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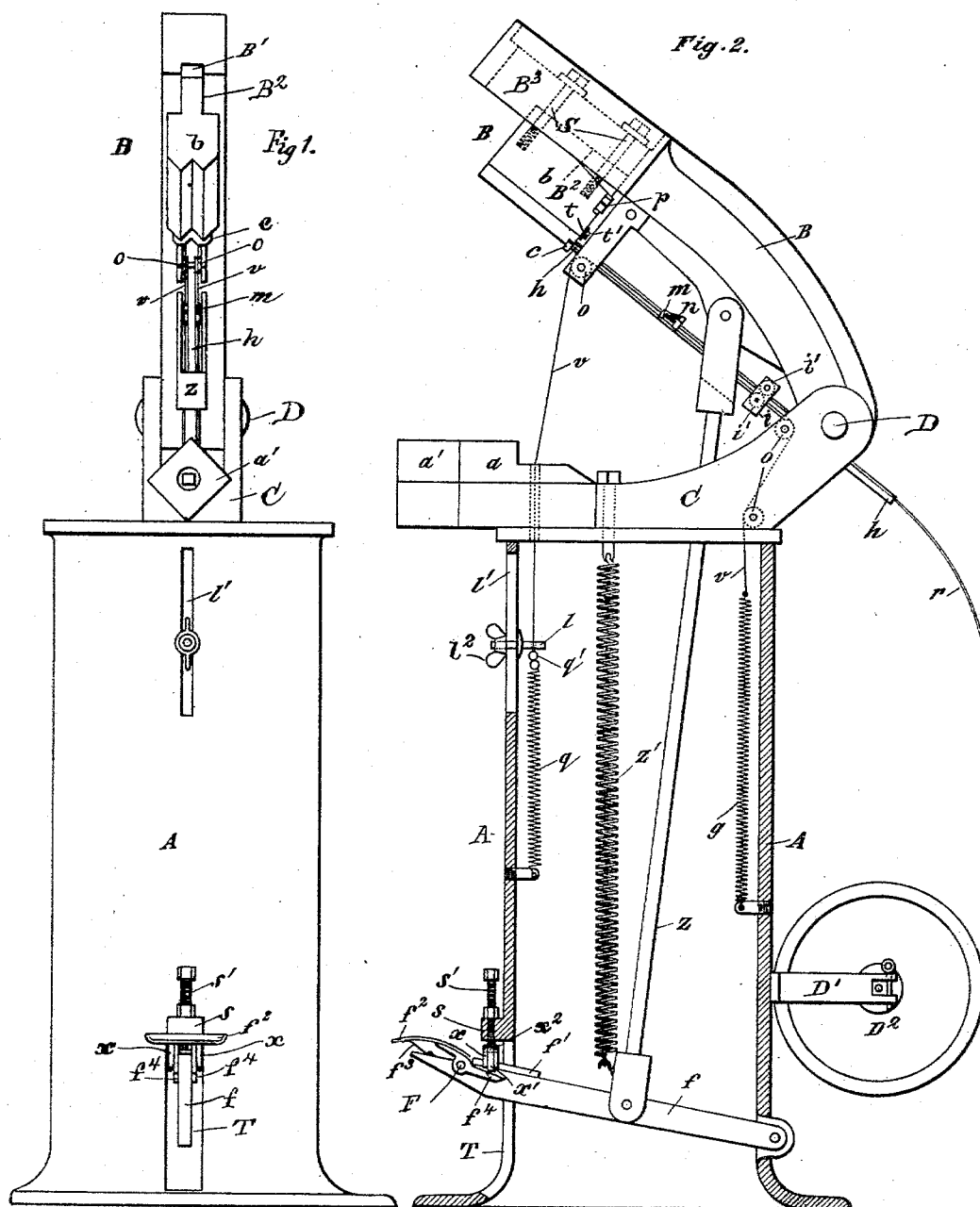
4 Sheets—Sheet 1.

O. & M. SCHUBERT.

### APPARATUS FOR APPLYING METAL STRIPS TO BOX CORNERS.

No. 569,567.

Patented Oct. 13, 1896.



Witnesses  
 M. V. Bidgood  
 C. H. Ott.

Inventors: -  
Otto Schubert and  
Max Schubert  
By Amig 28857 Attys

(No Model.)

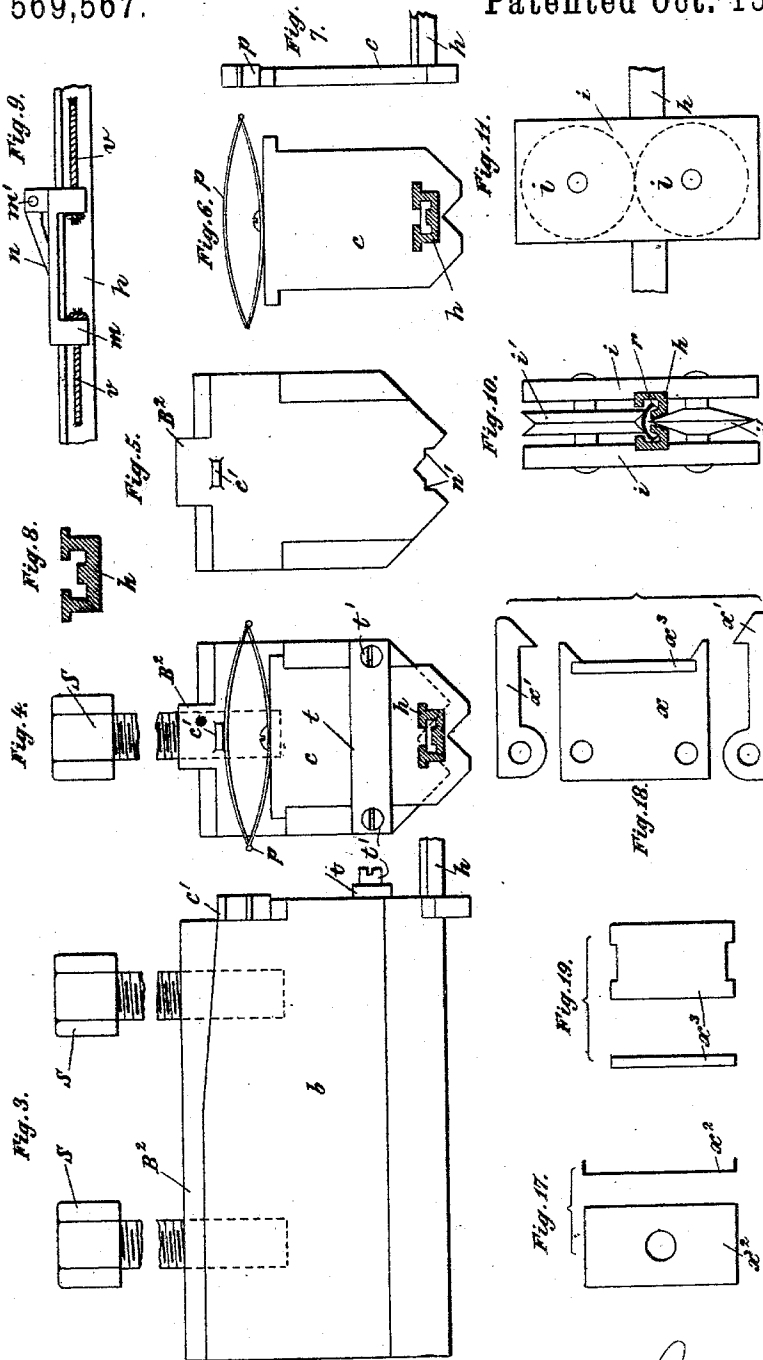
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In v. Bridgord.  
C. M. Ott.

Inventors:-  
Otto Schubert and  
Max Schubert  
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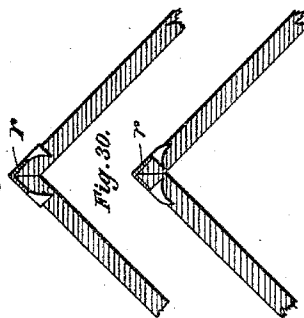
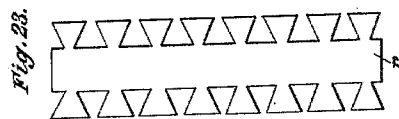
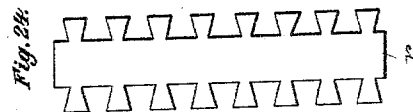
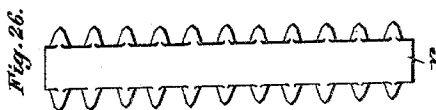
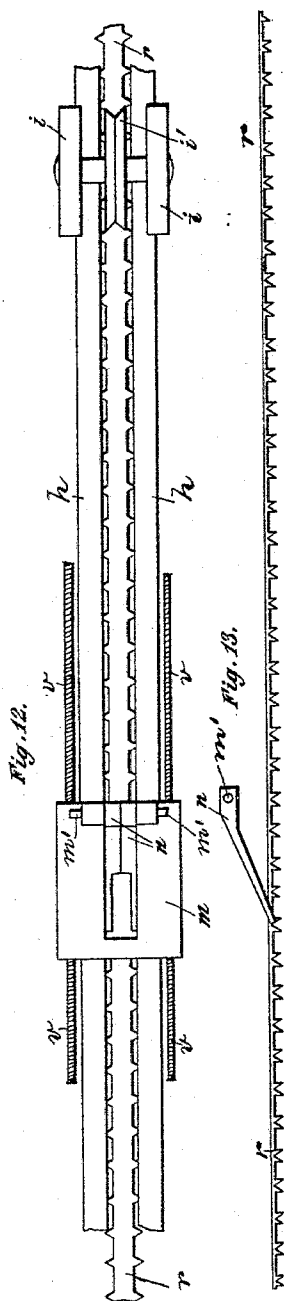
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M. V. Bridgford  
C. M. Ott.

Inventors:  
Otto Schubert and  
Max Schubert  
By Henry A. Brown Attys.

(No Model.)

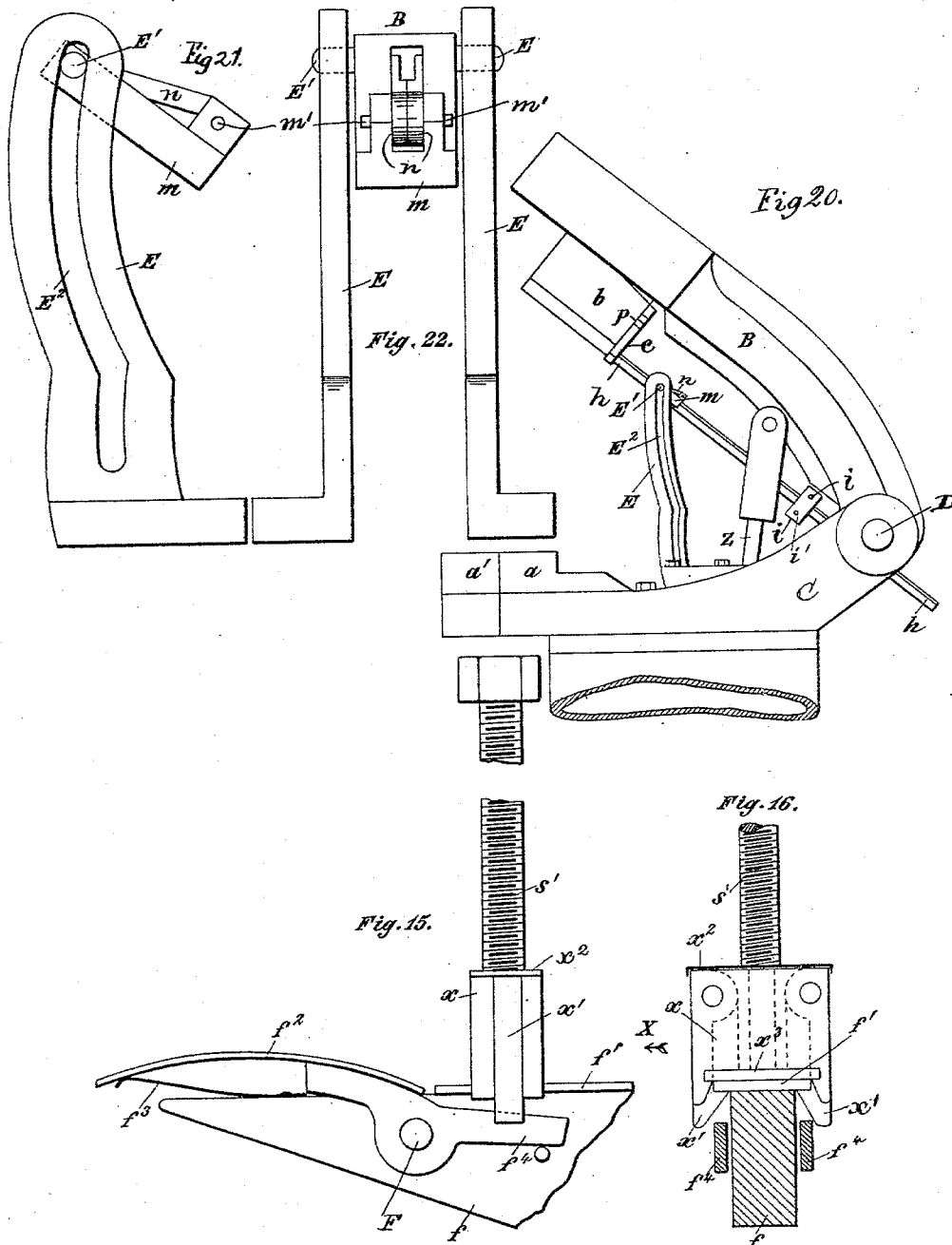
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O. & M. SCHUBERT.

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Witnesses:-  
M. V. Bidgood.  
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# UNITED STATES PATENT OFFICE.

OTTO SCHUBERT AND MAX SCHUBERT, OF CHARLOTTENBURG, GERMANY,  
ASSIGNORS TO THE UNITED STATES METAL BOX CORNER COMPANY, OF  
ATLANTA, GEORGIA.

## APPARATUS FOR APPLYING METAL STRIPS TO BOX-CORNERS.

SPECIFICATION forming part of Letters Patent No. 569,567, dated October 13, 1896.

Application filed December 6, 1894. Serial No. 531,006. (No model.)

*To all whom it may concern:*

Be it known that we, OTTO SCHUBERT and MAX SCHUBERT, subjects of the King of Prussia, German Emperor, residing at Charlottenburg, near Berlin, in the Kingdom of Prussia and Empire of Germany, have invented certain new and useful Improvements in Methods of and Apparatus for Applying Serrated Metal Strips to the Corners of Cardboard and other Boxes, of which the following is a specification.

The present invention relates to a machine for applying corner-pieces to cardboard and other boxes; and it consists of means for shaping serrated strips of sheet metal into cramps and corner-pieces, cutting them into the lengths required, and effecting the connection of the corners or sides of cardboard and other boxes by means of such corner-pieces.

The invention also consists of an automatic device by means of which the said strips of serrated sheet metal, which can be rolled up in lengths of one hundred meters and more on reels or drums and fixed to the frame of the machine, are drawn forward, at each throw of the hammer-lever, a certain length, which can be predetermined according to the depth of the box being fastened together.

By the use of such automatic device the waste of metal, which is otherwise unavoidable in machines for a like purpose, is entirely obviated, and the fastening of cardboard and similar boxes is effected rapidly and neatly.

The invention consists, further, in various details of construction which will hereinafter be more fully described, and finally pointed out in the claims.

In the accompanying drawings, Figures 1 to 22 illustrate two constructions of our machine and details thereof, while Figs. 23 to 30 show the forms of the serrated metal strips and the method of connecting the corners of boxes by means of such strips. Fig. 1 is a front elevation of our corner-fastening machine. Fig. 2 is a side elevation of the same, showing the base or support of the machine in vertical section. Fig. 3 is a side view of the angle-hammer provided with shearing device for cutting off the metal strips. Fig. 4

is an end view of the angle-hammer and shearing device. Fig. 5 is an end view of the angle-hammer with the shearing device removed. Fig. 6 is a front view of the shearing device. Fig. 7 is a side view of the same. Fig. 8 is a cross-section of the guide-rail for the metal strip and feeding device. Fig. 9 is a side view of the feeding device and part of the guide-rail. Fig. 10 is a front elevation of the shaping-rollers for the metal strips. Fig. 11 is a side elevation of the same. Fig. 12 is a plan view of the guide-rail with feeding device and shaping-rollers, showing a metal strip drawn through said rollers and guide-rail. Fig. 13 is a side view of a shaped metal strip, showing a pawl of the feeding device registering behind a serration of the same and in a position to move the strip forward. Fig. 14 is a plan view of the separate feeding-pawl. Fig. 15 is a side view of the stop device for the treadle-crank, on an enlarged scale. Fig. 16 is a view of the stop device, seen in the direction of the arrow-head *x*, on an enlarged scale. Figs. 17, 18, and 19 are details of the stop device, shown on an enlarged scale. Fig. 20 is a side elevation of a modification in the construction of our machine. Figs. 21 and 22 are respectively side and front views, on an enlarged scale, of the feeding device and guide-slots for the same as used in our modified construction. Figs. 23 to 26 illustrate in plan view two forms of serrations provided on the metal strips, while Figs. 27 to 30 show the corner-strip at different stages of the fastening operation.

Like letters denote corresponding parts throughout the several figures.

In the construction shown in Figs. 1 and 2 the feeding device *m*, attached to thin cords *v*, reciprocates on the guide-rail *h*, through which the metal strip *r* is led under the influence of the movements in a vertical plane of the hammer-lever *B*, caused by the treadle-crank *f*. This reciprocatory movement of the feeding device is effected by the two spiral springs *g* and *g*, which are secured at their lower ends in any suitable manner to the sides of the support or base of the machine, while to their upper ends are attached the cords *v*, which pass over rollers *o.o*, set in

suitable bearings in the hammer-lever and frame of the machine. Standards *i i* are rigidly fixed to the guide-rail *h*, Figs. 10, 11, and 12, serving as bearings for two superposed and suitably-profiled rollers *i' i'*, through which the serrated metal strip *r* is led and bent to required form.

In a vertical slot *l'* in the hollow support or base *A* of the machine slides a bolt *l*, which can be adjusted at any point by means of a winged nut *l'*, the head of the bolt being bored through at right angles to the axis of the same. Through this hole are led the ends of the cords *v*, which, by means of a hook *q'*, are connected to the spiral spring *q*. As the spring *q*, to which the other ends of the cords *v* are attached, is stronger than the spring *q*, the natural tendency of the feeding device *m*, secured to the cords *v*, is, on the downward throw of the hammer-lever *B*, to slide toward the standards *i i* until it abuts against these standards. Springs *q* then draw the front ends of cords *v* down and hold these taut, so that any formation of loops or knots is avoided. On the backward motion of the feeding device *m* the pawls *n n*, Figs. 12 to 14, which are pivoted at *m'* to the feeding device *m*, slide over the serrations of the metal strip in the guide-rail *h* without displacing it. Now on the upward throw of hammer-lever *B* first the spiral spring *q* is elongated until hook *q'* abuts against the head of bolt *l*. The feeding device *m* is then drawn toward the angle-hammer *b*, the pawls *n n*, falling of their own weight, register behind the next serrations of the metal strip and push this latter forward under the angle-hammer.

The length of the forward movement of the feeding device *m* is dependent on the throw of the hammer-lever *B*; but it can also be regulated by the bolt *l*, whatever the length of the throw may be. The higher the bolt *l* is adjusted the less distance will the feeding device have to travel, as the hammer-lever must be raised correspondingly more before hook *q'* abuts against the head of bolt *l*, and, as the feeding device will reach its place of rest, the standards *i i* correspondingly quicker on the downward throw of the hammer-lever. The lower the bolt *l* is adjusted the greater will be the distance through which the feeding device is drawn and the greater the length of metal strip pushed forward by the same.

The guide-rail *h* is provided longitudinally with a suitable groove, as shown in Fig. 8, so that the metal strip can be securely passed through the same. As already described above, the guide-rail *h* is, behind the feeding device *m*, provided with a pair of standards *i' i'*, Figs. 10 and 11. Between these rollers the metal strip *r* is drawn through and suitably bent, so that in this manner it gains in rigidity and comes to lie under the angle-hammer in the desired position.

The end of the guide-rail *h* remote from the standards *i i* is attached to the shearing device *c*, (see Figs. 3 and 4,) which has a ver-

tical reciprocal motion in a guide at the back of the angle-hammer *b*. An elliptical spring *p*, which on the one side is attached to the shears *c* and on the other side bears against the projection *c'* of the angle-hammer *b*, tends to press the shearing-piece *c* down.

In the shearing device *c* is an opening which corresponds with the groove in the guide-rail *h*, so that the end of the rail when pushed forward can pass through the shearing-piece. When the hammer-lever *B* is drawn down, the lower edge of the shearing device *c* first comes in contact with the anvil *a*, remaining in this position while angle-hammer *b* is still further lowered, and thus sliding against this latter, so that the shaped metal strip *r* is cut off by the tempered cutting edge of the shearing-piece *c* at the moment of the operation of fastening the corner-piece in place on the cardboard or other box. The shearing-piece *c* is held in its position at the back of the angle-hammer by a cross-bar *t*, secured by screws *t'* to said hammer *b*.

In the angular striking-surface of the hammer *b* rectangular grooves *n'*, corresponding to the breadth of the metal strip *r*, have been provided to insure the said shaped metal strip passing forward and lying in proper position for the operation of fastening, Fig. 5.

The regular advancing of the metal strip is, as is clear from the above description, dependent on the exact upward throw of the hammer-lever, and to attain this, and at the same time to prevent any unintentional drop of the said hammer-lever, we have provided the treadle-crank, by which the machine is operated, with the stop device described in the following paragraphs.

The hammer-lever *B*, which is pivoted to the frame *C* of the machine at *D*, is connected with the treadle-crank *f* by the connecting-link *Z* and kept constantly in its most upward position by the tension of a strong spiral spring *Z'*, which at its upper end is attached to the frame *C* in any suitable manner and at its lower end is secured either to the head of the connecting-link *Z*, as shown in Fig. 2, or in some other suitable way to the treadle-crank, as may be desirable. On the front end of the treadle-crank *f* is attached a steel plate *f'*, the edges of said plate projecting on each side over the treadle-crank. Above the treadle-crank *f*, which moves in a slot *T*, provided in the lower part of the support *A*, is a projecting lug *s*, cast integral with the support *A*. An adjusting-screw *s'* passes through lug *s* and carries at its lower end a block *x*, Figs. 15 to 19, on which are pivoted two pendent latches *x' x'*, said pendent latches being held in position under the influence of a flat spring *x''*, secured at the top of the block *x*. On the treadle-crank being drawn upward by the tension of the spiral draw-spring *Z'* the plate *f'* strikes against the block *x*. To prevent injury from too hard a blow, a packing of leather or caoutchouc *x''* is inserted in the lower part of the block *x*.

On the treadle-crank  $f$  striking against the block  $x$  the two pivoted latches, which are made of suitable length for this purpose, are forced outward and then catch under each side of plate  $f'$  and hold the same firmly under the pressure of the flat spring  $x^2$ . By this means the treadle-crank  $f$ , and consequently the hammer-lever B, connected to it by connecting-link  $z$ , are prevented from falling at an undue moment.

To the front of the treadle-crank  $f$  is pivoted at F the treadle-plate  $f^2$ , which is held normally in a raised position by a spring  $f^3$ , attached to the treadle-crank and bearing against the treadle-plate, and is provided on each side of the crank with extensions  $f^4$ , which act on the latches  $x'$  in such a manner that when pressure is applied to the treadle-plate  $f^2$  the said latches are pressed out by the extensions  $f^4$ , the treadle-crank is set free, and the hammer-lever B, with angle-hammer  $b$ , can be drawn down.

As it is essential that the shaped metal strip, the exact required length of which has been advanced, should be brought over the proper place on the box to be fastened, and as the anvil is made stationary, the angle-hammer  $b$ , with shearing-piece  $c$  and guide-rail  $h$ , attached thereto, is provided with a shoulder  $B^2$  and made to slide in the hammer-chamber  $B^3$  in a channel  $B'$  provided in the same, Figs. 1, 2, and 3. This makes it possible to attach the metal strip advanced under the hammer  $b$  at any desired place on the box to be fastened.

To enable every desirable length of fastener to be attached, the anvil is made in two parts, the rear part  $a$  being made integral with the frame C of the machine, while the front part  $a'$  is made interchangeable.

For the purpose of making the angle-hammer adjustable, so that with varying thicknesses of material to be fastened together the blow may be equally distributed all over, that part of the hammer at the back which abuts against the under side of the hammer-lever B is cut away at an angle on each side of the shoulder  $B^2$ , so that by drawing on the bolt S the position of the angle-hammer to the anvil can be altered at will.

The method of operating the machine is as follows: Any desired length of the serrated metal strip  $r$  is wound on the drum  $D^2$ , which is placed in bearings in supports  $D'$ , attached to the base of the machine and made easily interchangeable. After having adjusted the throw of the hammer-lever B by setting the bolt  $s'$ , Fig. 2, and adjusting the angle-hammer  $b$  to the thickness of the materials to be fastened together by drawing on the slots S the serrated metal strip  $r$  is introduced at the back into the guide-rail  $h$  and passed forward until it is caught by the feeding device  $m$ . The rollers  $i' i''$ , between which the metal strip passes and is suitably shaped, act at the same time as brake-disks and prevent any unintentional withdrawal of the metal strip  $r$ .

The length of metal strip to be advanced at each throw is then determined by setting the adjustable bolt  $l$ , and the machine is then ready to operate. If the operator treads on the plate  $f^2$ , the extensions  $f^4$  of the same press the latches  $x'$  outward, releasing the treadle-crank  $f$ , the hammer-lever B is pulled down, and the feeding device  $m$ , which is then in its most forward position, slides back until it abuts against the standards  $i i$  after hook  $q$  of spiral spring  $q$  abuts against the bolt  $l$ . On releasing the treadle-crank  $f$  it is drawn up by the tension of the spiral spring  $Z'$ , hammer-lever B is thrown up, and the feeding device  $m$  advances the metal strip  $r$  a corresponding length under the angle-hammer  $b$ . The boards to be fastened are then brought edge to edge on the anvil  $a a'$ , and by a tread on the plate  $f^2$  the metal strip is applied and the first corner made, and the whole above-described operation repeated.

The modified construction shown in Figs. 20 to 22 is more especially intended for the manufacture of such cardboard or other boxes in which only corner-pieces with a maximum length of about fifteen serrations are required. This construction differs only in the method of effecting the movement of the feeding device  $m$ , for which purpose we, in this case, employ slotted cams E, as shown on an enlarged scale in Figs. 21 and 22.

The feeding device  $m$  is provided with pins  $E'$ , which are guided in the slots  $E^2$  of the cams E. Said cams E are firmly screwed to the frame C of the machine, and the curvature of the same is such that on the downward throw of the hammer-lever B the feeding device  $m$  is drawn back, while it is impelled forward and with it the metal strip on the upward movement of the hammer-lever. The length of metal strip advanced depends in this construction on the throw of the lever B, which can be exactly regulated by the adjusting-screw  $s'$ , Figs. 1, 2, 15, and 16. To prevent any movement of the feeding device  $m$  when the throw is but very slight, such as would, for instance, prevent a proper adjusting of the boards on the anvil, the lower parts of the slots  $E^2$  are made concentric to the axis of rotation D.

Figs. 23 to 26 show clearly the most suitable form of metal strip for providing fasteners of cardboard and similar boxes. These metal strips have either dovetail, Fig. 23, or triangular, Fig. 25, serrations providing corresponding recesses between the serrations. In the latter form the serrations are provided with incisions at their roots or bases. The serrations are previously bent over to form prongs, so that they easily penetrate into the materials to be fastened together.

The metal strip herein shown and described forms the subject-matter of another application, Serial No. 594,360, filed June 5, 1896.

A metal strip of any desirable length and prepared in the above manner is wound on

the drum  $D^2$  and brought under the angle-hammer  $b$ , as previously described.

The edges of the boards, as shown in Figs. 29 and 30, are brought together on the anvil, the previously-shaped serrated metal strip taking first the position shown in Fig. 27 to the said boards. The groove of the angle-hammer presses the crescent-shaped serrations, which act like knives, into the material, which then spread out in the same without penetrating it, Fig. 28. This effects a fastening which can only be loosened by the forcible destruction of the connected materials or of the corner-piece. Such corner-pieces, applied in the above-described manner, possess the advantage that the serrations are not subjected to bending, the operation of fastening being effected by one pressure, and at the same time they are a perfect substitute for fasteners applied in the interior of boxes, which can easily be bent up and are frequently a disturbing element in the same.

Having thus described our invention, what we desire to secure by Letters Patent is—

1. A machine for applying corner-pieces to cardboard and like boxes, comprising a frame, an anvil mounted on the frame, a lever carrying a hammer and pivoted to the frame, the reciprocating yielding shearing-piece, a guide-rail supported between the lever and the frame, a feeding device having pawls and sliding on the guide-rail, and means for advancing the feeding device on the outward throw of the lever; substantially as described.

2. A machine for applying corner-pieces to cardboard and like boxes, comprising a frame, an anvil mounted on the frame, a lever carrying a hammer and pivoted to the frame, the reciprocating shearing-piece, a guide-rail supported between the lever and the frame, a feeding device having pawls and sliding on the guide-rail and means for actuating the feeding device consisting of cord and spring for drawing the feeding device along the guide-rail toward the fulcrum of the lever, on

the downward throw of the lever and the opposing cord and spring for advancing the feeding device on the upward throw of the lever, and the adjustable bolt; substantially as described.

3. A machine for applying corner-pieces to cardboard and like boxes, comprising a frame, an anvil mounted on the frame, a lever carrying a hammer and pivoted to the frame, a guide-rail supported between the lever and the frame, a feeding device having pawls and sliding on the guide-rail, the standards secured to the rail in the rear of the feeding device, the shaping-rollers mounted between the standards, and means for actuating the feeding device to cause it to draw the strip between the shaping-rollers and feed it beneath the hammer; substantially as described.

4. A machine for applying corner-pieces to cardboard and like boxes, comprising a frame, an anvil mounted on the frame, a lever having a channel, and pivoted to the frame, a hammer having a shoulder fitting in the channel, and cut away at an angle on each side of the shoulder, and the bolts for adjusting the hammer longitudinally on the lever; substantially as described.

5. A machine for applying corner-pieces to cardboard and like boxes, comprising a frame, an anvil mounted on the frame, a lever carrying a hammer and pivoted to the frame, the block having spring-latches, a treadle mechanism for operating the lever, having a treadle, an overlapping plate located on the treadle with which the latches are adapted to engage and a treadle-plate pivoted to the treadle and having extensions adapted to release the latches from the overlapping plate; substantially as described.

In witness whereof we hereunto set our hands in presence of two witnesses.

OTTO SCHUBERT.  
MAX SCHUBERT.

Witnesses:

WILHELM SCHWICHTAL,  
JOHN B. JACKSON.