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R. B. SMITH,
MACHINE FOR SETTING EYELETS AND THE LIKE.
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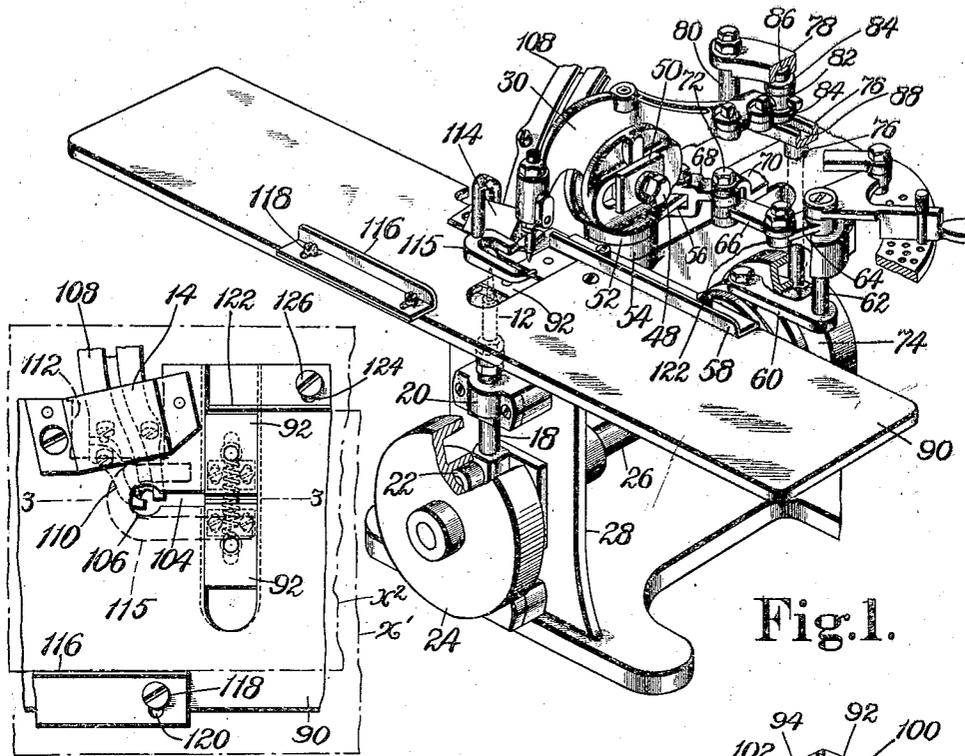


Fig. 1.

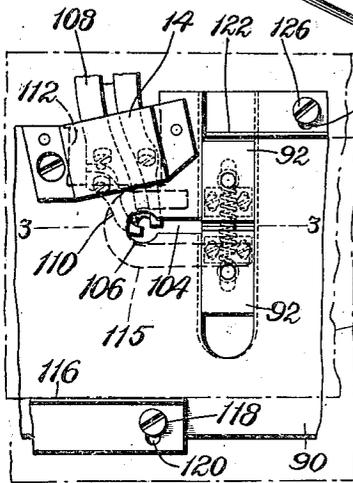


Fig. 2.

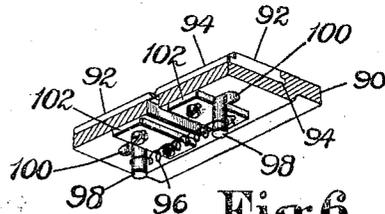


Fig. 6.

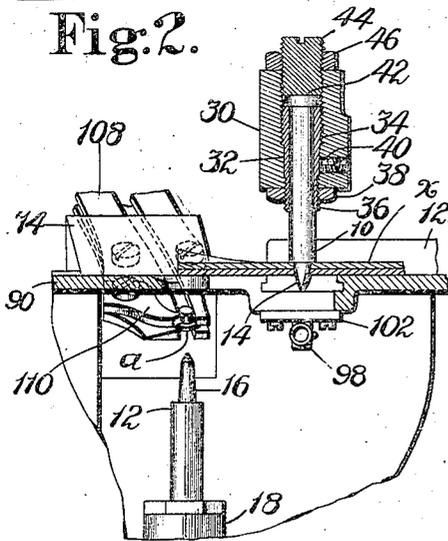


Fig. 3.

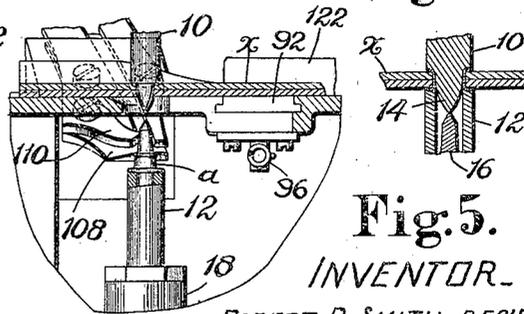


Fig. 4.

Fig. 5.

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MACHINE FOR SETTING EYELETS AND THE LIKE.

Application filed April 7, 1919. Serial No. 288,076.

To all whom it may concern:

Be it known that ROBERT B. SMITH, late of Stoughton, in the county of Norfolk and State of Massachusetts, deceased, invented
 5 certain Improvements in Machines for Setting Eyelets and the like, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings in-
 10 dicating like parts in the several figures.

This invention relates to fastener-inserting machines such as those used for inserting and clenching eyelets, lacing-hooks and gromets, and an important object, generally
 15 stated, is to provide an improved machine of general utility capable of operating satisfactorily on certain special kinds of work that require different treatment from that required by the more common kinds of work.

20 The setting of eyelets and gromets in articles such as canvas cartridge-belts for example, involves difficulties that are not encountered with the more common kinds of work such as shoe uppers and corsets. The
 25 canvas of which cartridge-belts, machine-gun-belts, haversacks, and other articles used for military purposes, is relatively thick and tightly woven. When setting fasteners in articles made of woven material it is not
 30 feasible to cut or punch out portions of the fabric to form the holes in which the fasteners are to be set, for the reason that such cutting or punching would sever the woven strands and the fabric would there-
 35 after pull away from the fasteners and thus lose the reinforcing effect of the latter. For this reason it is customary to form the hole in the fabric by spreading the interwoven strands sufficiently to form the holes
 40 for the fasteners. It has been found, however, that the sharply pointed punches used for this purpose become so tightly embraced by any relatively heavy and tightly woven fabric that the latter becomes distorted in
 45 consequence of accidental edgewise displacement and skewed by twisting of the punch incidentally to feeding the work. In order, therefore, to avoid these objectionable results the present invention provides im-
 50 proved mechanism which, in the illustrated embodiment, comprises a swivel punch, that is to say, a punch that is free to turn rela-

tively to its carrier, the freedom of the punch so to turn enabling the punch to remain in fixed relation to the work in the
 55 event that the latter should be twisted relatively to the punch-carrier or in the event that the punch-carrier should execute angular motion relatively to the work while feed-
 60 ing it.

It may also be desirable and advantageous in some cases to render the clenching tool capable of turning about its axis relatively to its carrier, and when, as in the illustrated
 65 machine, the clenching element and the punch are integral parts of the same tool they would both be capable of turning as specified. The invention therefore comprises the feature of a clenching tool con-
 70 structed and arranged to turn about its axis relatively to its carrier while the machine is in condition for use.

Another object of the invention is to adapt, for special work of the kind hereinbefore
 75 mentioned, machines of otherwise well-known construction designed for operating upon the more common kinds of work. Cartridge-belts, for example, may require two, three, or possibly four rows of fasteners, some or
 80 all of which would, of course, be more distant from the edges of the work than the fasteners inserted in shoe uppers or corsets. Because of the greater distance, as in the case of cartridge-belts, it has been found that the machines as organized for the more
 85 common kinds of work are not suitable without alteration, one difficulty being that the inclined raceway by which the fasteners are conducted to the setting means is so close to the latter that, when it is attempted to set
 90 the fasteners at a relatively great distance from an edge of the work, the latter interferes with the raceway and with the fasteners therein. This not only displaces the work from the desired position but the work ob-
 95 structs the flow of fasteners in the raceway.

In order to avoid such interference the invention provides means arranged to deflect
 100 upwardly that marginal portion of the work that would normally touch the raceway, and to support such portion above the raceway. The raceway is thus enabled to be reciprocated horizontally as usual without agitating the work and without subjecting the

fasteners therein to interference on the part of the work. In consequence of this feature of the invention there is a tendency on the part of the work to deviate from a straight path of feeding motion, and accordingly another object is to provide means to counteract this tendency. In this connection a feature of the invention consists in a work-guide arranged to control the edge of the work opposite to the one that is deflected as aforesaid.

Other features of the invention are hereinafter described and claimed, and are illustrated by the drawings. For convenience in illustrating the invention, but without imposing any undue limitation thereon, the various features are illustrated as being embodied in a fastener-inserting machine of the same general type as that shown and described in United States Letters Patent No. 1,205,277, granted November 21, 1916, upon an application of Walter Shaw. Excepting as hereinafter specified it is to be understood that the machine shown and described herein is similar to that shown and described in the aforesaid patent.

Referring to the drawings,—

Fig. 1 represents a perspective view of a fastener-inserting machine embodying the present invention, although some parts of the machine are broken away;

Fig. 2 represents a top plan view on a larger scale, including portions of the work-supporting table, the raceway, the guard associated with the latter, and two oppositely disposed work guides arranged to co-act with opposite edges of the work to set three or four rows of fasteners;

Fig. 3 represents a sectional view in the vertical plane indicated by line 3—3 of Fig. 2, with the addition of the fastener-setting members and the work punch;

Fig. 4 represents a sectional view similar to Fig. 3 showing the parts in another position wherein a fastener carried by the lower setting member is about to be inserted in the work;

Fig. 5 represents a sectional view in a vertical plane showing the setting members completing the setting operation; and

Fig. 6 represents a perspective view of a fragment of the work-supporting table including two separable plates arranged to co-operate with the punch.

The upper setting member of the fastener-inserting mechanism is indicated at 10, and the lower setting member is indicated at 12. The punch for forming a hole in the work to receive a fastener is indicated at 14 and, in the present instance, is an integral part of the setting member 10. This construction is commonly termed a "combined punch and set." The punch 14, in the present instance, is pointed so as to form the hole by spreading the stock instead of

cutting or punching a piece out of the stock, this form of punch being preferable when operating upon woven fabric so as to avoid cutting the strands that form the fabric. The lower set is tubular and is occupied by a spindle 16, the function of which is to detach a fastener from the raceway and to center the fastener relatively to the setting members.

The lower setting member is affixed to a plunger 18 and the latter is arranged to slide up and down in guides one of which is indicated at 20 in Fig. 1. A cam roll 22 carried by the plunger co-acts with a cam 24 to move the plunger up and down. The cam is fixed to a driven shaft 26 and the latter is arranged to rotate in suitable bearings in the frame 28 of the machine.

The upper setting member is carried by a carrier 30 which, in the present instance, is a lever. A sleeve 32 is inserted in the carrier to hold the setting member, and is provided with external screw-threads 34 which engage internal screw-threads formed in the carrier. The sleeve may, therefore, be adjusted up and down relatively to the carrier by turning it. The lower end of the sleeve is reduced in diameter and is provided with external screw-threads 36 to co-act with a binding nut 38. The carrier is bored and tapped to receive a set screw 40, the latter being arranged to engage a smooth portion of the sleeve to prevent the latter from turning while the nut 38 is being tightened. The setting member 10 is formed to turn relatively to the sleeve 32, and its upper end is provided with a head 42 arranged to rest upon the upper end of the sleeve. A screw plug 44 is screwed into the carrier above the setting member to bear against the upper surface of the head 42 so as to sustain the stress incidental to clenching a fastener. In practice the plug 44 will be adjusted to take up substantially all lost motion between the setting member and the carrier without, however, binding the setting member so as to interfere with its freedom to turn relatively to the sleeve. The plug 44 is provided with a binding nut 46 by which it may be held in the desired position of adjustment.

The carrier 30 is arranged to rock upon a fulcrum member 48 the axis of which is substantially horizontal. This fulcrum member extends through two sliding blocks one of which is indicated at 50, this construction being shown in the aforesaid patent. The blocks 50 are mortised into a forked portion at the upper end of a post 52, the axis of which is substantially vertical. The post is arranged to turn about its axis in a bearing 54 in the frame 28, and is provided with an arm 56 by which it may be oscillated to impart feeding motion to the carrier 30. The feeding motion is derived

from a cam 58 carried by the shaft 26 and is transmitted by a cam-lever 60, rock shaft 62, arm 64, and links 66 and 68. The two links and a third link, indicated at 70, are
5 connected by a common pivot member 72, and are adapted to be adjusted in such manner as to vary the extent of motion transmitted to the arm 56.

The up-and-down motion of the setting member 10 is derived from a cam 74, and is transmitted by a vertically movable plunger 76 to the rear end of the carrier 30. The upper end of the plunger is provided with horizontal parallel members 78, 78 that form
15 a yoke, the ends of the members being connected by rods 80. The connection between the yoke and the rear end of the carrier embodies a ball-and-socket construction, the ball member 82 being fixed to the carrier,
20 and the socket members 84 being disposed between the ball and the members 78 respectively. The socket members are provided with rollers 86, and the latter are arranged to move in grooves 88 formed in the members 78, the grooves being curved to impart
25 a slight longitudinal movement to the carrier 30 in consequence of the feeding motion imparted to the carrier. The carrier is thus caused to execute a compound motion, the result of which is to move the setting
30 member 10 in a straight line.

The machine is provided with a stationary work supporting table 90 which, for the purpose of supporting relatively long articles
35 such as cartridge-belts, is preferably extended a considerable distance to the right and left of the setting members. In the vicinity of the setting members the work table is cut away to receive a pair of co-operative plates
40 92, 92, and is provided with undercut grooves to receive tongues 94 formed on opposite edges of the plates. The plates are thus mortised into the table and are capable of sliding relatively to the table and relatively
45 to each other in lines transverse to the lines of feeding movement of the work. The plates are normally drawn toward each other by a spring 96, the ends of which are anchored respectively to pins 98 carried by
50 the plates. These pins extend downwardly from the plates through slots 100 formed in the table. The abutting edges of the plates are beveled as shown by Fig. 6 to facilitate the insertion of the punch between them.
55 The plates are adjusted initially by stop members 102 clamped to the under side of the table 90 in position to engage the pins 98. The stop members are adjustable relatively to the table, and in practice they are set at positions that will cause the abutting
60 edges of the plates 92 to register with the point of the punch 14. When the plunger 76 at the rear of the machine is moved upwardly by its cam the punch 14 moves downwardly through the work x , and, on coming

in contact with the confronting beveled edges of the plates 92 it forces the latter apart. The work x as shown comprises two layers and is intended to represent the thick and
tightly woven fabric of a cartridge-belt. 70 The punching motion occurs when the punch is displaced laterally from the line of the lower setting member, as shown by Fig. 3, and when the punch has been inserted through the work it is moved laterally to a
75 position in registration with the lower setting member, as shown by Fig. 4. Incidentally to this movement, by which the work is fed along the table, the punch passes away from the punch plates 92 and moves through
80 a slot 104 formed in the table. The left hand end of this slot is enlarged as indicated at 106, to a size sufficient to enable the lower setting member and a fastener to pass there-
85 through.

Fasteners such as that indicated at a are supplied to the lower setting member by an inclined raceway 108. This raceway, like the corresponding raceway in the aforesaid patent, is reciprocated horizontally toward
90 the front and rear of the machine in timed relation to the movements of the lower setting member such that the leading fastener in the raceway will occupy a position in registration with the spindle 16 during the
95 first stages of upward movement of the plunger 18. The spindle 16 is thus inserted through the barrel of the leading fastener, and before the lower setting member has been raised far enough to engage the race-
100 way the latter is retracted toward the rear of the machine and is maintained out of the path of the setting member until the latter has subsequently descended far enough to clear it. The raceway is then moved toward
105 the front to present the next fastener in the path of the spindle. The lower end of the raceway is provided with a yielding stop 110 by which the leading fastener is prevented from escaping until it is withdrawn
110 by the spindle as the raceway is retracted.

In consequence of the inclination of the raceway and its close relation to the setting members, the raceway necessarily intersects the path that would normally be traversed
115 by the rear edge of the work. For present purposes the term "work" is meant to refer to the kind of work in which the fasteners are set at a relatively great distance from the rear edge. In order, therefore, to provide adequate support for the work without
120 incurring interference between the table and the raceway, the rear edge of the table is cut away to form a notch 112 (Fig. 2) in which the raceway moves incidentally to its
125 reciprocating to the front and rear. This, however, does not avoid interference between the work and the raceway, or the fasteners in the latter. In order, therefore, to avoid such interference a guard 114 is ar- 130

ranged in position to hold the rear marginal portion of the work above and out of contact with the fasteners. In the present instance this guard is affixed to the table and covers the notch 112. The guard is inclined substantially in accordance with the inclination of the raceway, being higher at its rear edge than at its front edge. A presserfoot 115 is arranged to depress the work against the table between the guard 114 and the hole 106.

In order to utilize the machine to insert two, three, or four, as the case may be, fasteners the machine is provided with two stationary but adjustable work guides 116 and 122. In the present instance these guides are clamped to the work table, the guide 116 being provided with slots 120 for the reception of clamping screws 118, and the guide 122 being provided with slots 124 for the reception of clamping screws 126. One of these guides, preferably that at the rear of the table, is relatively near the line in which the fasteners are inserted. When a piece of work, for example, that indicated at x' in Fig. 2, is placed upon the table with its rear edge abutting against the guide 122 the front marginal portion of the work may overlie the front guide, in which event the front guide is not effective to determine the line in which the fasteners will be inserted. The work will progress from right to left and its rear marginal portion will pass over the guard 114 without engaging the raceway or the fasteners therein. A slight manual effort is sufficient to keep the rear edge of the work against the guide 122, the work-engaging surface of which is parallel to the lines of feeding movement of the punch. When, under the conditions last stated, the first series of fasteners has been inserted the work may be returned to its original starting position for the purpose of inserting a second row of fasteners in another line. For this purpose the work may be shifted slightly to the rear far enough to place the front edge of the work against the front guide 116. In this case the rear marginal portion of the work will overlie the rear guide 122, and the work will occupy the position indicated conventionally at x^2 . According to the width of the work as shown, and the position of the front guide 116, the second row of fasteners will be inserted exactly midway between the front and rear edges of the work, but the slots 120 in the front guide enable the latter to be adjusted toward and from the fastener inserting means so that the second row may be inserted, if desired, elsewhere than exactly in the longitudinal median line of the work. The work may now be advanced again from right to left to insert the second series of fasteners, and in the event that a third row of fasteners is desired the work may be reversed end for

end and placed with its present rear edge against the rear guide so that it will again occupy the position indicated at x' . The third row of fasteners will, therefore, be inserted at the same distance from the rear edge as the distance between the first row and the present front edge. Assuming that the second row of fasteners has been inserted in a line other than the longitudinal median line of the work, a fourth row of fasteners may be inserted by again returning the work to its starting position with its front edge against the front guide according to the position indicated at x^2 .

The motions of the various instrumentalities occur substantially as follows. The presserfoot will be raised manually in opposition to the applied force of a spring (not shown) preparatory to placing the work in the desired starting position for punching the first hole. When the presserfoot is released its spring will depress it to clamp the work upon the table. The punch initially occupies the position shown in Fig. 3 excepting that it is raised as shown by Fig. 1. When the machine is started, as by depressing a starting treadle to connect the shaft 26 with suitable driving mechanism, the punch descends to the position shown by Fig. 3, thereby spreading the strands of the fabric to form a hole for the reception of a fastener. The presserfoot then rises to free the work for feeding and the punch carrier 30 moves from right to left, the punch remaining in the work to impart feeding movement thereto. When the punch arrives at a position in registration with the lower setting member the presserfoot descends to clamp the work upon the table, and the punch and upper setting member remain stationary until an eyelet has been inserted and clenched. During the work feeding period the lower set rises far enough to insert the spindle 16 through the leading eyelet in the raceway, and the raceway is then retracted horizontally to the rear to leave the eyelet on the spindle and to clear the path for the lower setting member. This condition of the parts is shown by Fig. 4. The lower setting member then continues upwardly to complete the setting movement, the spindle 16 being depressed relatively to the lower setting member by the point of the punch, as shown by Fig. 5, and the lower setting member rises far enough to insert the barrel of the eyelet through the work and to clench the barrel conjointly with the upper setting member. The setting members are then retracted in opposite directions, the raceway is advanced to place another eyelet in registration with the spindle 16, and the carrier 30 is moved to the right to its initial position preparatory to beginning a new cycle of operations.

Having thus described the invention, what is claimed as new and is desired to be se-

cured by Letters Patent of the United States is:

1. In a fastener-inserting machine, a work-punch, and a carrier therefor arranged to execute feeding movement transversely of the axis of the punch, the punch being free to remain in fixed relation to the work notwithstanding relative skewing of the carrier and the work.

2. In a fastener-inserting machine, a work-punch, and a carrier therefor arranged to execute oscillatory work-feeding motion about an axis parallel to that of the punch, said work-punch being arranged to turn relatively to the carrier to avoid distorting and skewing the work.

3. In a fastener-inserting machine, a fastener-setting device having a work-punching element, and a carrier therefor arranged to execute a feeding movement transversely of the axis of said device, said punching element being arranged to turn relatively to the carrier to avoid distorting and skewing the work.

4. In a fastener-inserting machine, a combined punch and set, and a carrier therefor arranged to execute a feeding movement transversely of the axis of said combined punch and set, the latter being arranged to turn relatively to the carrier to avoid distorting and skewing the work.

5. In a fastener-inserting machine, a device for upsetting the barrel of an eyelet, and a carrier therefor, said device being swiveled to turn about its axis relatively to the carrier.

6. In a fastener-inserting machine, fastener-inserting means, a work-supporting table, an inclined raceway for supplying fasteners to said means below the table, a guard arranged adjacent to the raceway to displace a portion of the work upwardly from the table and thereby to prevent the work and the raceway from touching each other, and a work-guide arranged to engage an edge of the work opposite to said guard to prevent edgewise displacement of the work by the guard.

7. In a fastener-inserting machine, fastener-inserting means, a work-supporting table, an inclined raceway for supplying fasteners to said means below the table, means arranged to support a marginal portion of the work above the plane of the table, and a presserfoot arranged to press the work against the table between said sup-

porting means and the fastener-inserting means.

8. An eyeleting machine comprising eyelet-setting mechanism including a tool formed and arranged to spread open and clench the barrel of an eyelet, and means for sustaining said tool against axial movement relatively to said means but so that the latter may rotate about its axis relatively to said means.

9. An eyeleting machine comprising power-driven work-feeding and eyelet-setting mechanism including a tool-carrier, and a tool carried thereby for feeding the work and clenching the eyelet, said tool being rotatable about its axis relatively to said carrier.

10. An eyeleting machine comprising a work-support, power driven mechanism including a tool-carrier and a tool carried thereby to punch the work and feed it along said support, said tool being swiveled so as to turn about its axis relatively to said carrier, and means arranged to insert and clench an eyelet in the work.

11. An eyeleting machine comprising eyelet-setting mechanism including a tool formed and arranged to clench the barrel of an eyelet, a support, and means having screw-threaded engagement with the support for connecting the tool therewith so as to adjust the tool lengthwise of its axis, the tool being rotatable about its axis relatively to said adjusting means and the support.

12. An eyeleting machine comprising eyelet-setting mechanism including a support, a sleeve arranged in said support so as to be adjustable lengthwise, a clenching tool having a shank-portion journaled in said sleeve so as to be rotatable relatively thereto, and means arranged to co-operate with the sleeve to maintain the tool against longitudinal movement relatively to the sleeve.

In testimony whereof I, the said HERBERT A. CASSIDY, have signed my name to this specification.

HERBERT A. CASSIDY,
Executor of the will of Robert B. Smith,
deceased.

In testimony whereof I, the said HARRY B. SMITH, have signed my name to this specification.

HARRY B. SMITH,
Executor of the will of Robert B. Smith,
deceased.