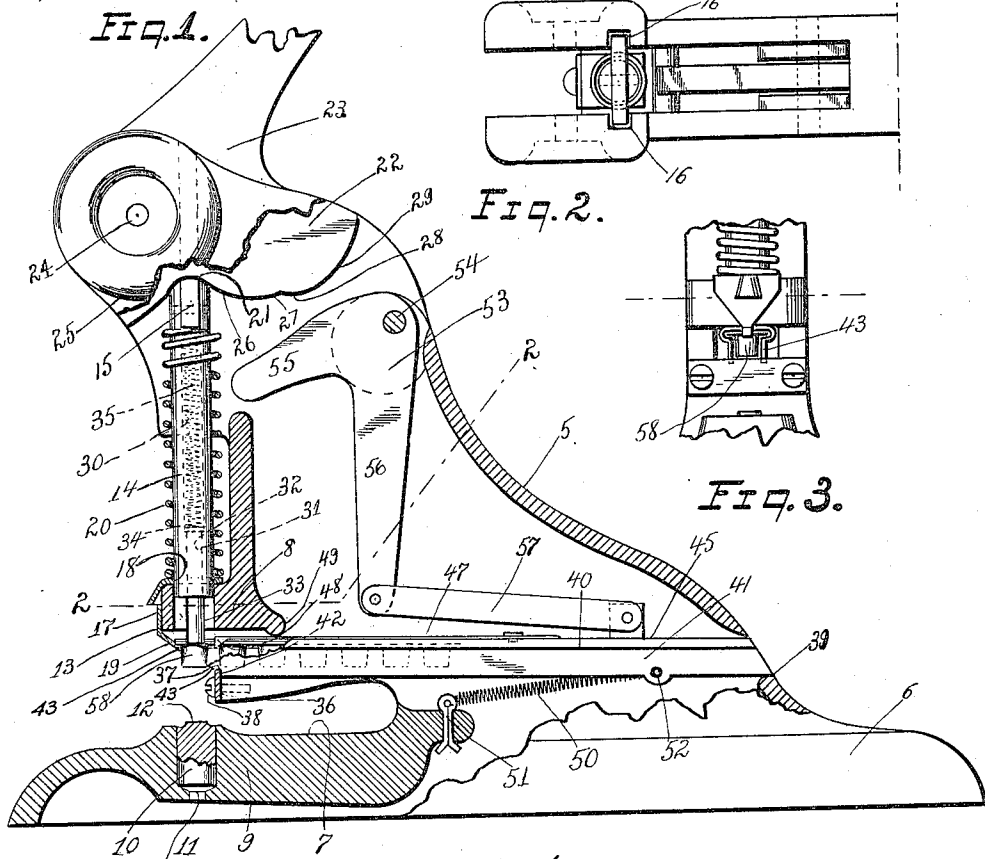


A. F. ENGEL.
EYELETING MACHINE.
APPLICATION FILED JAN. 22, 1915.

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Witnesses:

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UNITED STATES PATENT OFFICE.

ARTHUR FRANCIS ENGEL, OF NEW YORK, N. Y.

EYELETING-MACHINE.

1,169,386.

Specification of Letters Patent.

Patented Jan. 25, 1916.

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To all whom it may concern:

Be it known that I, ARTHUR FRANCIS ENGEL, a citizen of the United States of America, residing at 305-9 Broadway, in the city, county, and State of New York, United States of America, have invented new and useful Improvements in Eyeletting-Machines, of which the following is a specification.

This invention relates to eyeletting machines, and more especially to machines of this type adapted to be used in fastening papers together.

The primary object of the invention is to provide a machine which is adapted to be used in connection with strips of connected eyelets, such as are shown and claimed in my prior Patent No. 1,071,406, dated August 26, 1913, and by means of which the strip will be fed positively and each eyelet will be severed from the strip at the proper time and quickly inserted in position and upset or riveted at one and the same operation.

A further object is to provide a device wherein the functioning parts are constructed to move with the required speed at certain stages in each operation and to receive the necessary application of power at certain other stages as the operating handle is moved steadily and with a uniform application of pressure by the operator.

Another object is the provision of a device which will be positive in action and which will not be likely to get out of order.

Other objects will in part be obvious and in part pointed out hereinafter.

In the accompanying drawing, showing an illustrative embodiment of this invention and in which the same reference characters indicate like parts in the several figures: Figure 1 is a side elevation of the device, part being broken away and shown in vertical section for the sake of clearness; Fig. 2 is a top plan view, the handle of the device being removed and the body of the same being broken away on the section line 2...2 of Fig. 1; Fig. 3 is a front elevation of a portion of the device; and, Fig. 4 is a bottom plan view, a portion of the device being broken away.

In the drawings, the numeral 5 designates the body or frame of the machine which includes a base 6. This body is constructed so as to be hollow in order that it may accommodate and house the operative parts of the machine. The front of the body 5 is indented just above the base as, at 7 to

provide upper and lower jaws 8 and 9 respectively. An anvil 10 is fitted within a socket 11 provided therefor in the lower jaw 9. The anvil is provided upon its upper end with a low projection 12 for a purpose which will be set forth more fully hereinafter.

The upper jaw 8 is provided with a cylindrical vertical opening 13 which is arranged in vertical alinement with the anvil, 10. This opening is intended to serve as a bearing opening for the lower end portion of a plunger 14 which is mounted for vertical reciprocation within the body 5, its upper end being guided by a cross-head 15 whose laterally projecting portions are slidably engaged within the vertical grooves 16 provided in the sides of the body extending through the upper end of the same. A limiting member 17 which is formed preferably from sheet metal is adapted to be mounted upon the upper jaw 8 and is provided in its uppermost supporting portion with an aperture 18 for the reception of the plunger 14, whereby the said member is secured in its applied position. An inbent tongue 19 is provided at the lower edge of the member 17 and underlies the upper jaw for a purpose which will be set forth hereinafter. A helical compression spring 20 is mounted upon the plunger 14 and is interposed between the member 17 and the cross-head 15 in order that the plunger will be supported normally by this spring in its operative position with its lower end projecting into the bearing opening 13 of the upper jaw to a slight extent only. The upper end of the plunger is curved from front to rear so as to present a convex bearing surface 21 for engagement with the actuating surfaces of a cam 22 which is formed integral with an operating handle 23, which latter is pivotally connected with the upper end of the body 5 preferably by means of a transverse pivot pin 24. This cam is provided adjacent to the pivot with a concavity 25 in its lower actuating surface, in which the upper end of the plunger 14 is adapted to engage when in inoperative position to maintain the handle 23 in its upwardly projecting inoperative position also. Directly in rear of the concavity 25 the actuating surface of the cam extends away from the pivot of the handle abruptly in a radial direction as at 26. It is then formed convex so as to provide at a point more distant

from the pivot a less abruptly inclined portion 27. The actuating surface is then extended abruptly away from the pivot as at 28 in the form of a convex curve, but it then becomes less abrupt as at 29 and nearly approaches a regular curve concentric to the handle pivot. The functions of these peculiarly curved portions of the actuating surface of the cam will become apparent as the description progresses.

The plunger 14 is provided with a medial longitudinal bore, 30, whose upper portion is larger than its lower portion 31, whereby a limiting shoulder 32 is provided at the juncture of the two bore portions. An eyelet holding pin 33 is mounted for reciprocation within the reduced portion 31 of the plunger bore, and is provided at its upper end with a limiting flange 34 which is adapted to engage the shoulder 32 normally to support the pin in its depending operative position with its lower end projecting below the lower end of the plunger to a convenient distance, as shown particularly in Fig. 1. A helical compression spring is mounted within the upper, main portion of the plunger bore 30, between the cross-head 15 and the upper end of the holding-pin 33, so as to maintain the latter normally in its operative position. When the plunger 14 is in its elevated, inoperative position, the lower end of the holding pin 33 will be disposed at a point slightly elevated above the engaging end of the retaining tongue 19 of the member 17.

A transversely extending cutting blade 36 is mounted upon the body 5 beneath the upper jaw 8 and extends through the indentation 7. This blade is arranged substantially at a tangent to the opening 13 in the upper jaw, and consequently to the imaginary cylinder which constitutes the path of the plunger 14, inwardly of the frame, with its active edge 37 disposed uppermost. The blade is secured to the frame preferably in a removable manner by means of the attaching screws 38 in order that it may be replaced readily by a new blade when it becomes worn excessively. A bearing opening 39 is provided in the rear wall of the body 5, substantially on a level with the cutting blade 36. An eyelet guide member 40 is mounted within the body for horizontal reciprocation from front to rear and for slight vertical oscillatory movement, in which latter movement it is fulcrumed by the edges of the body opening 39 through which the rear end of the guide member is adapted to project.

The guide member 40 is constructed preferably of sheet-metal which is bent into such a form that it will fit the eyelet strip and thus will support as well as guide the same longitudinally therein. The guide member is open all along its bottom and its

depending side portions 41 are arranged substantially parallel to each other, both longitudinally and vertically. The side walls 41 of the guide member are cut away adjacent to the forward end of the latter to provide limiting shoulders 42, which are adapted to engage the cutting blade 36 when the guide member is in its forwardly disposed operative position to secure the same against undue movement in this direction. The lower edges of the side walls 41 are beveled from a point adjacent to the said shoulders 42 upwardly to the forward end of the guide member as at 43. The portions of the said edges which intervene between the said beveled or inclined portions and the shoulders 42 and which are indicated by the numeral 44, are adapted to bear against the active edge 37 of the cutting blade 36 when the guide member is in its operative position to support the forward end of the same rigidly therein. The forward end of the guide member 40 will project through the path of movement of the plunger 14 when in its operative position, but its top wall 45, is provided with a longitudinal slot opening through the front edge of the said wall through which the holding pin 33 may project. A longitudinally extending spring tongue 47 is secured at its rear end medially to the upper wall 45 of the guide member and is arranged with its forward end overlying the slot 46 and projecting forwardly to a point where it is spaced from the forward end of the guide member at such a distance that it will be disposed immediately above the cutting blade 36 when the guide member is in its operative position. This spring tongue constitutes a locking member and is provided at its forward, free end with eyelet engaging teeth 48 which project downwardly from the sides of the said locking member. The front edges of the teeth 48 are arranged at right angles to the plane of the upper surface of the locking member, whereas the rear edges of the said teeth are inclined. A limiting surface 49 is provided at a short distance below the upper jaw 8 and in rear of the bearing opening 13 in spaced relation thereto for engagement with the locking member 47 in spaced relation to its free end to limit the upward movement of the guide member when moving into its operative position.

A helical retracting spring 50 has one end thereof connected with the base 6 of the machine directly in rear of the indentation 7 as at 51. This spring projects upwardly and rearwardly from its point of connection 51 with the base and has its opposite end connected with the guide member 40 adjacent to the rear end of the same as at 52. This spring is adapted normally to maintain the guide member in its forwardly disposed operative position. A bell crank lever

53 is pivotally mounted within the upper portion of the body 5 upon a transverse pivot pin 54. This lever includes a forwardly projecting arm 55, which is arranged within the path of the cam 22, and a depending arm 56. The lower end of the arm 56 is connected with the guide member 40 at a point adjacent to the point of connection 52 of the retracting spring therewith, by means of links 57, whereby the guide member will be thrust rearwardly upon depression of the handle 23 to bring the actuating surface of the cam 22 into engagement with the arm 55 of the bell crank lever.

The operation of the device will now be described.

Assuming that a strip of connected eyelets 58 is inserted into the guide member 40 through the open rear end of the same, and is thrust forwardly until the foremost eyelet is in the path of movement of the plunger 14 and is engaged between the engaging end of the stationary tongue 19 and the securing teeth 48 of the locking member 47, the handle 23 is depressed gradually. During this movement of the operating handle, the abruptly inclined portion 26 of the actuating surface of the cam 22 will move into sliding engagement with the convex upper end of the plunger 14 so as to thrust the said plunger downwardly at great speed until the holding pin 33 carried by the plunger has penetrated the foremost eyelet and the lower end of the plunger itself has engaged the said eyelet to force the same downwardly to bring the tie-piece connecting this eyelet with the next succeeding eyelet into operative engagement with the cutting edge 37 of the blade 36. At the same time, the portion 29 of the actuating surface of the cam will have engaged the arm 55 of the bell crank lever so as to force the same downwardly and thus rock the lever to move the guide member 40 rearwardly through the medium of the rigid links 57. The guide member will be moved longitudinally to the rear against the action of the retracting spring 50 and also will be oscillated to a slight extent upon the edges of the bearing opening 39 in the body 5 as a fulcrum whereby the forward end of the said guide member will move downwardly and to the rear, the inclined edges 43 of the side walls of the said member just clearing the cutting edge of the blade. During this movement of the guide member, the foremost eyelet and the entire strip consequently will be retained in forwardly disposed position owing to the engagement of the holding pin 33 with the said eyelet. At the instant the said tie-piece of the eyelet strip comes into engagement with the cutting edge of the blade, the less abruptly inclined portion 27 of the actuating surface of the cam will engage the upper end of the plunger so as to retard the

speed of the plunger but at the same time increase the power which is applied to the eyelet to force the tie-piece of the strip against the cutting edge of the blade 36 during the operation of severing the said tie-piece. When the eyelet is completely severed from the strip, the lower end of the holding pin 33 approaches the projection 12 of the anvil, with which it matriculates, so closely that the said eyelet cannot escape from its engagement with the said pin but will fall, guided by the pin, onto the upper surface of the paper or the like (not shown) which may be mounted between the jaws of the machine overlying the anvil. Just as the cutting operation terminates, the abruptly inclined portion 28 of the actuating surface of the cam engages the upper end of the plunger so as to again accelerate the speed of the downward movement of the same until the upper end of the plunger has become engaged by the less abruptly inclined portion 29 of the said actuating surface, at which stage in the operation the lower end of the holding pin 33 will have become engaged with the surface of the paper interposed between the same and the projection 12 of the anvil, and the plunger will have moved downwardly over the checked holding pin until the lower end of the plunger has become engaged with the eyelet to force the lower edge of the latter through the paper, whereupon it will be tripped or upset by its engagement with the anvil in the manner desired to be attained. The eyelet itself thus serves as the punch of the device. Owing to the peculiar formation of the actuating surface of the cam, the plunger will be moved slowly and with the exertion of considerable power at the stages in the operation where such power is most needed. During the other stages of the operation, however, the plunger will move rapidly and thus without loss of time. At the end of the stroke of the piston, the handle 23 is released, and the spring 20 will serve to retract the plunger and the operating handle. The spring 35 will at the same time retract the holding pin 33 and the spring 50 will retract the guide member 40, thereby moving the latter into its forwardly disposed operative position. During the preceding, rearward movement of the guide member 40, another eyelet was brought into operative position in advance of the teeth 48 of the locking member 47, owing to the fact that the end of the locking member bearing the teeth was deflected upwardly by engagement of the said eyelet with the inclined rear edges of the said teeth. This new eyelet therefore has been moved into operative relation to the plunger and into a position wherein it is retained effectively between the said teeth of the locking member and the engaging end of the retaining

tongue 19 fixedly disposed upon the jaw 8. As the operating handle is manipulated in the manner set forth repeatedly, the eyelets will be fed, severed and fastened in the paper successively. The last eyelet will be operated upon just as effectively as any of the others, owing to the construction of the functioning parts of the machine.

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

1. An eyeleting machine comprising a body, eyelet fastening means provided upon the body, actuating means therefor, eyelet feeding means including a movable guide member adapted to contain a strip of eyelets for sliding movement therethrough, one end of the said guide member being adapted to be positioned normally in operative relation to the fastening means, means adapted to engage each foremost eyelet as it reaches its operative position automatically to secure the same against retrograde movement, and means operatively connected with the said actuating means for moving the said guide member into and out of operative position.

2. An eyeleting machine comprising a body, eyelet fastening means provided upon the body, actuating means therefor, eyelet feeding means including a movable guide member adapted to contain a strip of eyelets for sliding movement therethrough, one end of the said guide member being adapted to be positioned normally in operative relation to the fastening means, means adapted to engage each foremost eyelet as it reaches its operative position automatically to secure the same against retrograde movement, means operatively connected with the said actuating means for moving the said guide member into and out of operative position, and means for severing each foremost eyelet from the strip at the completion of each movement of the guide member into inoperative position.

3. An eyeleting machine comprising a body, eyelet fastening means provided upon the body, actuating means therefor, eyelet feeding means including a movable guide member adapted to contain a strip of eyelets for sliding movement therethrough, one end of the said guide member being adapted to be positioned normally in operative relation to the fastening means, means adapted to engage each foremost eyelet as it reaches its operative position automatically to secure the same against retrograde movement, means operatively connected with the said actuating means for moving the guide member into inoperative position at each operation of the fastening means, and yieldable means for retracting the guide member.

4. An eyeleting machine comprising a body including upper and lower jaws, an anvil carried by the lower jaw, a plunger

mounted for reciprocation within the upper jaw and being adapted to engage the anvil, means for feeding the eyelets of a connected strip successively into operative position in the path of the plunger, a stationary cutting blade for severing the eyelets arranged adjacent to the path of the plunger, the said plunger having relatively separated power stages of movement when it is operating forcibly upon an eyelet and speed stages preceding the respective power stages, and an operating handle pivotally mounted upon the body and having an actuating cam surface adapted for operative engagement with the upper end of the plunger, the said cam surface including portions arranged substantially radially extending with respect to the handle pivot and other portions which are arranged more nearly concentric to the pivot, the latter surfaces being adapted for successive engagement with the plunger during the depression of the same by the cam surface at the stages when the eyelet is brought into operative relation with the cutting blade and then with the anvil, the former surfaces being adapted for engagement with the plunger during the other stages of its movement.

5. An eyeleting machine comprising a body including upper and lower jaws, an anvil carried by the lower jaw, a plunger mounted for reciprocation within the upper jaw and being adapted to engage the anvil, means for feeding the eyelets of a connected strip successively into operative position in the path of the plunger, a stationary cutting blade for severing the eyelets arranged adjacent to the path of the plunger, the said plunger having relatively separated power stages of movement when it is operating forcibly upon an eyelet and speed stages preceding the respective power stages, an operating handle pivotally mounted upon the body and having an actuating cam surface adapted for operative engagement with the upper end of the plunger, the said cam surface including portions arranged substantially radially extending with respect to the handle pivot and other portions which are arranged more nearly concentric to the pivot, the latter surfaces being adapted for successive engagement with the plunger during the depression of the same by the cam surface at the stages when the eyelet is brought into operative relation with the cutting blade and then with the anvil, the former surfaces being adapted for engagement with the plunger during the other stages of its movement, and resilient retracting means for the plunger adapted to maintain the upper end of the same in engagement with the said cam surface.

6. An eyeleting machine comprising a body, fastening means mounted upon the body, an operating handle pivotally mount-

ed upon the body and connected operatively with the fastening means, feeding mechanism comprising a guide member movably mounted within the body, yieldable means
 5 for normally maintaining the said guide member in its operative position with respect to the fastening means, a lever pivotally mounted within the body and having one arm connected operatively with the
 10 guide member, said operating handle having a cam surface adapted to engage the other arm of the said lever and trip the same during each actuation of the fastening means for moving the guide member into inoperative position, the guide member being adapted
 15 to have a strip of eyelets mounted therein for movement therethrough, and means for securing each eyelet in operative position with respect to the fastening means as it
 20 arrives in this position upon movement of the guide member.

7. An eyeleting machine comprising a body, fastening means mounted upon the body, an operating handle pivotally mounted
 25 upon the body and connected operatively with the fastening means, feeding mechanism comprising a guide member movably mounted within the body, yieldable means for normally maintaining the said guide
 30 member in its operative position with respect to the fastening means, a lever pivotally mounted within the body and having one arm connected operatively with the guide member, said operating handle having
 35 a cam surface adapted to engage the other arm of the said lever and trip the same during each actuation of the fastening means for moving the guide member into inoperative position, the guide member being adapted
 40 to have a strip of eyelets mounted therein for movement therethrough, means for securing each eyelet in operative position with respect to the fastening means as it arrives in this position upon movement of the guide
 45 member, and means for severing the eyelet from the strip during the actuation of the fastening means.

8. An eyeleting machine comprising a body including upper and lower jaws, an
 50 anvil carried by the lower jaw and having a projection upon its upper surface, a plunger mounted for reciprocation within the upper jaw and having its lower end adapted for engagement with the anvil, means by which the
 55 plunger may be operated, a holding pin mounted for longitudinal sliding movement in the lower end of the plunger and being adapted to project therefrom, means for limiting the downward movement of the
 60 said pin within the plunger, a guide member mounted movably within the body and adapted for the reception of a strip of connected eyelets for sliding movement through the same, the said member being adapted
 65 when in operative position to be arranged

with one of its ends projecting into the path of the plunger beneath the upper jaw, and means for operating the guide member to withdraw the same from operative position after the plunger is depressed sufficiently to
 70 bring the holding pin into engagement within the foremost eyelet of the strip.

9. An eyeleting machine comprising a body including upper and lower jaws, an anvil carried by the lower jaw and having a
 75 projection upon its upper surface, a plunger mounted for reciprocation within the upper jaw and having its lower end adapted for engagement with the anvil, means by which the plunger may be operated, a holding pin
 80 mounted for longitudinal sliding movement in the lower end of the plunger and being adapted to project therefrom, means for limiting the downward movement of the said pin within the plunger, a guide member
 85 mounted movably within the body and adapted for the reception of a strip of connected eyelets for sliding movement through the same, the said member being adapted when in operative position to be arranged
 90 with one of its ends projecting into the path of the plunger beneath the upper jaw, means for operating the guide member to withdraw the same from operative position after the plunger is depressed sufficiently to bring the
 95 holding pin into engagement within the foremost eyelet of the strip, and yieldable means for retracting the guide member when the plunger has reached the end of its downward stroke.

10. An eyeleting machine comprising a body including upper and lower jaws, an anvil carried by the lower jaw and having a
 105 projection upon its upper surface, a plunger mounted for reciprocation within the upper jaw and having its lower end adapted for engagement with the anvil, means by which the plunger may be operated, a holding pin mounted for longitudinal sliding movement in the lower end of the plunger and being
 110 adapted to project therefrom, means for limiting the downward movement of the said pin within the plunger, a guide member mounted movably within the body and adapted for the reception of a strip of connected eyelets for sliding movement through the same, the said member being adapted
 115 when in operative position to be arranged with one of its ends projecting into the path of the plunger beneath the upper jaw, means for operating the guide member to withdraw the same from operative position after the plunger is depressed sufficiently to bring the holding pin into engagement with the fore-
 120 most eyelet of the strip, yieldable means for retracting the guide member when the plunger has reached the end of its downward stroke, and a limiting member carried by the upper jaw and adapted to engage the fore-
 125 most eyelet of the strip upon the return of

the guide member into operative position to limit the movement of the same.

11. An eyeleting machine comprising a body including upper and lower jaws, an anvil carried by the lower jaw and having a projection upon its upper surface, a plunger mounted for reciprocation within the upper jaw and having its lower end adapted for engagement with the anvil, means by which the plunger may be operated, a holding pin mounted for longitudinal sliding movement in the lower end of the plunger and being adapted to project therefrom, means for limiting the downward movement of the said pin within the plunger, a guide member mounted movably within the body and adapted for the reception of a strip of connected eyelets for sliding movement through the same, the said member being adapted when in operative position to be arranged with one of its ends projecting into the path of the plunger beneath the upper jaw, means for operating the guide member to withdraw the same from operative position after the plunger is depressed sufficiently to bring the holding pin into engagement within the foremost eyelet of the strip, yieldable means for retracting the guide member when the plunger has reached the end of its downward stroke, a limiting member carried by the upper jaw and adapted to engage the foremost eyelet of the strip upon the return of the guide member into operative position to limit the movement of the same, and a yieldable locking member carried by the guide member and including securing teeth adapted to project between the foremost eyelet when in operative position within the guide member and the next succeeding eyelet.

12. An eyeleting machine comprising a body including upper and lower jaws, an anvil carried by the lower jaw and having a projection upon its upper surface, a plunger mounted for reciprocation within the upper jaw and having its lower end adapted for engagement with the anvil, means by which the plunger may be operated, a holding pin mounted for longitudinal sliding movement in the lower end of the plunger and being adapted to project therefrom, means for limiting the downward movement of the said pin within the plunger, a guide member mounted movably within the body and adapted for the reception of a strip of connected eyelets for sliding movement through the same, the said member being adapted when in operative position to be arranged with one of its ends projecting into the path of the plunger beneath the upper jaw, means for operating the guide member to withdraw the same from operative position after the plunger is depressed sufficiently to bring the holding pin into engagement within the foremost eyelet of the strip,

yieldable means for retracting the guide member when the plunger has reached the end of its downward stroke, a limiting member carried by the upper jaw and adapted to engage the foremost eyelet of the strip upon the return of the guide member into operative position to limit the movement of the same, and a yieldable locking member carried by the guide member and including securing teeth adapted to project between the foremost eyelet when in operative position within the guide member and the next succeeding eyelet, the said teeth having beveled rear edges and having its front edges arranged substantially at right angles to the body of the locking member.

13. An eyeleting machine comprising a body including upper and lower jaws, an anvil carried by the lower jaw and having a projection upon its upper surface, a plunger mounted for reciprocation within the upper jaw and having its lower end adapted for engagement with the anvil, means by which the plunger may be operated, a holding pin mounted for longitudinal sliding movement in the lower end of the plunger and being adapted to project therefrom, means for limiting the downward movement of the said pin within the plunger, a guide member mounted movably within the body and adapted for the reception of a strip of connected eyelets for sliding movement through the same, the said member being adapted when in operative position to be arranged with one of its ends projecting into the path of the plunger beneath the upper jaw, means for operating the guide member to withdraw the same from operative position after the plunger is depressed sufficiently to bring the holding pin into engagement within the foremost eyelet of the strip; and eyelet severing means provided upon the body.

14. An eyeleting machine comprising a body including upper and lower jaws, an anvil carried by the lower jaw and having a projection upon its upper surface, a plunger mounted for reciprocation within the upper jaw and having its lower end adapted for engagement with the anvil, means by which the plunger may be operated, a holding pin mounted for longitudinal sliding movement in the lower end of the plunger and being adapted to project therefrom, means for limiting the downward movement of the said pin within the plunger, a guide member mounted movably within the body and adapted for the reception of a strip of connected eyelets for sliding movement through the same, the said member being adapted when in operative position to be arranged with one of its ends projecting into the path of the plunger beneath the upper jaw, means for operating the guide member to withdraw the same from opera-

tive position after the plunger is depressed sufficiently to bring the holding pin into engagement within the foremost eyelet of the strip, and a stationary cutting blade
5 mounted upon the body between the jaws of the same and beneath the operative position of the forward end of the cutting blade contiguous to the path of the plunger.

In testimony whereof I have signed my name to this specification in the presence of 10 two subscribing witnesses.

ARTHUR FRANCIS ENGEL.

Witnesses:

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