upward by means of the foot lever, and a wiper arm C^6, pivoted to the plate C^4 is moved beneath the shoulder c^5 formed by an annular channel c^6 in the bolt C^3 as plainly shown in Fig. 1. This wiper arm C^6 is provided with a suitable handle c^{60} so that it can be moved by hand.

Having so far described the machine, I will now describe the mechanism for feeding and cutting the wire, forming a staple and inserting it. D designates a spool or reel of wire mounted at one end on a fixed center d on a frame D′ secured to the upper arm a of the frame and at the other end on an adjustable center d' movable in said frame and held as adjusted by means of a thumb screw d^2. From the spool or reel the wire d^3 extends through an eye d^4 in a guide arm D^2 affixed to the machine frame, and also through a guide d^5, secured to the front plate D^3, to feed rollers d^6 d^7. The feed rollers d^6 d^7 have journal bearings in the plate D^3 and in a bracket arm D^4 attached to said plate D^3. The feed roller d^6 is provided with a gear d^8 meshing with a gear d^9 on the feed roller d^7 and this gear d^9 engages with a larger gear d^{10} having journal bearings in the plate D^3 and bracket D^4. The gear wheel d^{10} has affixed to it a ratchet wheel d^{11} with which engages a spring controlled dog d^{12} pivoted to an arm E which is fulcrumed on the journal of the gear d^{10}. To the outer end of the arm E a link E′ is pivoted. The opposite end of the link E′ is pivoted to a lever E^2 fulcrumed on a screw engaged with the plate D^3, and the opposite end of the lever E^2 has a sliding pivotal connection with a lever E^3 also pivoted on a screw engaging with the plate D^3. The free end of the lever E^3 is projected between lugs e carried by a vertically reciprocating bar F. The lugs e are preferably adjustable on the bar F and I have therefore shown them as slotted longitudinally and held in position by screws passing through the slots into tapped holes in the bar F. The advantage of making these lugs adjustable is to vary the feed. Obviously, when the lugs are adjusted as close together as possible, lost motion between them and the lever E^3 will be avoided, and hence the maximum feed will be obtained. By adjusting the lugs farther apart, more or less lost motion will be secured, and a consequent variation of the feed will be obtained. By the construction just described it is obvious that by the upward movement of the bar F the feed rollers will be operated to move a sufficient length of wire into the machine to form a staple. From the feed rollers d^6 d^7 the end of the wire is forced through an opening f in a block F′ having a plate or tang f' through which screws are passed to secure the block to the plate D^3. The block F′ consists of several pieces, that is, it is made up of a back plate f^2, from which the tang f' extends, intermediate plates f^3 f^4 and the outer plate f^5. The plates f^5, f^4, f^3, are secured to the plate f^2 by means of screws. The opening f for the passage of the wire communicates laterally with a groove f^6, which is substantially V shaped in cross section. The plate f^5 on its inner side is provided with a rib f^7 adapted to fit into the groove f^6. At the rear end of the opening f is a regulating screw f^8 which may be adjusted to regulate the length of wire required to form a staple. Of course, when the screw f^8 is adjusted the blocks e must be adjusted correspondingly. After a wire is fed into the machine as described the proper length to form a staple is cut off by means of a vertically reciprocating cutter G, movable in a slot g in the plate f^3, and coacting with a fixed cutter G′ in the bottom of said slot. The cutter G′ may be adjusted vertically to bring its cutting edge substantially flush with the lower side of the wire opening f and held adjusted by means of a set screw g'. The cutter G is carried by a bar G^2 reciprocated vertically by the

shaft A^4 through cam mechanism as will be hereinafter described. After the length of wire shall have been cut it is bent in staple form by means of a bender H carried by a rock lever H′ fulcrumed at h on the block F′ and having a link connection h' with a plunger rod H^2. The bender H is movable across and considerably above the wire opening f in a slot h^2 formed in the block F′. The bender has a yielding connection with the rock lever H′, and as a means therefor I attach it to or form it integral with a slide block h^3. This slide block h^3 is movable in guide ways h^4 formed in the lever H′ and is held in position by means of a pin h^5 on the lever extending into a slot in the slide block. A spring h^6 interposed between a portion of the block H and the lever H′ serves to hold the cam or curved surfaces h^7 of the block against the surface of the plate f^2. The bender H will engage the piece of wire at about its center and by a continued upward movement the ends of the wire will be drawn out of the opening f and the said wire will be formed in staple shape. After the bender shall have resumed its normal position a driver H^3, carried by the rod F moves through a vertical hole h^9 in the block F′ and serves to force the staple out of the slot h^2 and through the hat material and the sweat band.

Before describing the means for turning or clinching the ends of the staples, I will describe the connections between the shaft A^4 and the parts F, G^2 and H^2, whereby said parts are reciprocated. I is a cam secured to the shaft A^4 and coacting with a cam yoke I′, having its grooved edges engaging with ribs i secured to or formed integral with the inner surface of cheek pieces i' secured by screws or bolts to the opposite sides of the arms a. From the yoke I′ a stud I^3 extends upward through an opening in the upper arm a and from this stud I^3 a cross-head I^4 extends to and engages with the cutter bar G^2. J is a cam mounted on the shaft A^4 and coacting with a cam yoke J′ having edge grooves to engage ribs i on the cheek pieces i'. From this cam yoke a stud J^2 extends upward through an opening in the upper arm a and a cross-head J^3 connects this stud with the rod H^2. K is a cam mounted on the shaft A^4 and coacting with a cam yoke K′ having edge grooves engaging ribs i on the cheek pieces i'. From this cam yoke a stud K^2 extends through the upper arm a and a cross-head K^3 connects this rod with the bar F. The studs I^3, J^2 and K^2 are threaded at their upper ends, where they receive the cross-heads, and jam nuts are provided as shown, to secure the cross-heads at any elevation it may be found necessary to adjust them. Each cam I, J, K, has a plate k secured to one side. These plates have their greatest length transverse to the length of the cams and the ends thereof bearing at certain times against the surface of the top bars of the respective yokes serve to steady the cams. These cams I, J, K are suitably shaped to operate their respective parts at the proper time.

I will now describe the manner of turning or clinching the staple ends. L designates a clinching head arranged beneath the opening h^2 and provided in its upper surface with oppositely extending grooves l, the bottoms of which incline upward from the adjacent ends. The clinching head is mounted on a resilient arm L′ which is adjustable longitudinally and laterally so as to align the grooves l with the ends of the staple. The arm L′ extends from a block L^2 resting on the upper surface of the bracket B^9 between side lugs l' and forward of an end lug l^2. Screws l^3 extending through the lugs l' and impinging against the sides of the block L^2 serve to adjust the arm L′ laterally and a screw l^4 extending through the lug l^2 serves to adjust the arm longitudinally. A bolt L^3 serves to clamp the arm rigidly in position. The hole in the block L^2 through which the bolt L^3 passes is larger than the bolt so that the several adjustments may be made. After the several staples shall have been inserted in a hat the operation of the shaft A^4 must stop, otherwise the machine would continue forming staples after removal of the hat, as the shaft A′ is in constant rotation.

As a means of disengaging the clutch section B^2 from the clutch section B and holding it out of engagement, I employ a lever N fulcrumed intermediate of its ends to a box like structure N′ secured to the web a'. The upper end of the lever N has a pin n projected into a cam slot n' in the clutch section B^2. A latch N^2 is movable into the line of oscillation of the lower end of the lever N and when in its upper position the lower end of the lever N will strike against the latch which will thus prevent further oscillation and the cam surfaces or side walls of the annular slot n' impinging against the pin n will cause the clutch section B^2 to move longitudinally of the shaft A^4 and out of engagement with the section B. As a further means for preventing the shaft A^4 from rotating beyond a certain limit, I employ a yielding stud N^3 having a taper upper end over which a U shaped notch n^2 in the clutch section B^2 engages when the said section is moved longitudinally as described. This stud N^3 extends into a hole in the structure N′ and a spring n^3 is interposed between the lower end of the stud and the bottom of the hole. The latch N^2 is secured to and extends outward from a sliding bolt N^4 movable vertically in a way formed in the structure N′ and having a rod connection N^5 with a foot treadle, not shown, by means of which the said bolt and latch may be drawn downward to disengage the lever N. A spring N^6 secured to the lower end of the structure N and engaging with a portion of the bolt N^4 serves to force the bolt and latch upward when the foot lever is released.

The operation of the machine is as follows: Pressure is first brought to bear upon the

foot lever to move the latch N′ downward and allow the clutch sections to engage. It is to be understood that before starting the machine, a hat is in position, with the sweat leather and band in place, between the lower end of the block F′ and the clinching head L. The rotation of the shaft A^4 will now cause the cutting, forming and insertion of the staple through the material, as before described, at the instant the staple ends come in contact with the clinching head the anvil B^8 contacts with the arm L′ beneath the head L and supports the same until the ends of a staple are clinched. After inserting one staple the hat is turned by the operator to a position to receive another staple and the operation is continued until a sufficient number, say six or seven, staples shall have been inserted. Then of course the latch N^2 is allowed to assume its upper position to stop the machine.

It will be observed that this machine forms and inserts the staples lengthwise of the circumference of the hat.

The essentials of the machine are a feeding mechanism for a wire, a cutting mechanism for severing pieces of wire of the proper length to form staples, a bending mechanism for forming severed pieces of wire into staples, one at a time, a driving mechanism for driving a staple through parts to be connected by it, and a clinching mechanism; each of these mechanisms in my machine, being wholly independent of the others, in the sense that it does not derive motion through any of the others, but takes all its motion from its own cam mounted upon the driving shaft. This is extremely advantageous because it enables me to provide for adjustments in the different mechanisms, so as to make all these mechanisms operate in the proper relation to each other.

Having described my invention, what I claim is—

1. The combination with the frame and a driving shaft, of staple forming mechanism substantially such as described, a vertically adjustable bracket arm, a wiper arm pivoted to the base of the frame and serving to support the bracket arm in its upward position, an anvil movable vertically in said bracket arm, means for moving the said anvil, and a clinching head carried by the bracket arm, substantially as specified.

2. The combination with the staple forming mechanism, the anvil and the bracket arm of the clinching head, a clamping bolt passing loosely through a hole in the arm of the clinching head, screws for adjusting the head laterally and longitudinally, substantially as specified.

3. The combination with the staple forming mechanism, the movable anvil and the bracket arm of the clinching head, a resilient arm upon which said head is mounted, a clamping bolt passing loosely through a hole in said arm and screws for adjusting said arm and head laterally and longitudinally, substantially as specified.

4. In a machine of the character described, the combination with staple forming and inserting mechanism, of a vertically adjustable bracket arm, means comprising a screw threaded rod for causing said adjustment and a wiper arm for supporting the bracket in its upper position, substantially as specified.

5. The combination with the frame, the driving shaft and the staple forming mechanism, of the wire guides, the feed rollers, gears on said feed rollers, a gear wheel engaging with one of the feed roller gears, a ratchet wheel on said gear, a rocking lever, a dog carried by said lever and engaged with the ratchet wheel, means for adjusting the length of feed and mechanism between said lever and the driving shaft comprising a link, a fulcrumed lever pivoted to the link, and another lever engaging with said fulcrumed lever and with a vertically reciprocating bar whereby the feed rollers are operated from said driving shaft, substantially as specified.

6. The combination with a driving shaft, of a stationary cutter, a vertically reciprocating cutter co-acting therewith, a bar to which said cutter is rigidly attached, a cam on the driving shaft for operating said bar and cutter in both directions and a feeder operated by the upward movement of the bar operated by the said shaft independently of the cutter carrying bar, substantially as specified.

7. In a machine of the class described, the combination with the driving shaft, the feeder and the cutter of the longitudinally yielding bender, a rock lever carrying said bender, a spring for pressing the bender outward and connections between the rock lever and driving shaft, whereby the bender is operated, substantially as specified.

8. In a machine of the class described, the combination with the driving shaft, the feeder operated therefrom and the cutter, of the rock-lever, a bender carried thereby and yielding longitudinally, a plunger rod, a link connection between the plunger rod and rock lever and mechanism comprising a cam on the driving shaft and connections with the plunger rod for operating the bender, substantially as specified.

9. In a machine of the class described, the combination with a driving shaft, the anvil and the clinching head, of a feeder, a cutter, a bender and a driver, each operated by the driving shaft, a clutch on the driving shaft, a fulcrumed lever engaging at one end in a cam groove in one section of the clutch and a piece movable into the path of the lower end of said lever, substantially as specified.

10. In a machine of the class described, the combination with a driving shaft and a wire feeder, of a vertically reciprocating cutter, a rod carrying said cutter, a bender, a vertically reciprocating plunger rod having a link connection with said bender, a driver for inserting a staple, in a hat material, a verti-

cally reciprocating rod carrying said driver, cams rotated by the driving shaft, cam yokes co-acting therewith, and connections between the respective cam yokes and the respective vertically reciprocating rods, substantially as specified.

11. In a machine for forming and applying staples, the combination of feeding mechanism, a cam for operating the latter, cutting mechanism, a cam for operating the cutting mechanism, the said feeding and cutting mechanisms each including means for adjustment between their cams and the parts that operate upon the wire, substantially as specified.

12. In a machine for forming and applying staples, the combination of cutting mechanism, a cam for operating the latter, bending mechanism, a cam for operating the bending mechanism, the said cutting and bending mechanisms each including means for adjustment between their cams and the parts that operate upon the wire, substantially as specified.

13. In a machine for forming and applying staples, the combination of driving mechanism, a cam for operating the latter, clinching mechanism, a cam for operating the clinching mechanism, the said driving and clinching mechanisms each including means for adjustment between their cams and the parts that operate upon the wire, substantially as specified.

14. In a machine for forming and applying staples, the combination with feeding mechanism, cutting mechanism, bending mechanism for forming staples; and mechanism for applying the staples, of a main shaft, cams upon the main shaft for operating said mechanisms, a driving shaft, a clutch for engaging the driving shaft and main shaft, a treadle or its equivalent, for shifting the movable part of the clutch, a stop and a part, shifted with the movable part of the clutch to a position opposite the said stop, so as to engage therewith, substantially as specified.

15. In a machine for forming and applying staples, the combination of staple applying mechanism and a clinching head, and screws for supporting and holding the said head, while providing for adjustments, both lateral and longitudinal, substantially as specified.

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

FREDRICK W. COOPER.

Witnesses:
ELI C. BARNUM,
LUMAN L. HUBBELL.