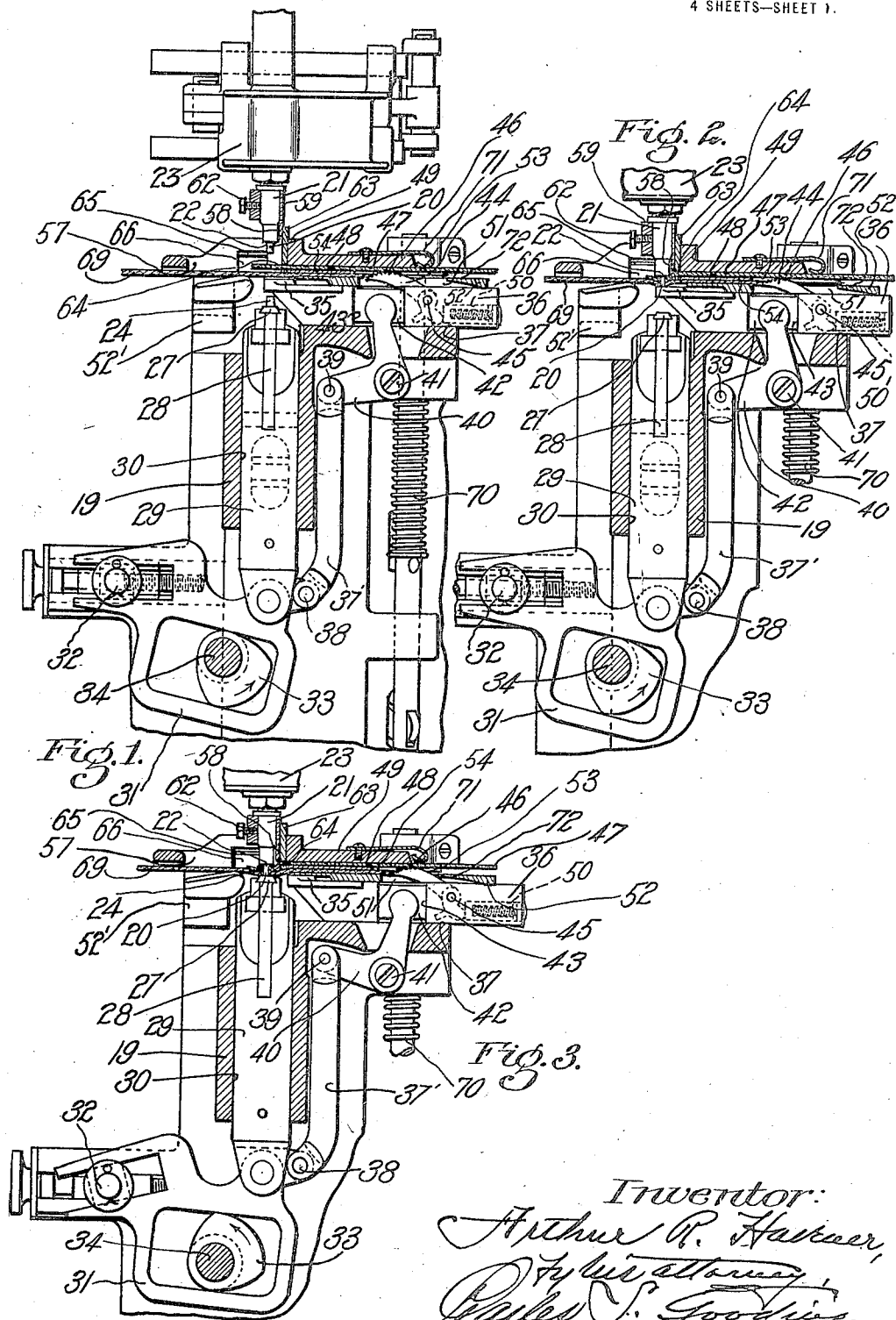


A. R. HAVENER,
 LACING STUD SETTING MACHINE.
 APPLICATION FILED SEPT. 29, 1917.

1,301,432.

Patented Apr. 22, 1919.

4 SHEETS—SHEET 1.



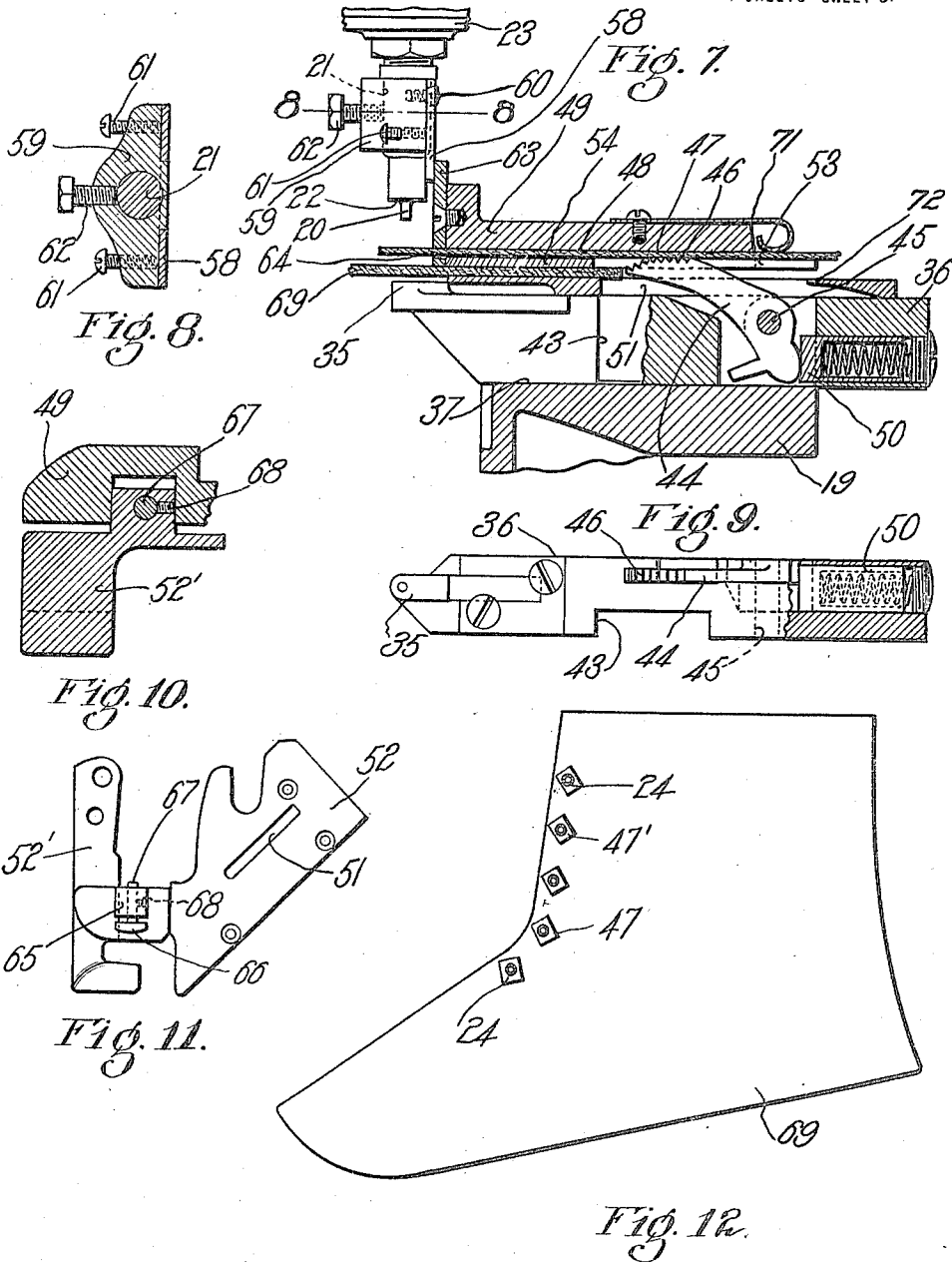
Inventor:
 Arthur R. Havener,
 By his attorney,
 Paul J. Gooding.

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4 SHEETS—SHEET 3.



Inventor:
Arthur R. Havener,
 by his attorney, *Charles S. Gooding*

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55 SHEETS—SHEET 4.

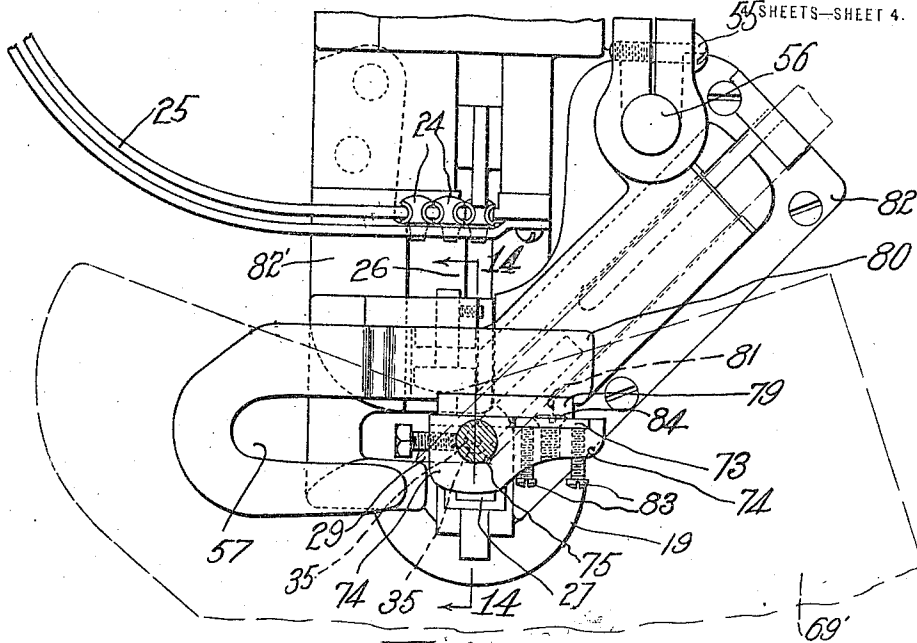


Fig. 13.

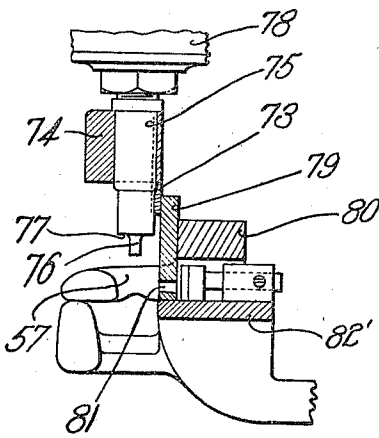


Fig. 14.

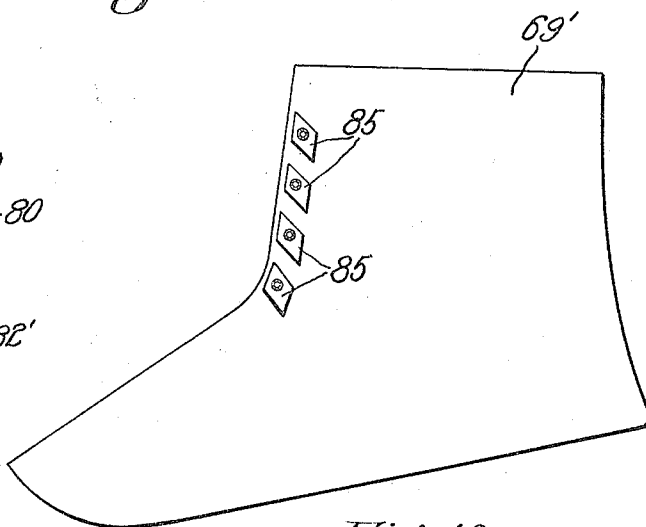


Fig. 16.

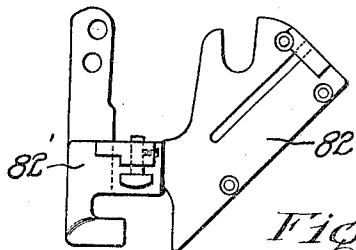


Fig. 15.

Inventor:
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 by his attorney,
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UNITED STATES PATENT OFFICE.

ARTHUR R. HAVENER, OF WAYLAND, MASSACHUSETTS, ASSIGNOR TO AMERICAN LACING HOOK CO., A CORPORATION OF NEW JERSEY.

LACING-STUD-SETTING MACHINE.

1,301,432.

Specification of Letters Patent.

Patented Apr. 22, 1919.

Application filed September 29, 1917. Serial No. 193,371.

To all whom it may concern:

Be it known that I, ARTHUR R. HAVENER, a citizen of the United States, residing at Wayland, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Lacing-Stud-Setting Machines, of which the following is a specification.

This invention relates to a lacing stud setting machine which is adapted to set lacing studs in the uppers of boots and shoes and also is adapted to set said studs in a reinforcing tape in order that the stud shall have a firmer hold upon the upper and shall be harder to detach therefrom under the ordinary conditions of use.

The object of the invention is to provide a machine of the character set forth which will automatically feed the upper and the reinforcing tape and which will feed the reinforcing tape to the upper at an angle to the direction in which the upper is fed, that is, it may be fed at an acute angle or it may be fed at a right angle thereto. The reinforcing tape after being fed to the upper is attached thereto by a lacing stud which is driven through the upper and clenched in the tape, and after the reinforcing tape has thus been attached to the upper by the stud, the portion so attached is cut off and the upper is then fed forward, together with the attached portion of the reinforcing tape, to space the studs.

The machine in which my invention is embodied is substantially the same as to the mechanism for punching a hole in the upper, the mechanism for feeding and setting the lacing hooks or studs and the mechanism for feeding the upper to space the studs, as the machine illustrated in U. S. patent to Arthur R. Havener, "Machine for setting lacing hooks," No. 977,090, patented November 29, 1910. I have, however, added to this machine, and adapted the machine for operation with, a reinforcing tape positioning, feeding and cutting mechanism, and therein resides the principal novelty of this invention.

The invention consists in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims thereof.

The term "lacing stud" is used throughout the specification and claims to indicate

not only a lacing hook but an eyelet, as the invention is equally applicable to the setting of eyelets in an upper and reinforcing piece as well as lacing hooks.

The drawings are devoted principally to the illustration of the manner in which the reinforcing strip is fed, attached to the upper and cut off, and the mechanisms whereby the necessary movements are imparted to the punch, die and lacing hook carrier and for feeding the lacing hooks to the lacing hook carrier are to be found in said Letters Patent, to which reference may be had.

Referring to the drawings:

Figure 1 is a sectional elevation viewed from the front of the machine and taken on the line 1-1-1, Fig. 6, illustrating the punching and setting mechanisms and the tape feeding and cutting mechanism, with the parts in the positions occupied thereby when the machine stops.

Figs. 2, 3, 4 and 5 are sectional elevations similar to Fig. 1, illustrating the parts in the different relative positions assumed thereby during the operations of punching, setting, cutting and feeding.

Fig. 6 is a plan view of the setting, cutting and feeding instrumentalities with a portion of an upper shown in position with relation thereto in broken lines.

Fig. 7 is a sectional elevation taken on line 7-7 of Fig. 6.

Fig. 8 is a detail sectional plan taken on line 8-8 of Fig. 7.

Fig. 9 is a plan view, partly in section of the punching die and its slide and the tape feeding mechanism.

Fig. 10 is a detail section taken on line 10-10 of Fig. 6.

Fig. 11 is a detail plan of the work-support.

Fig. 12 is a plan of an upper with sections of the reinforcing tape attached thereby by lacing studs.

Fig. 13 is a plan, partly in section, similar to Fig. 6 illustrating a modified form of my invention, with a portion of an upper shown in broken lines in connection therewith.

Fig. 14 is a sectional elevation taken on line 14-14 of Fig. 13.

Fig. 15 is a plan view of the work support as used in connection with the embodiment of my invention illustrated in Fig. 13.

Fig. 16 is a plan view of an upper show-

ing sections of the reinforcing tape attached thereto by lacing studs as it will appear when the operation is performed by the modified form of my invention illustrated in Figs. 13 to 15 inclusive.

Like numerals refer to like parts throughout the several views of the drawings.

In the embodiment of my invention illustrated in Figs. 1 to 12 inclusive, to which reference will now be had, the reinforcing tape is cut off at right angles to its length, and in these figures 19 is the frame of the machine. The punch proper 20 is formed upon the lower end of a stud 21 which has an annular clenching surface 22 thereon constituting an anvil against which the shank of the lacing hook strikes to clench the same during the setting operation. This stud 21 is screw-threaded to engage a slide 23 which constitutes a punch holder and to which a vertical movement and a lateral movement are imparted by mechanism which is disclosed in said U. S. Patent No. 977,090, to which reference may be had.

The lacing hooks 24 are fed down a raceway 25, Fig. 6, and then are carried along an auxiliary raceway 26 onto a lacing hook carrier plate 27 which is fastened to a lever 28 pivotally mounted on a slide 29 which slides in ways 30 in the frame of the machine, and to which a vertical reciprocatory motion is imparted by a lever 31 mounted to rock about a pivot 32 and having a rocking motion imparted thereto by a cam 33 fast to a shaft 34.

A die plate 35 cooperates with the punch 20 in punching holes in the upper and reinforcing tape and is fastened to a slide 36 which is guided to slide in ways 37 formed in the frame of the machine, these ways being arranged at an angle to the direction in which the upper is fed as hereinafter explained. A reciprocatory motion is imparted to the slide 36 and the die 35 by a link 37' pivotally connected at its lower end at 38 to the slide 29 and at its upper end at 39 to a lever 40 which is pivoted at 41 to the frame of the machine and engages a sliding block 42 which is slidable vertically in a slot 43 in the die slide 36, so that as the slide 29 moves up and down a reciprocatory motion is imparted to the slide 36 and to the die fast thereto.

The slide 36 has a feed finger 44 pivoted thereto at 45. The upper end of said feed finger is corrugated at 46 and is adapted to engage a strip of reinforcing tape 47 which is guided in a guideway 48 provided in the presser foot 49. The feed finger 44 is held against the reinforcing strip 47 during the feeding movement by a spring pressed plunger 50 which is slidably mounted in the die slide 36. The feed finger 44 projects through a slot 51 in the work-support 52 and also projects through a slot 53 in a plate

54 fast to the under side of the presser-foot 49 and forming a portion of the guideway for the reinforcing tape 47.

The presser foot 49 is clamped by a screw 55 to a rod 56, said presser foot having a slot 57 within which the punch moves during the operation of feeding the upper. The presser foot 49 may be raised or lowered by the rod 56 either by foot power or automatically by means of the mechanism set forth in said U. S. Letters Patent.

A primary cutter 58 is fastened to a bracket 59 by screws 60 (Fig. 7) and is adjustable on said bracket by means of screws 61. Said bracket is adjustable vertically upon the stud 21 by means of a screw 62, so that the cutter can be adjusted laterally by means of the screws 61 and vertically by means of the screw 62.

A secondary cutter 63 is fastened to the presser foot 49 adjacent to the punch 20 and has a slot 64 therein through which the tape 47 can be fed.

The presser foot 49 is gripped to the rod 56 by the screw 55 and is further held firmly in position by an ear 65 on the part 52' of the work-support 52. The ear 65 serves the further purpose of supporting the edge gage 66 which has its shank 67 projecting there-through and held in adjusted position by a set-screw 68 (Fig. 11).

The general operation of the mechanism hereinbefore specifically described and illustrated in Figs. 1 to 12 inclusive is as follows: Assuming the parts to be in the position illustrated in Fig. 1, the presser foot 49 is raised sufficiently to allow the operator to introduce the upper 69 beneath said presser foot and to place said upper upon the work-support 52, 52', with its front edge resting against the edge gage 66. The presser foot is raised by means of the rod 56 and by a foot treadle. On the release of the presser foot it is carried down into contact with the upper which it holds firmly in position upon the work-support by means of the spring 70. At this time the reinforcing tape 47 is in an advanced position and projecting beneath the punch 20. The punch now descends and punches a hole in the tape and in the upper as illustrated in Fig. 2, in which position it coacts with the die 35 in the punching operation.

At this time the primary cutter 58 just contacts with the upper surface of the reinforcing tape, but does not cut it. The punch now releases slightly and the die 35 moves backwardly out of alinement with the punch, the presser foot still holding the work upon the work-support, and as said die is moved back by the die slide 36, the lever 40 and link 37', the feed finger 44 is moved backwardly preparatory to taking another grip upon the reinforcing tape 47 in order to feed the same forward to re-

ceive another lacing hook. The teeth or corrugations 46 upon the feed finger 44 are so made and shaped that they will readily slip beneath the reinforcing tape when moved backwardly, but when moved forwardly will take a grip thereon. Moreover, any tendency of the reinforcing tape to move horizontally when not held by the punch or when not being fed by the finger 44 is counteracted by a spring 71 which bears against said reinforcing tape and is supported upon the presser foot 49. At the same time that the die starts to move backwardly out of alinement with the punch 20 and lacing hook carrier, the lacing hook carrier with a lacing hook on the lacing hook carrier plate 27 starts to move upwardly. The lacing hook carrier thus moving upwardly forces the lacing hook shank through the upper 69 and the reinforcing tape 47, the punch at this time projecting into the hole in the shank of the lacing hook, and also at this time a slight downward movement is imparted to the punch to meet the carrier during the latter part of the setting operation, and this downward movement of the punch begins as soon as the die has moved sufficiently laterally of the punch to clear the same, and thus the shank of the lacing hook is clenched against the anvil clenching surface or anvil 22 upon the punch. The lacing hook is shown as just having been set in the manner hereinbefore described in Fig. 3. The punch is now elevated slightly to release the pressure upon the lacing hook.

As soon as the lacing hook has been set in the upper, as hereinbefore set forth, the lacing hook carrier plate 27 is moved to clear the same from the lacing hook. At this time the presser foot is raised in order that the upper may be fed and this raising of the presser foot is automatically performed by mechanism illustrated and described in said U. S. Letters Patent, and when said presser foot moves upwardly the secondary cutter 63 coacts with the primary cutter 58 to cut a section 47' from the end of the strip of reinforcing tape which has already, as hereinbefore described, been fastened to the upper by a lacing stud 24.

The parts now being in the position illustrated in Fig. 4, a lateral movement is imparted to the punch while the same is projecting into the shank of the lacing hook to feed the upper the proper distance to space the hooks. This lateral movement is accomplished by means of the mechanism described in said U. S. Letters Patent and the punch is moved laterally with the upper and the reinforcing piece 47' to the position illustrated in Fig. 5.

During the feeding of the upper hereinbefore described, the lacing hook carrier slide descends from the position illustrated

in Fig. 4 to that illustrated in Fig. 1 and the lacing hook carrier plate 27 is thus brought into alinement with the lower end of the auxiliary raceway 26 and another lacing hook is placed on said lacing hook carrier plate by mechanism illustrated and described in said U. S. Letters Patent. When the punch has fed the upper as hereinbefore described and as illustrated in Fig. 5, the presser foot is automatically lowered to clamp the upper to the work-support again.

While the lacing hook carrier slide 29 is descending it is evident that the die 35 and die slide 36 will be moved forwardly and the finger 44 will engage the reinforcing tape and move it forward to the position illustrated in Fig. 7. During the latter part of the backward movement of the slide 36 the feed finger 44 engages the work support at 72, as illustrated in Fig. 4, and the feed finger is thrown automatically out of engagement with the reinforcing tape and remains out of engagement with said tape until the slide is again moved forward.

The punch now having fed the lacing hook, upper and reinforcing section 47' forward, moves upwardly out of the lacing hook and then moves laterally to its first position, as in Fig. 1, in readiness to descend and the cycle of operations hereinbefore described is then repeated to punch the upper and reinforcing tape, set the lacing hook in said upper and reinforcing tape, sever the reinforcing tape and feed the upper.

In Figs. 13 to 16 inclusive a modified form of my invention is illustrated in which the operation is substantially the same as that hereinbefore described in relation to that embodiment of my invention illustrated in Figs. 1 to 12 inclusive, except that the primary cutter is arranged at the back of the punch instead of at one side thereof and consequently said primary cutter, in cooperation with the secondary cutter arranged to coact therewith, severs the tape at an acute angle to the direction in which the tape is fed instead of at right angles thereto.

Referring to Figs. 13 to 16 inclusive, 73 is the primary cutter which is attached to the back of a bracket 74 fast to a stud 75 which carries the punch 76 and anvil 77, said stud being fastened to a slide 78. The secondary cutter 79 is fastened to a presser foot 80 and is provided with a slot 81 through which the reinforcing tape is fed, said tape being cut off at the proper time by the raising of the presser foot 80 and by the cooperation during said raising movement of the secondary cutter 79 with the primary cutter 73 in a very similar manner to that hereinbefore described.

The upper rests upon a work-support 82, 82' (see Figs. 14 and 15) and is held in position thereon by the presser foot in the man-

ner hereinbefore described. The cutter is adjusted laterally by means of screws 83 (Fig. 13) and is fastened to the bracket 74 by a screw 84. The upper 69' has sections 85
5 attached thereto by lacing studs in the same manner as hereinbefore described in relation to that embodiment of my invention illustrated in Figs. 1 to 12 inclusive.

The general operation of the form of my invention illustrated in Figs. 13 to 15 is substantially the same as hereinbefore described in relation to that embodiment of my invention illustrated in Figs. 1 to 12, inclusive.
10

Having thus described my invention, what I claim and desire by Letters Patent to secure is:
15

1. A machine for applying lacing studs to shoe uppers having, in combination, means for feeding an upper, means for feeding a reinforcing strip in a direction at an angle to the direction in which said upper is fed and means for setting a stud in said upper and reinforcing strip, whereby the same are connected together.
20

2. A machine for applying lacing studs to shoe uppers having, in combination, means for feeding an upper, means for feeding a reinforcing strip in a direction at an angle to the direction in which said upper is fed, means for setting a stud in said upper and reinforcing strip, whereby the same are connected together, and means for severing from said strip the portion thereof which has been attached to said upper and reinforcing strip
25 by said lacing stud.
30

3. A machine for attaching lacing studs to shoe uppers having, in combination, means for imparting a step by step feeding movement to an upper, means for feeding a reinforcing strip in a direction transversely to the direction of movement of said upper, means for securing a stud to said upper and said strip and means for cutting the strip after said stud is applied.
35

4. In a lacing stud setting machine, a punch for forming a stud receiving hole in both a reinforcing strip and a shoe upper, means for imparting a step by step feeding movement to the strip in a direction at an angle to the direction in which said upper is fed, means for severing the strip and means for setting a stud in said upper and in a portion of said strip.
40

5. A machine for setting a lacing stud in the upper of a boot or shoe having, in combination, a work support, a presser foot provided with a guideway for a reinforcing strip, means for imparting a step by step feeding movement to said upper at an angle to said guideway, means independent of said upper feeding means for feeding a strip of tape step by step through said guideway to said upper and means for setting a lacing hook in said upper and strip.
55

6. A machine for setting a lacing stud in
60

the upper of a boot or shoe having, in combination, a work support, a presser foot provided with a guideway for a reinforcing strip, means for imparting a step by step feeding movement to said upper at an angle to said guideway, means independent of said upper feeding means for feeding a strip of tape step by step through said guideway to said upper, means for setting a lacing hook in said upper and strip and means for severing said strip from the portion thereof which has been attached to said upper.
70

7. A machine for setting a lacing stud in the upper of a boot or shoe and in a reinforcing strip therefor having, in combination, a punch and anvil, a die adapted to cooperate with said punch, mechanism adapted to move said punch and anvil longitudinally thereof toward said die, mechanism adapted to subsequently move said die out of alignment with said punch while said punch is inserted in said upper and reinforcing strip, means adapted to sever said strip from the portion which has been punched, mechanism adapted to move said punch laterally thereof to feed said upper and said severed portion of said strip and means operated by said die adapted to impart a step by step feeding movement to said reinforcing strip.
80

8. A machine for setting a lacing stud in the upper of a boot or shoe and in a reinforcing strip therefor having, in combination, a punch and anvil, a die adapted to cooperate with said punch, mechanism adapted to move said punch and anvil longitudinally thereof toward said die, mechanism adapted to subsequently move said die out of alignment with said punch while said punch is inserted in said upper and reinforcing strip, means adapted to sever said strip from the portion which has been punched, mechanism adapted to move said punch laterally thereof to feed said upper and said severed portion of said strip and means adapted to impart a step by step feeding movement to said reinforcing strip.
90

9. A machine for setting a lacing stud in the upper of a boot or shoe and in a reinforcing strip therefor having, in combination, a punch and anvil, a die adapted to cooperate with said punch, mechanism adapted to move said punch and anvil longitudinally thereof toward said die, mechanism adapted to subsequently move said die out of alignment with said punch while said punch is inserted in said upper and reinforcing strip, means adapted to sever said strip from the portion which has been punched, a carrier adapted to hold a lacing hook in alignment with said punch and anvil prior to said lateral feeding movement of said punch, mechanism adapted to move said carrier toward said punch and anvil whereby the shank of said lacing hook may be driven through said upper and reinforcing strip and
110

clenched upon said anvil prior to the feeding of said upper, mechanism adapted to move said punch laterally thereof to feed said upper and said severed portion of said strip and means operated by said die adapted to impart a step by step feeding movement to said reinforcing strip.

10. A machine for setting a lacing stud in the upper of a boot or shoe and in a reinforcing strip therefor having, in combination, a punch, a die adapted to cooperate with said punch, mechanism adapted to move said punch longitudinally thereof toward said die, mechanism adapted to subsequently move said die out of alignment with said punch while said punch is inserted in said upper and reinforcing strip, a presser foot provided with a guideway for said reinforcing strip, a feed finger embodied in said die operating mechanism and adapted to engage said reinforcing strip to impart a feeding movement thereto and a cutter fastened to said punch and adapted to sever a portion of said strip therefrom.

11. A machine for setting a lacing stud in the upper of a boot or shoe and in a reinforcing strip therefor, having, in combination, a presser foot provided with a guideway for said reinforcing strip, a punch, a primary cutter fast to said punch, a secondary cutter on said presser foot and adapted to cooperate with said primary cutter to sever a section from said reinforcing strip, a die adapted to cooperate with said punch to punch a hole in said upper and reinforcing strip, mechanism adapted to impart a reciprocatory movement to said die to move the same into and out of alignment with said punch and means operated by said die operating mechanism adapted to impart a step by step movement to said reinforcing strip.

12. A machine for setting a lacing stud in the upper of a boot or shoe and in a reinforcing strip therefor having, in combination, a presser foot provided with a guideway for said reinforcing strip, a punch, a primary cutter fast to said punch, a secondary cutter on said presser foot adapted to cooperate with said primary cutter to sever a section from said reinforcing strip, a die adapted to cooperate with said punch to punch a hole in said upper and reinforcing strip, a slide to which said die is fastened, a feed finger pivoted to said slide and adapted to engage said reinforcing strip to move the same toward said punch, and mechanism adapted to impart a reciprocatory movement to said slide to move said die into and out of alignment with said punch, whereby a step by step movement is imparted to said reinforcing strip.

13. A machine for setting a lacing stud in the upper of a boot or shoe and in a reinforcing strip therefor having, in combination, a presser foot provided with a guide-

way for said reinforcing strip, a punch, a primary cutter fast to said punch, a secondary cutter on said presser foot adapted to cooperate with said primary cutter to sever a section from said reinforcing strip, a die adapted to cooperate with said punch to punch a hole in said upper and reinforcing strip, a slide to which said die is fastened, a feed finger pivoted to said slide and adapted to engage said reinforcing strip to move the same toward said punch, mechanism adapted to impart a reciprocatory movement to said slide to move said die into and out of alignment with said punch, whereby a step by step movement is imparted to said reinforcing strip, and means to throw said finger out of engagement with said strip during the movement of said die away from said punch.

14. A machine for setting a lacing stud in the upper of a boot or shoe and in a reinforcing strip therefor having, in combination, a presser foot provided with a guideway for said reinforcing strip, a punch and anvil, a primary cutter movable with said punch, a secondary cutter on said presser foot adapted to cooperate with said primary cutter to sever a section from said reinforcing strip, a die adapted to cooperate with said punch to punch a hole in said upper and reinforcing strip, mechanism adapted to impart a reciprocatory movement to said die to move the same into and out of alignment with said punch, means operated by said die operating mechanism to impart a step by step movement to said reinforcing strip, mechanism adapted to move said punch laterally thereof to feed said upper, a carrier adapted to hold a lacing hook in alignment with said punch and anvil prior to said lateral feeding movement of said punch, mechanism adapted to move said carrier toward said punch and anvil whereby the shank of said lacing hook may be driven through said upper and reinforcing strip and clenched upon said anvil prior to the feeding of said upper, mechanism adapted to raise said presser foot, whereby said section may be severed from said reinforcing strip and mechanism adapted to move said punch laterally thereof to feed said upper and said section of said reinforcing strip.

15. A machine for setting a lacing stud in the upper of a boot or shoe and in a reinforcing strip therefor having, in combination, a presser foot provided with a guideway for said reinforcing strip, a punch and anvil, a primary cutter movable with said punch, a secondary cutter on said presser foot adapted to cooperate with said primary cutter to sever a section from said reinforcing strip, a die adapted to cooperate with said punch to punch a hole in said upper and reinforcing strip, mechanism adapted to impart a reciprocatory movement to said die to move the same into and out of

alinement with said punch, means operated
by said die operating mechanism to impart
a step by step movement to said reinforcing
strip, mechanism adapted to move said
5 punch laterally thereof to feed said upper,
a carrier adapted to hold a lacing hook in
alinement with said punch and anvil prior
to said lateral feeding movement of said
punch, mechanism adapted to move said
10 carrier toward said punch and anvil where-
by the shank of said lacing hook may be
driven through said upper and reinforcing
strip and clenched upon said anvil prior to
the feeding of said upper, mechanism adapt-

ed to raise said presser foot, whereby said 15
section may be severed from said reinforcing
strip, and mechanism adapted to move said
punch laterally thereof at an angle to said
guideway to feed said upper and the sec-
tion of said reinforcing strip attached 20
thereto.

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

ARTHUR R. HAVENER.

Witnesses:

SYDNEY E. TAFT,
CHARLES S. GOODING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."