(No Model.)

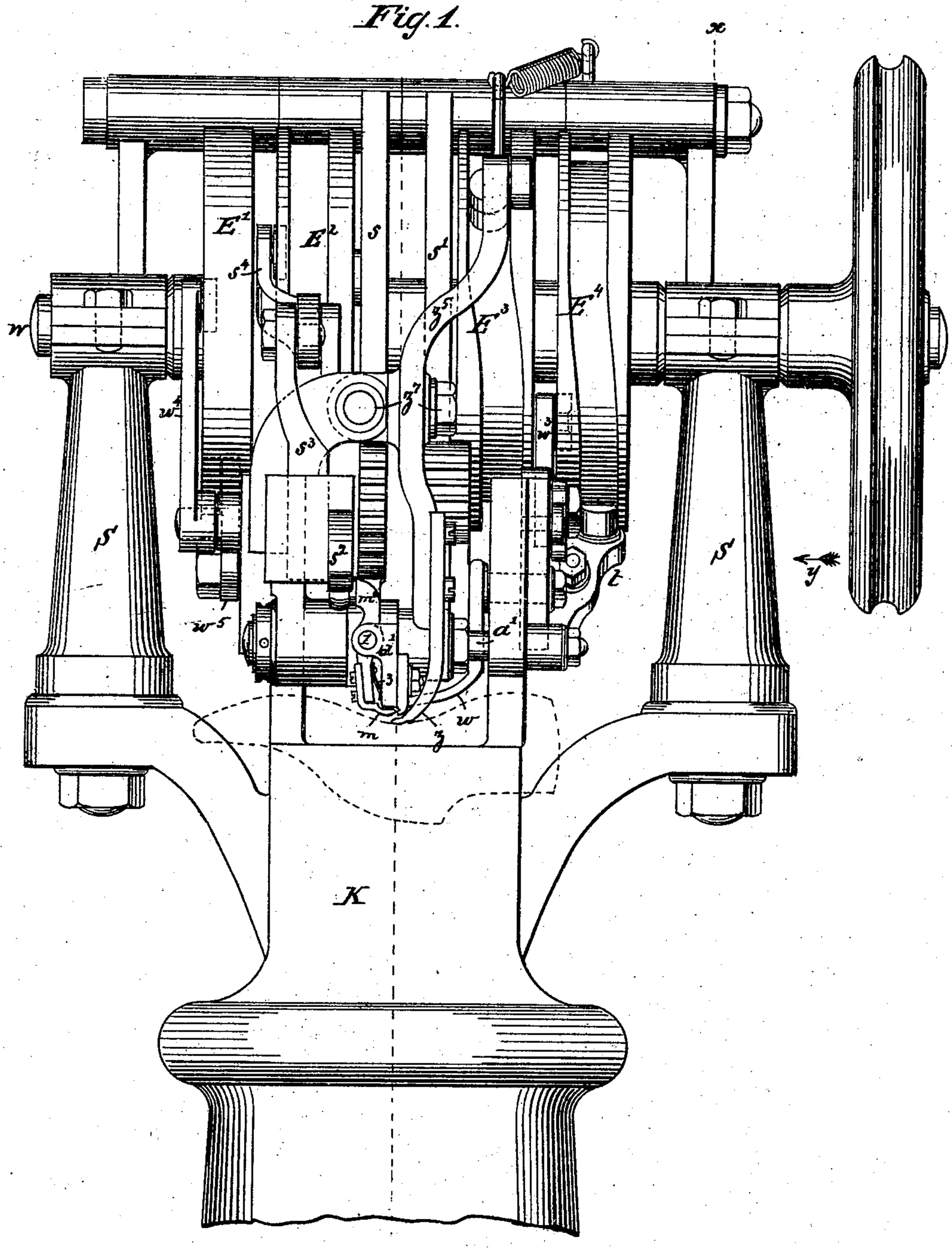
4 Sheets—Sheet 1.

H. C. GROS.

WELT ATTACHING MACHINE.

No. 501,831. Patented July 18, 1893.

Fig. 1.



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(No Model.) 4 Sheets—Sheet 2.

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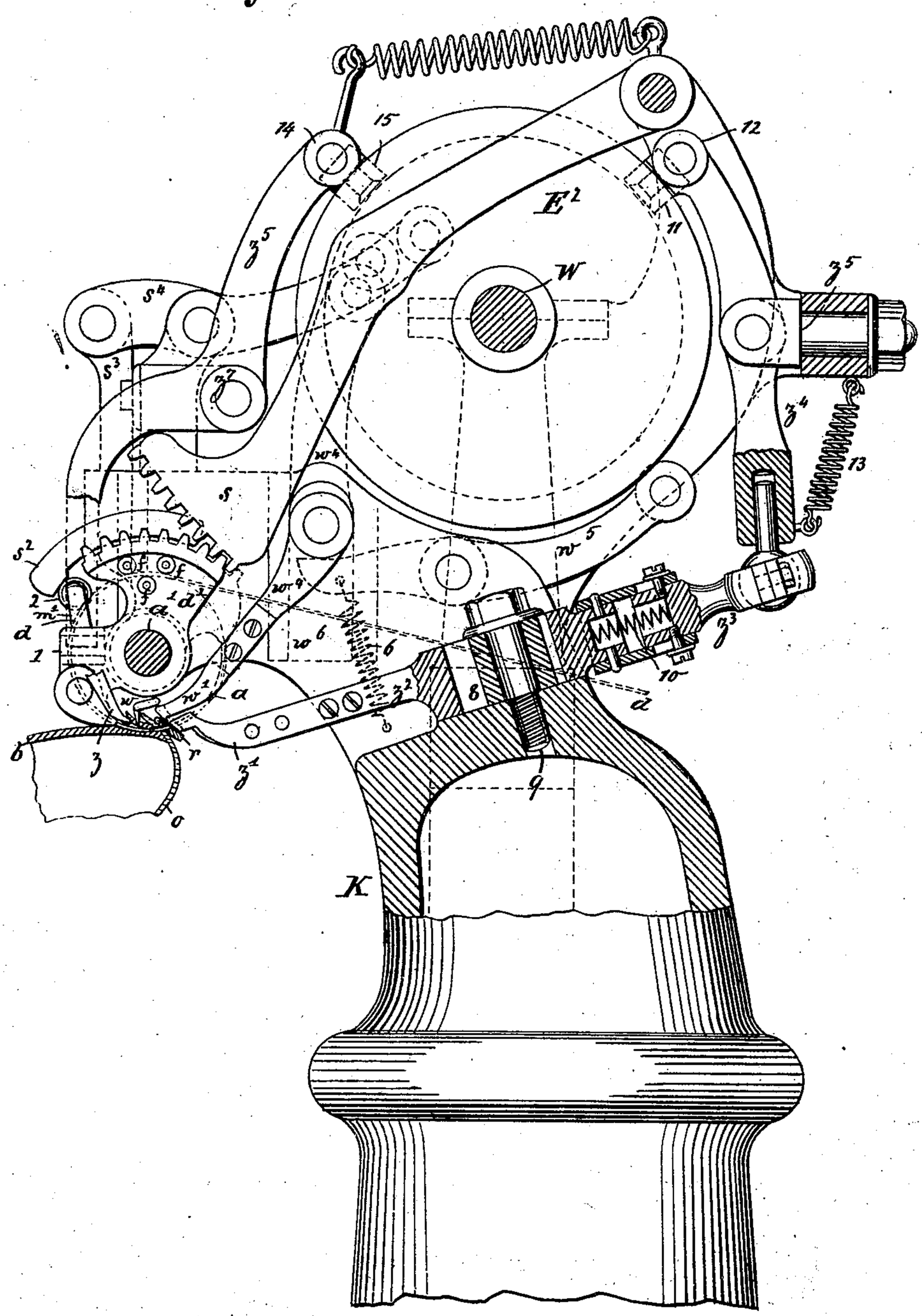
Fig. 2.



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(No Model.) 4 Sheets—Sheet 3.

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WELT ATTACHING MACHINE.

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Fig. 3.

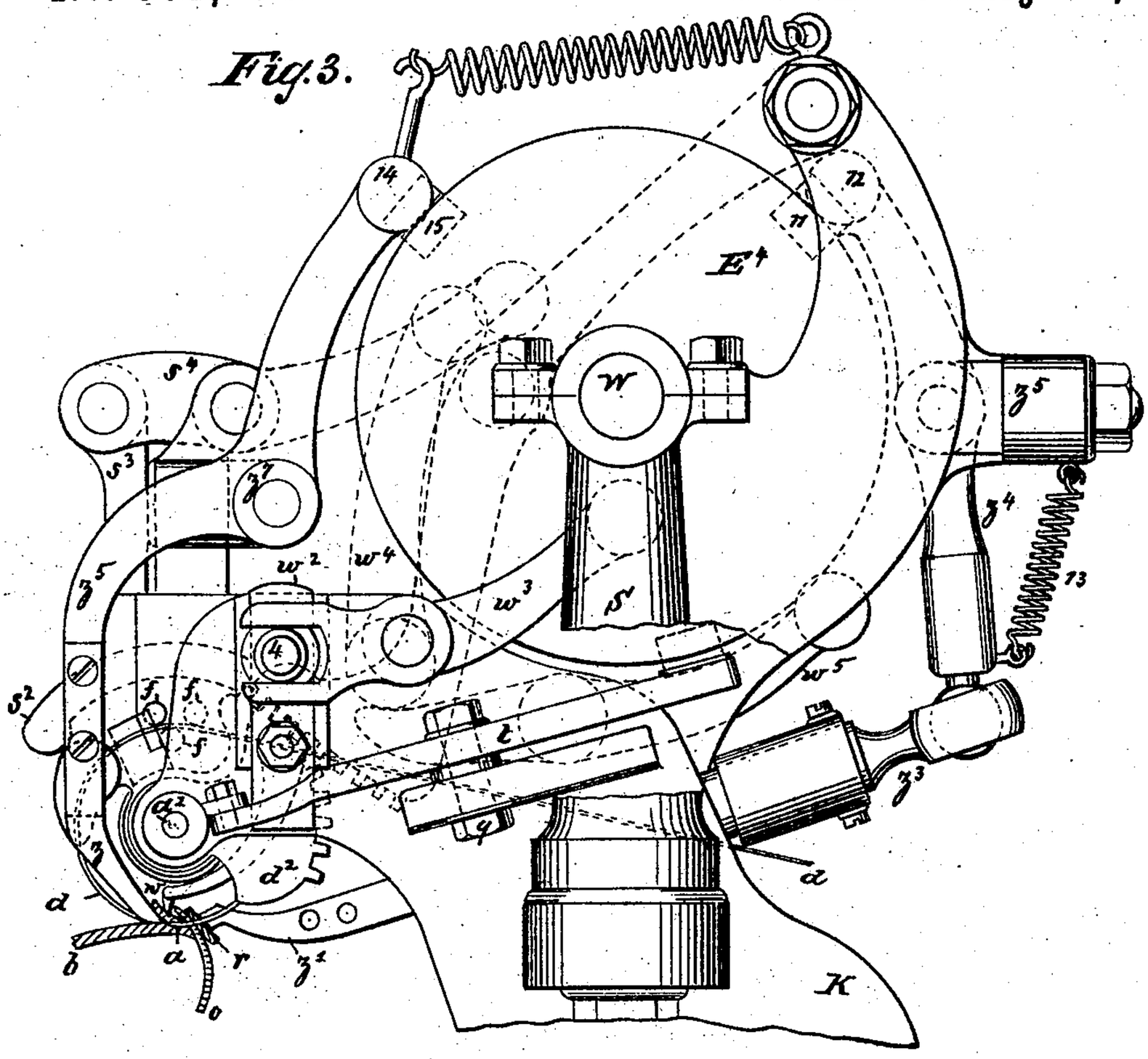
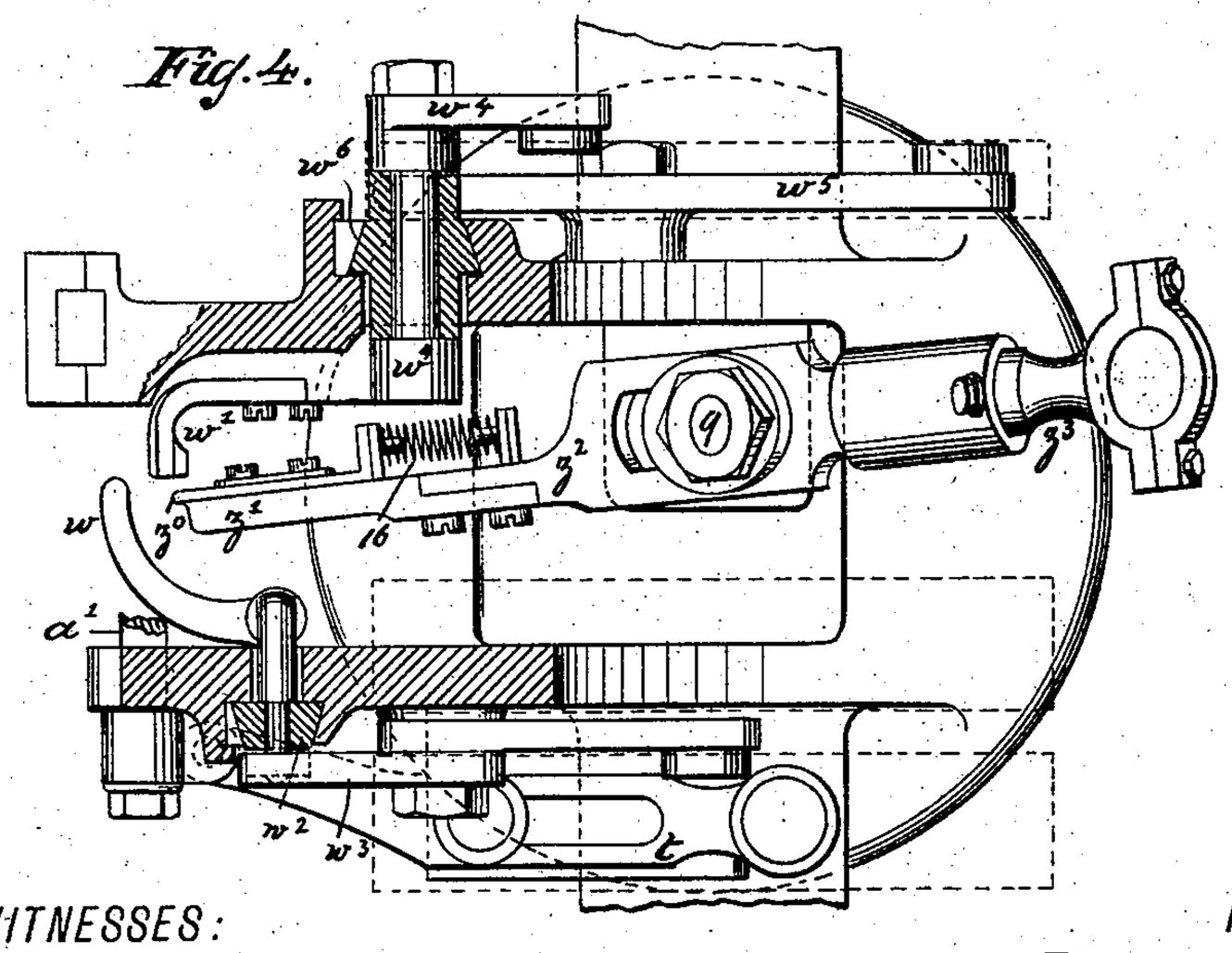


Fig. 4.



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4 Sheets—Sheet 4.

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WELT ATTACHING MACHINE.

No. 501,831. Patented July 18, 1893.

Fig. 5.

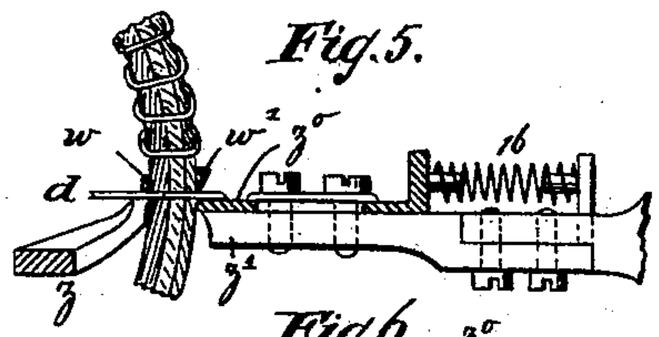


Fig. 6.

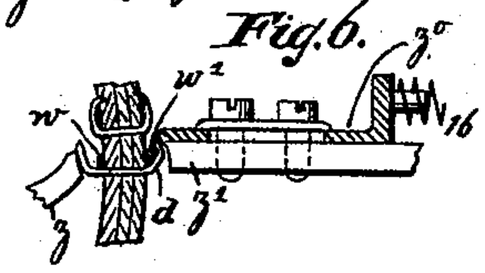


Fig. 7.

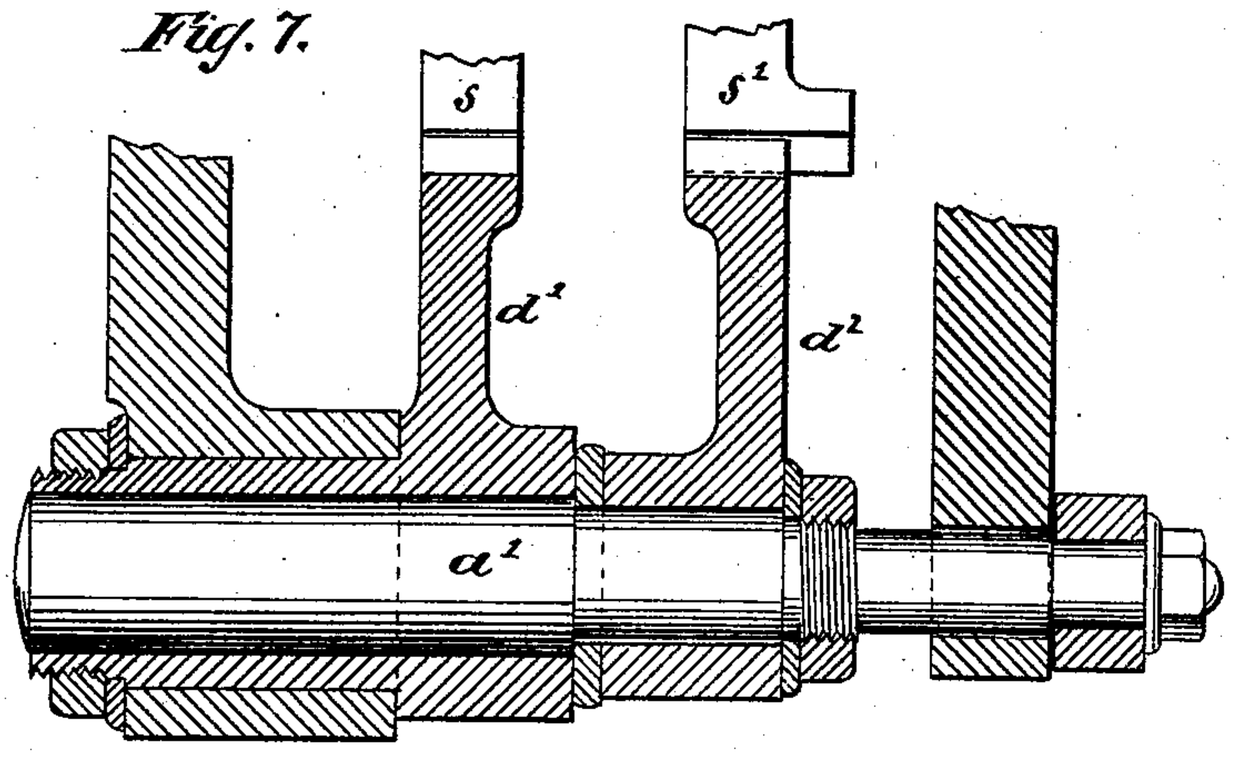


Fig. 8.

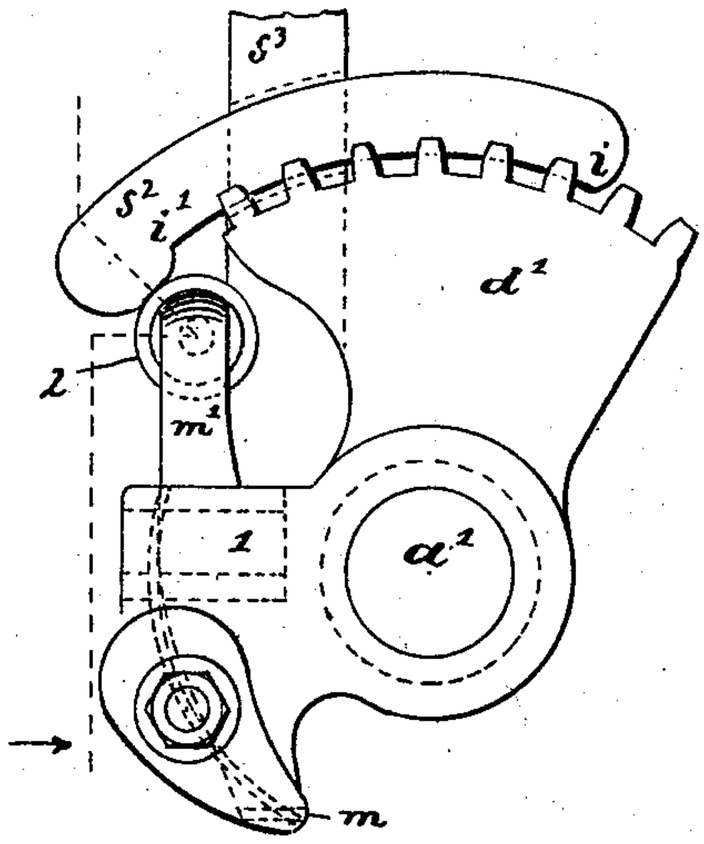
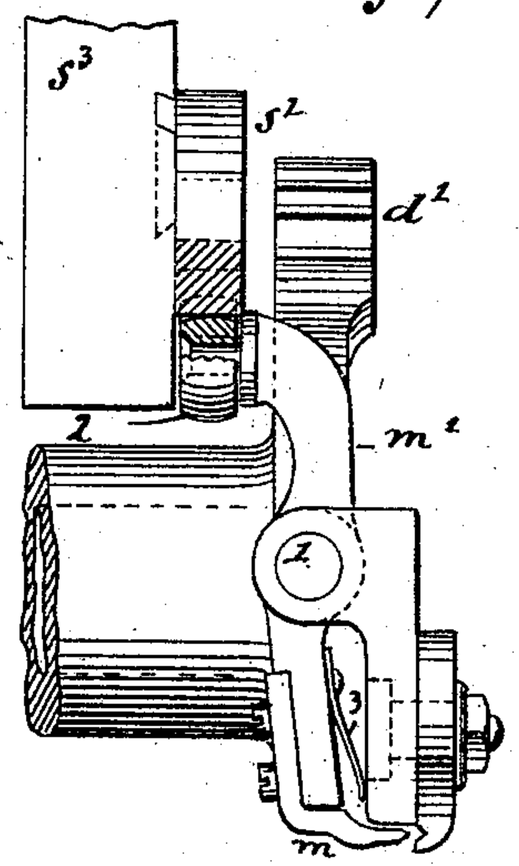


Fig. 9.



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UNITED STATES PATENT OFFICE.

HERMANN CARL GROS, OF OBER-URSEL, GERMANY.

WELT-ATTACHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 501,831, dated July 18, 1893.

Application filed March 9, 1893. Serial No. 465,332. (No model.)

To all whom it may concern:

Be it known that I, HERMANN CARL GROS, a subject of the King of Würtemberg, residing at Ober-Ursel, near Frankfort-on-the Main, in Hesse-Nassau, Germany, have invented new and useful Improvements in Machines for Attaching Welts to Boots or Shoes, of which the following is a specification.

This machine serves for connecting the welts of boots or shoes with the insole and the upper by means of wire.

This machine is based on the construction of sole sewing machines in which the welt is sewed to the insole and upper by means of waxed thread. In this case however in place of waxed thread there is employed metallic wire, preferably brass wire. The wire is led to the machine from a spool or supply and is taken by a wire carrier. An awl or perforator on a suitable carrier punctures a hole into the material into which the wire is inserted and then cut to suitable length so that the wire projects at each side of the material. The projecting ends are then bent and pressed firmly against the material so that by repeating the action of the machine a row of fastenings or clamps is formed taking the place of the former seam of waxed thread.

The machine is illustrated in the annexed drawings in which—

Figure 1, is a front elevation of the machine carried by a suitable column or support. Fig. 2, is a side elevation sectioned along *x x* Fig. 1. Fig. 3, is a broken side elevation looking in the direction of arrow *y* Fig. 1. Fig. 4, is a plan view of the machine partly sectioned and with the cam disks removed. Figs. 5 and 6, are detail views showing the formation of the wire fastening. Figs. 7, 8 and 9, are detail views on a larger or natural scale, Fig. 7 showing a sectional view of carriers, Fig. 8 a side elevation of a carrier and Fig. 9 an edge view of a carrier.

Upon the support or frame K are supported a pair of columns S S in which is journaled the shaft W upon which are fastened the cams or eccentric disks E′ E^2 E^3 E^4 which latter impart motion to various levers and parts.

The awl carrier d^2 (Figs. 3 and 7) is journaled in well known way on the shaft *a′* so that it can turn but not move laterally on such shaft, see Fig. 7. The swing or oscillation is received from the toothed segment lever *s′* actuated by eccentric or disk E^3 and at the same time this carrier must partake of the horizontal oscillation or sliding reciprocation imparted in well known way to shaft *a′* by lever *t*. The awl *a* is secured to the awl carrier. In its forward stroke (Fig. 3) the awl perforates the material to be united, namely, insole *b*, upper *o* and welt *r* and then by a lateral movement said awl or perforator feeds the material the length of a stitch. In the drawings the feed motion takes place in the direction toward the left of the spectator looking at Fig. 1. The metal wire *d* is engaged by three adjustable guide rollers *f* so as to receive a bend corresponding to the circle of the curved awl and said wire is then engaged by the wire carrier. The wire carrier *d′* forms the left hand journal or support for the shaft *a′* as seen in Fig. 7 and said carrier is so journaled in the frame or support K that it can swing but can not move laterally. Its swing is received from toothed segment lever *s* and cam E^2. A cutting apparatus described hereinafter is connected to the wire carrier so as to partake of its backward and forward movements. If the wire carrier is back or in its rear portion away from the work the wire is led into proper position in the same and held at the proper place by the knife *m* of the cutting arrangement which at first exerts a slight pressure so as to hold the wire but not cutting the same before the proper moment has arrived. At the same time that the awl makes its back stroke or moves away from the work the wire carrier moves forward or toward the work and inserts the wire through the hole formed therefor by the awl. The stroke of the wire carrier is so adjusted that the wire penetrates the material and projects a suitable distance at the other side. When the wire carrier has ended its forward stroke the cutter severs the wire so as to leave the cut portion projecting from the rear side of the material a distance corresponding to the projection of the wire on the other side of the material as seen in Fig. 5. The wire carrier then returns but without carrying back the wire, the latter remaining in the position it occupied at the moment of cutting.

The arrangement of the cutting device is as follows: The knife or blade m is secured to lever m' fulcrumed at stud 1 on wire carrier d'. The lever m' has a roller 2 actuated by segment s^2 secured to a slide s^3. The slide s^3 is connected to the lever s^4 actuated by cam E^2.

As seen in Figs. 2, 8 and 9 the apparatus operates as follows: By the action of segment s^2 on roller 2 the lever m' is actuated to press the knife m on the wire in the wire carrier, and while the roller with the wire carrier passes the distance from point i to i' (Fig. 8) on the inner side of segment s^2 this pressure of the knife is such as to firmly hold the wire during the forward stroke. At the point i' directly in advance of the end of the stroke of the wire carrier is a nose which on the further or final advance of the wire carrier exerts increased pressure on roller 2, lever m' and knife m whereby the edge of the knife cuts the wire. The cutting is done diagonally to the direction of length of the wire so that the ends of the cut portion are pointed. When the wire is cut the segment s^2 on slide s^3 is raised by lever s^4 and cam E^2 and the lever m' and knife m are pressed back by spring 3 so that the knife on the back stroke of the wire carrier will not act upon the wire. After the return stroke the segment s^2 again presses lightly on roller 2 whereby the knife m again takes hold of the wire and the operation is repeated. While the wire is brought into the position shown in Fig. 5 the inner and outer presser feet w w' come against opposite sides of the material to compress the same directly in front of the wire piece at the spot where the latter is to be bent. The inner presser foot w is provided with a downwardly projecting point and is merely moved up and down. It is secured to the slide w^2 (Fig. 4) having at its upper end a roller 4 (Fig. 3) engaged by the forked end of lever w^3 actuated by cam E^4. The point of the inner presser foot w descends and enters from above into the channel of the inner sole directly after the awl has ended its feed. The outer presser foot w' has a fourfold motion, first diagonally upward or pendulumlike in the direction of position of the welt, second, vertically upward, third, diagonally backward (pendulumlike), fourth, vertically downward against the welt. These movements are effected as follows: The presser foot w' is secured to a lever w^4 fulcrumed in the upper part of slide w^6. Below the fulcrum extends a lever w^5 having a roller pressed by spring 6 (Fig. 2) against the disk E'. This lever under the action of disk E' effects the up and down motion of the slide w^6 and of the lever w^4 carrying the outer presser foot w'. A roller on this lever w^4 runs in a cam groove of disk E' whereby the diagonal or pendulumlike movements of the lever w^4 and of the outer presser foot w' are effected. As soon as the inner presser foot w is in the above last mentioned position, the outer presser foot moves on the other side vertically downward against the material and rests with a certain pressure upon the latter, that is to say upon the outer side of the welt. The end of the outer presser foot resting on the material or welt as seen in Fig. 5 has the form of an acute triangle the acute angle of which points toward the piece of wire. When in this position (Fig. 5) two other instruments come into operation, namely, the benders and pressers z z' which taken together from a sort of pliers. Each cheek of this so called pliers receives a fourfold motion, first, in horizontal direction along in the direction of the joint or seam, second, forward from inside and outside against the material, third, backward away from the inner and outer edge of the material, fourth, in horizontal direction back opposite to the first direction. The movement of the inner plier cheek differs from that of the outer in this that the former moves at all times in constant position, while the outer cheek is under the influence of a spring and therefore yielding to accommodate different thicknesses of material. The cheek z' is secured to the forward end of lever z^2 which rests on a somewhat inclined face of the frame and is slotted at about its turning point in which slot is fitted a roller 8 (Fig. 2). This roller carried by screw 9 forms the fulcrum of lever z^2. The other end of the lever z^2 consists of two parts, the end proper of the lever z^2 and the end piece or tail z^3. The latter can move or play in a tube or sleeve on lever z^2, and a spring 10 is interposed between the parts z^2 z^3. The tail piece z^3 is connected by a ball joint with the lever z^4 having a double fulcrum or double jointed support z^5 and having two rollers 11 and 12, one of which runs in a cam groove in disk E^2 while the other runs on the disk E^2 and is forced against said disk by spring 13. The disk E^2 and its cam groove are so formed as to impart to lever z^4 a lateral as also vertical oscillation, which movements being imparted to lever z^2 cause the latter to move backward and forward as guided by its slot and also to swing or turn about the screw 9. The inner plier cheek z is secured to lever z^5 having a double fulcrum or double jointed support z^7 and having two rollers 14 and 15 actuated by disk E^3 in a similar manner as the disk E^2 actuates rollers 11 and 12 of lever z^4. The lever z^5 receives the same kind of motion as just described namely laterally back and forth as also back and forth in a vertical direction.

Referring to the position of parts shown in Fig. 5 the plier cheeks z z' move horizontally in a direction toward the wire fastening last formed whereby the wire piece is bent about the inner and outer presser feet w and w' close to the inner and outer edges of the material. The outer plier cheek z' consists of two parts, being provided with the finger z° (Figs. 4, 5 and 6) movable in the longitudinal direction of lever z^2 and moved by spring 16 forward or toward the outer presser foot w'. On the advance of the cheek z' the finger z°

recedes somewhat in pressing the wire piece against the suitably formed presser foot w' and when past the edge of the presser foot w' the finger will advance under the pressure of spring 16 to bend over the outer point of the wire piece which thereafter enters the material to form a hook or holder. The wire is thus bent into a clamp as seen in Fig. 6. The point of the presser foot w' by reason of the pendulum like or oscillating motion of lever w^4 now moves diagonally upward away from under cheek z' and out of the wire loop or hook formed about the presser foot w'. The lever z^2 then moves forward or toward the work whereby the outer end of the hook or clamp is pressed toward or rather into the material and against the inner cheek z and the inner presser foot w so that also the inner bent end of the wire piece is pressed into the inner edge of the channel of the insole. The outer cheek z' is so connected to lever z^2 as to be adjustable but besides in consequence of spring 10 between the parts z^2 z^3 the pressure of lever z^4 on cheek z' is not positive so that the cheek z' can yield automatically to inequalities in the thickness of the material. After the wire ends have been pressed in, the cheeks z z' make a return stroke or move away from the material and move horizontally at proper moments, the point of the inner presser foot w is moved out of the channel in the insole and the operation for forming a new stitch is repeated.

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

1. In a welt-attaching machine, the combination with an oscillatory awl or perforator, of an oscillatory wire-carrier for inserting the wire into the perforation made by the awl, a cutter for severing the wire, and inner and outer pliers for bending the opposite end portions of the severed parts of the wire, and pressing them against the inner and outer sides of the material being fastened, substantially as described.

2. In a welt-attaching machine, the combination with an awl or perforator, of an oscillatory wire-carrier for inserting the wire into the perforation made by the awl or perforator, a cutter pivotally mounted on and oscillating with the wire-carrier, and means for operating the awl or perforator, oscillating the wire-carrier, and vibrating the cutter on said wire-carrier, substantially as described.

3. In a welt-attaching machine, the combination with an awl or perforator, of an oscillatory wire-carrier for inserting the wire into the perforation made by the awl or perforator, a cutter pivotally mounted on and oscillating with the wire-carrier, means for operating the awl or perforator, oscillating the wire-carrier, and vibrating the cutter on said wire-carrier, and pliers for bending the end portions of the severed part of the wire, and pressing them against the inner and outer sides of the material being fastened, substantially as described.

4. In a welt-attaching machine, the combination of an oscillatory awl or perforator, an oscillatory wire-carrier for inserting the wire into the perforation made by the awl or perforator, a lengthwise movable shaft on which the awl or perforator and the wire-carrier are mounted side by side, and means for oscillating the awl or perforator and the wire-carrier, and moving the said shaft lengthwise, substantially as described.

5. In a welt-attaching machine, the combination with an awl or perforator, of an oscillatory wire-carrier, guiding and curving devices mounted upon said oscillatory wire-carrier for imparting to the wire the proper bend for the insertion thereof, and means for operating the awl or perforator, and oscillating the wire-carrier, substantially as described.

6. The combination with an awl or perforator of a wire carrier d' and guiding and curving rollers f substantially as described, for imparting to the wire the proper bend for the insertion thereof.

7. The combination with an awl or perforator, of an oscillating wire-carrier d', provided with a rocking cutter for severing the wire into proper lengths, and means for operating the awl or perforator, oscillating the wire-carrier, and rocking the cutter on the wire carrier, substantially as described.

8. The combination with an awl or perforator and a wire carrier d' provided with a knife m and knife lever m', of a segment s^2 for actuating the lever, a slide s^3 for the segment and an actuating lever s^4 for the slide, substantially as described.

9. In a welt attaching machine the combination with mechanism substantially as described for inserting wire pieces into the parts to be united of the plier cheeks z z' actuating mechanism substantially as described for the cheek z and an actuating lever for the cheek z' said lever being composed of two spring interposed parts or sections z^2, z^3, an actuating lever z^4 for the first named lever and a ball joint for connecting said two levers, substantially as described.

10. In a welt attaching machine the combination with mechanism substantially as described for inserting wire pieces into the parts to be united of the plier cheeks z z' for bending the wire and actuating mechanism substantially as described for said plier cheeks, said cheek z' being provided with a yielding spring-pressed finger z^6, substantially as described.

11. In a welt-attaching machine, the combination with mechanism, substantially as described, for inserting wire pieces into the portion to be united, of a rising and falling presser foot w, a rising and falling, and backward and forward moving presser-foot w', plier cheeks z z' opposing the presser foot for

bending the end portions of the wire pieces and pressing them against the parts to be united, and means for operating the presser feet and plier cheeks, substantially as described.

12. In a welt attaching machine the combination with mechanism substantially as described for inserting wire pieces, of presser feet *w w'*, actuating mechanism substantially as described for the presser foot *w* and an actuating lever w^4 for the presser foot *w'* said lever having a movable fulcrum and a lever w^5 for actuating the fulcrum, substantially as described.

13. In a welt attaching machine the combination with mechanism substantially as described for inserting wire pieces, of presser feet *w w'*, a slide w^2 and lever w^3 for actuating one of the presser feet and a movably fulcrumed lever for actuating the other presser foot, substantially as described.

14. In a welt attaching machine the combination with mechanism substantially as described for inserting wire pieces, of plier cheeks *z z'* and actuating levers for said cheeks, each of said levers having a double jointed fulcrum so as to be capable of compound motion, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HERMANN CARL GROS.

Witnesses:
DEAN B. MASON,
ALVESTO S. HOGUE.