

(No Model.)

3 Sheets—Sheet 1.

L. D. HAWKINS & J. C. PAIGE.

EYELETING MACHINE.

No. 384,157.

Patented June 5, 1888.

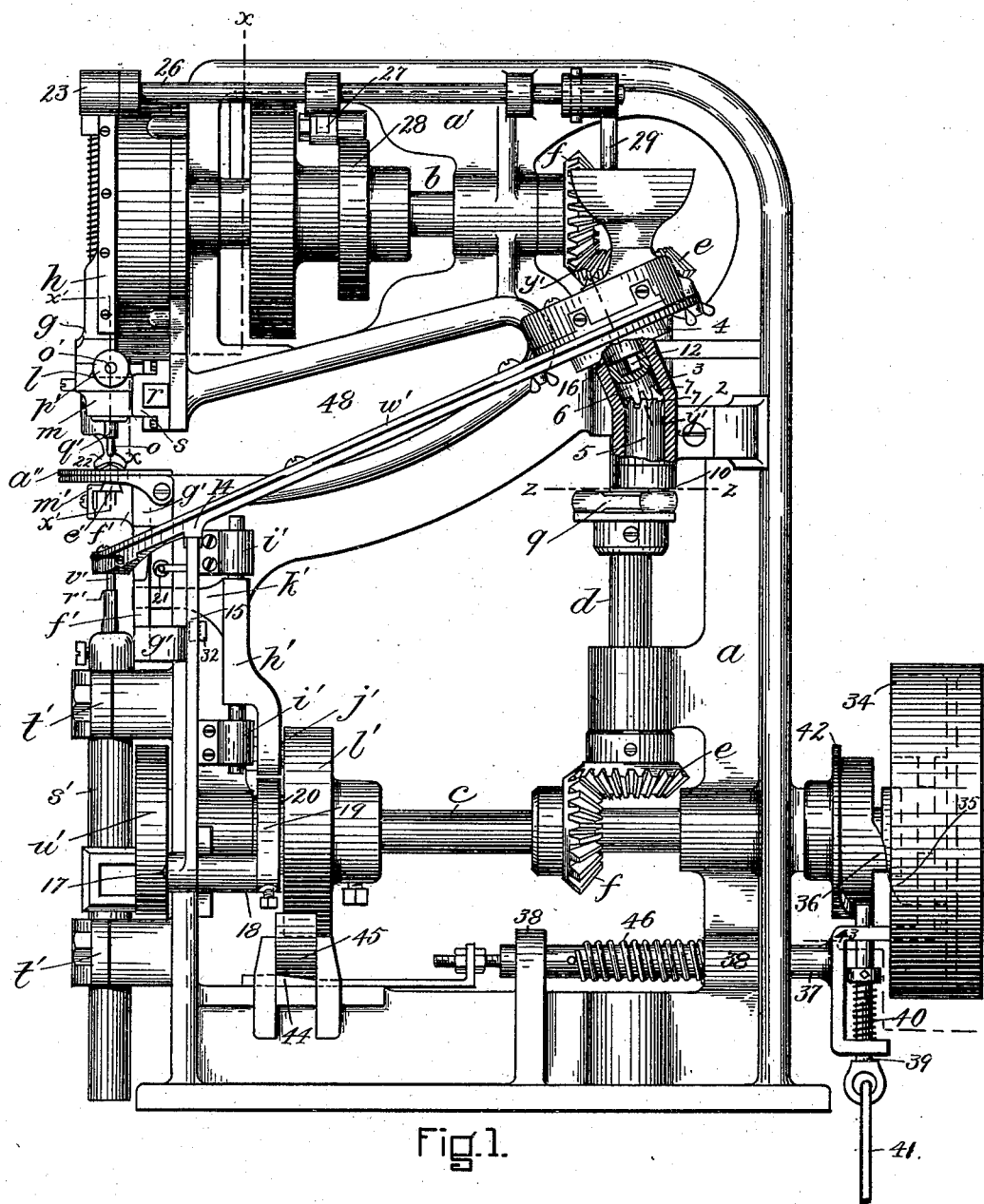


Fig. 1.

WITNESSES.

Chas. Spaulding.
Charles E. Moss.

INVENTORS.

L. D. Hawkins.
J. C. Paige.
by night Brown & Conley.
Atty.

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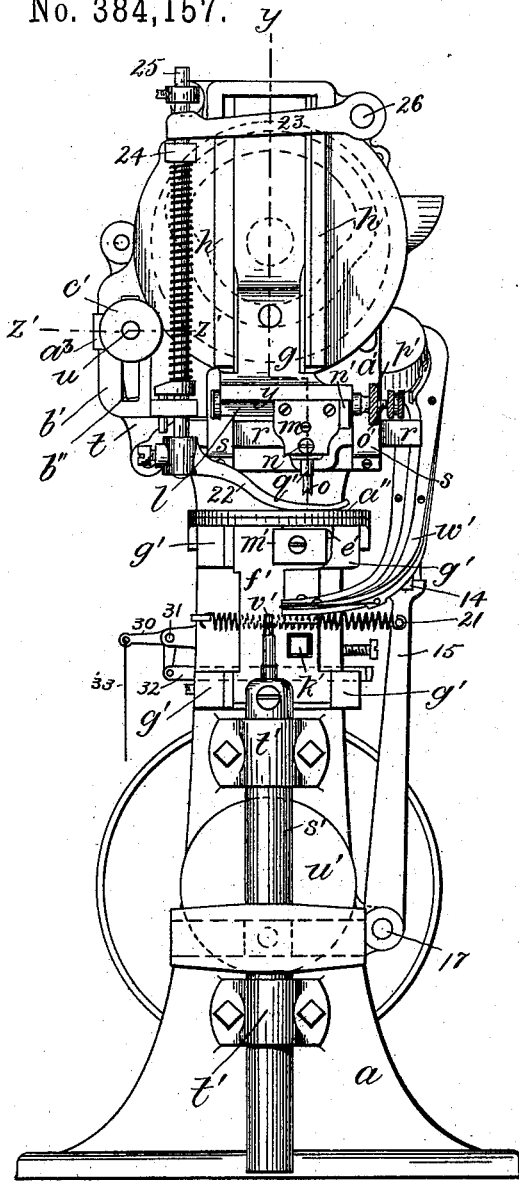


Fig. 2.

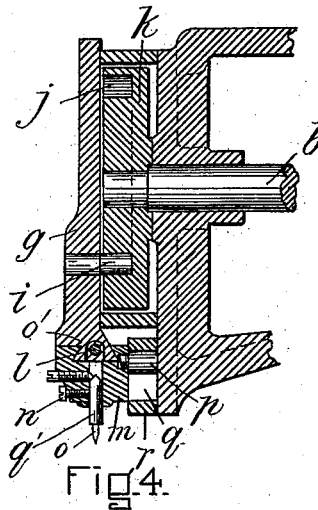
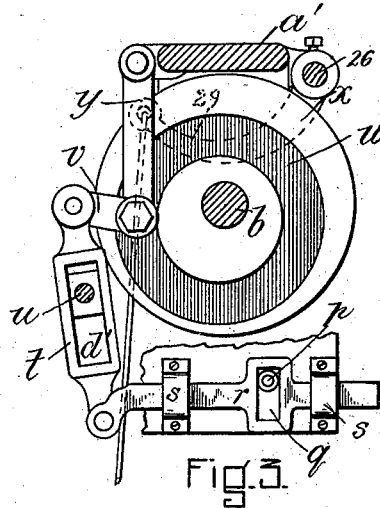


Fig. 4.

WITNESSES.

Chas. Spaulding
Charles E. Moss.

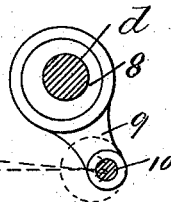


Fig. 5.

INVENTORS.

L. D. Hawkins.
J. C. Paige.
by Wright, Brown & Conley.
Atty.

(No Model.)

3 Sheets—Sheet 3.

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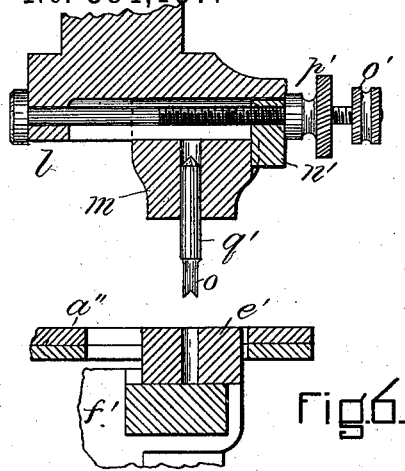


Fig. 6.

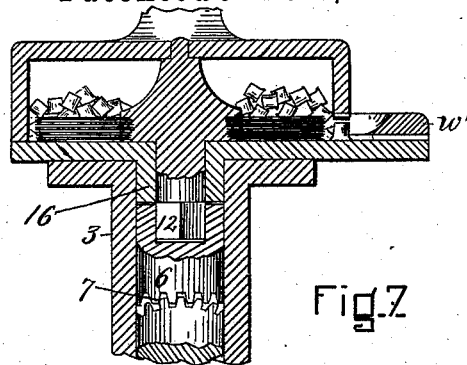


Fig. 7.

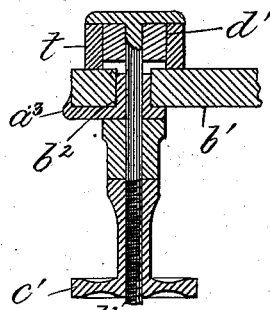


Fig. 8.

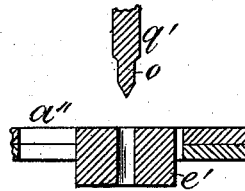


Fig. 10.

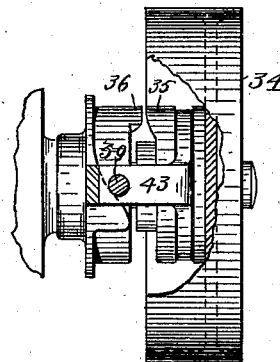


Fig. 9.

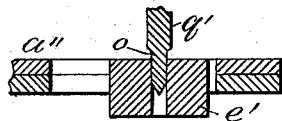


Fig. 11.



Fig. 12.

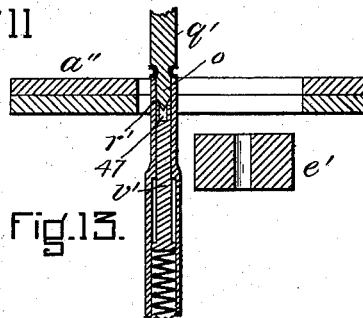


Fig. 13.



Fig. 14.

WITNESSES.

Chas. Spaulding.
Charles E. Moss.

INVENTORS.

L. D. Hawkins.
J. C. Paige.
By Wright, Brown & Cooley.
Attys.

UNITED STATES PATENT OFFICE.

LORENZO D. HAWKINS, OF STONEHAM, AND JOHN C. PAIGE, OF BOSTON,
MASSACHUSETTS, ASSIGNORS TO THE COMBINATION POWER PUNCH
AND EYELETING MACHINE COMPANY, OF PORTLAND, MAINE.

EYELETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 384,157, dated June 5, 1888.

Application filed October 17, 1887. Serial No. 252,577. (No model.)

To all whom it may concern:

Be it known that we, LORENZO D. HAWKINS, of Stoneham, in the county of Middlesex, and JOHN C. PAIGE, of Boston, in the
5 county of Suffolk, both in the State of Massachusetts, have invented certain new and useful Improvements in Eyeletting-Machines, of which the following is a specification.

This invention has for its object to simplify
10 the construction of eyeletting-machines which punch and feed the work, and to generally improve the construction of such machines with respect to convenience and efficiency of operation and capability of change from one size or
15 shape of eyelets to another.

To these ends our invention consists in the improvements which we will now proceed to describe and claim.

Of the accompanying drawings, forming a
20 part of this specification, Figure 1 represents a side elevation of our improved machine. Fig. 2 represents an end view of the same. Fig. 3 represents a section on line *x x*, Fig. 1. Fig. 4 represents a section on line *y y*, Fig. 2. Fig.
25 5 represents a section on line *z z*, Fig. 1. Figs. 6 and 7 represent, respectively, sections on lines *x' x'* and *y' y'*, Fig. 1. Fig. 8 represents a section on line *z' z'*, Fig. 2. Fig. 9 represents a view of the opposite side of the driving pulley and clutch from that shown in Fig.
30 1. Figs. 10, 11, 12, 13, and 14 represent sectional views showing the punching and setting devices at different stages of the operation.

The same letters of reference indicate the
35 same parts in all the figures.

In the drawings, *a* represents the frame of the machine, having the work-supporting table
40 *a''* and the arm or goose-neck *a'* overhanging the table and separated therefrom by a work-receiving recess, 48, which extends into the frame from the work-table and is adapted to receive the article to be eyeleted and permit
45 said article to project a considerable distance inwardly from the point where the eyelet-inserting devices act.

In the arm *a'* is journaled a shaft, *b*, having
cams, the purposes of which will be presently explained. Said shaft is connected with the
main driving-shaft *c*, which is journaled in

bearings in the lower part of the frame *a* by a
vertical shaft, *d*, having bevel-gears *e e*, mesh-
ing with like gears, *f f*, on the shafts *b c*.

g represents a slide adapted to move between
vertical guides *h h* on the outer end of the arm
a', and having a stud, *i*, entering a cam-groove, 55
j, in a disk, *k*, affixed to the shaft *b*, said cam-groove and stud reciprocating the slide *g* vertically when the shaft *b* is rotated. The lower
end of the slide *g* has a horizontal dovetail
guide, *l*, on which is fitted to slide horizontally 50
a carrier, *m*. To said carrier is affixed by a
set-screw, *n*, a punch, *o*, which projects downwardly from the carrier and is formed at its
lower end to punch a hole in the material to
be eyeleted. The carrier and punch are re- 65
ciprocated vertically by the slide *g*, and the
carrier is moved horizontally while the punch
is depressed, so as to cause the punch to feed
the material, and is moved horizontally in the
opposite direction while the punch is raised 70
to bring the punch back into position to again
descend and punch and feed the material. The
carrier is reciprocated horizontally on the guide
l by the devices next described.

To the back of the carrier is affixed a stud, 75
p, which projects into a vertical slot, *q*, in a
bar, *r*, adapted to slide horizontally in guides
s s, affixed to the arm *a'*, said slot being vertically elongated, so that the stud can move vertically with the slide *g*. To one end of the bar 80
r is pivoted the lower end of a lever, *t*, which
is adapted to oscillate on a vertically-adjustable fulcrum-pin, *u*. The upper end of the rocking lever *t* is pivoted to a link or arm, *v*, which
has a stud entering a cam-groove, *w*, in a disk, 85
x, on the shaft *b*. Said stud and arm are supported by a link, *y*, pivoted at its lower end to the link *v* and at its upper end to the arm
a'. The rotation of the disk *x* causes the cam-groove *w* to oscillate the rocking lever *t*, and 90
the latter, by its connection with the bar *r*, reciprocates the latter, and with it the punch-carrier *m*. The fulcrum-pin *u* is mounted in
a slide, *a''*, which is vertically adjustable on a
slotted ear, *b'*, affixed to the arm *a'*. The ful- 95
crum-pin has a shoulder bearing against one
side of the slotted ear *b'* and a reduced threaded
end which passes through the vertical slot *b''*

in said ear, and has a clamping-nut, *c'*, which secures the fulcrum-pin to the ear *b'* at any height within the range of its adjustment in the slot *b''*. The lever *t* has a longitudinal slot, *d'*, which permits the described adjustment of the fulcrum-pin. The vertical adjustability of the fulcrum-pin enables the throw or horizontal movement of the punch to be varied, so as to make the distance between the eyelets greater or less. By raising the fulcrum-pin the throw or feed movement of the punch is increased, while by lowering said pin the throw of the punch is decreased. *e'* represents a block containing a female die, which co-operates with the punch in making the holes. Said die-block is attached to a slide or carrier, *f'*, adapted to move vertically in fixed guides *g' g'* on the frame *a*, so that the die-block can be raised to co-operate with the punch and then descend to clear the punch and permit the latter to feed the work while inserted therein.

The die-carrier is reciprocated vertically by means of a bar, *h'*, adapted to move vertically in guides *i' i'* on the frame *a*, and provided with an arm, *j'*, which has a stud entering a cam-groove in a disk, *l'*, on the shaft *c*, and another arm, *k'*, which enters an orifice formed for it in the die-carrier *f'*. The rotation of the disk *l'* causes the cam-groove therein to reciprocate the bar *h'* vertically, and said bar by the arm *k'* reciprocates the die-carrier, the parts being so timed that the die is raised just before the punch descends and lowered just after the hole is formed in the material.

The die-block is detachably secured to the carrier *f'* by a clamping-plate, *m'*, secured by a screw to the carrier and bearing against one edge of the die-block. By loosening said plate the die-block can be removed to be replaced by another of different form or size in case a like change is made in the punch; or the die-block may have a series of dies, either of which may be brought into operative position by an adjustment of the die-block, which is permitted by the clamping-plate. The punch on its return movement must of course be brought into exact alignment with the female die, a stop, *n'*, being employed to secure this result. We make this stop adjustable, so that wear of the stop or of the end of the carrier, which abuts against it, as well as lost motion of the devices which move the punch-carrier horizontally, may be compensated for. To this end the stop *n'* is engaged with a screw-threaded rod, *o'*, which is journaled in the lower end of the slide *g*, so that when rotated it will not move endwise, the stop *n'* having a tapped orifice, through which said screw passes, so that when the screw is rotated it will feed the stop along it, as will be readily understood. A jam-nut, *p'*, on said rod, when turned to bear on the edge of the slide *g*, prevents the rod from being rotated, so that when the stop is adjusted it may be locked in the position to which it is adjusted.

Upon the shank of the punch *o* is formed

an enlargement or shoulder, *q'*, constituting the top set, against which the end of the tube of the eyelet is upset, as hereinafter explained. 70

r' represents the bottom set, which is attached to a vertically-reciprocating bar or carrier, *s'*, adapted to move in guides *t' t'* on the frame *a*, and provided with a horizontal grooved cross-head, which receives an eccentric stud or pin on a disk, *u'*, on the driving-shaft, these devices reciprocating the bottom set vertically, as in other well-known eyeletting-machines. The bottom set is formed to support the flange of an eyelet and is provided with the usual spring-supported spindle, *v'*, which, when the bottom set is raised, enters the lowermost eyelet in the chute or roadway *w'* and holds said eyelet on the bottom set until it is engaged with the material. *w'* represents the chute or roadway which conducts the eyelets from the reservoir *w''*. 85

The roadway and reservoir are rigidly connected and the roadway is formed, as usual in machines of this class, to guide the eyelets with their flanged ends downward to a point over the spindle *v'*, so that when the latter rises with the bottom set it will enter the lower eyelet, the reservoir being provided with an oscillating brush or agitator, which forces the eyelets out through ports in the side of the reservoir into the raceway. 95

The form of the raceway and reservoir and the brush or agitator are not parts of the present invention, and are not therefore particularly described. 100

We have improved the means for connecting the reservoir and roadway to the machine, so that said parts can be easily and quickly detached from the machine and another reservoir and roadway formed to guide differently shaped or sized eyelets can be applied. To this end we secure to the frame *a* a bracket, 2, having an obtuse-angled sleeve, 3, at the upper end of which is an inclined seat or flange, 4, on which the reservoir rests. In said sleeve are journaled two short shafts, 5 6, which are provided with intermeshing teeth 7 7 on their adjacent ends, said teeth being so formed that the upper shaft, 6, which is oblique to the lower shaft, 5, is oscillated by the latter, which in turn is oscillated by an eccentric, 8, on the vertical shaft *d*, and a rod, 9, connecting said eccentric to an eccentric wrist-pin, 10, on the lower end of the shaft 5. 110 115 120

The oblique shaft 6 has a square socket in its upper end, which receives the squared end of the shank or arbor 12, to which the brush or agitator within the reservoir is affixed. The oscillating motion imparted to the shaft 5 by the rotation of the eccentric therefore is communicated through the socketed shaft 6 to the brush or agitator. The lower portion of the roadway has a downwardly-projecting ear, 14, which enters a notch formed for it in the upper end of an oscillating lever, 15, whereby the roadway is oscillated to alternately present its lower end to and remove it from the spindle *v'*. The bottom of the reservoir has a 125 130

circular tubular stud, 16, which projects into the upper end of the fixed sleeve 3 and serves as the center on which the reservoir and roadway oscillate. The shank 12 of the brush or agitator passes through said tubular stud.

The lever 15 is attached to or formed on a rock-shaft, 17, which is journaled in a fixed bearing, 18, and has an arm, 19, which bears on a cam, 20, on the driving-shaft *c*. A spring, 21, secured at one end to the frame *a* and at the other end to the lever 15, keeps the arm 19 in contact with the cam 20, and the said spring and cam conjointly give the roadway its oscillating movements.

The reservoir and roadway are not positively secured to the parts that support them, but may, without any unfastening, be lifted from the sockets in the fixed sleeve 3 and in the lever 15, they being held in said sockets by gravitation only. It will be seen, therefore, that the reservoir and roadway may be very easily separated from the machine and replaced by another reservoir and roadway fitted to hold differently formed or sized eyelets. It will also be remembered that the punch *o* and die-block *e'* are readily detachable, so that the machine can very quickly be altered, so that it will set eyelets of a different size or shape.

The time of the movements of the punching and setting devices is as follows: The punch being raised and in position over the female die, as shown in Fig. 10, is depressed and co-operates with the female die in cutting a hole in the material, as shown in Fig. 11. The die-block then descends from the punch, as shown in Fig. 12, and the latter moves laterally, feeding the material until the punch is in line with the bottom set, as shown in Fig. 13. The bottom set then rises. At this time the lower end of the roadway is over the bottom set, so that the spindle *v'* in rising enters the lower eyelet. As soon as the spindle has entered the eyelet the roadway is moved back, leaving the eyelet on the spindle, its flange resting on the bottom set. The bottom set continues its upward motion, the finger striking the lower end of the punch and being arrested by it, while the bottom set continues its upward motion, inclosing the punch and inserting the tube of the eyelet through the material around the punch, and finally upsetting the upper end of the tube of the eyelet against the top set. It will be seen that the top set and punch are formed and operated together, the top set being a shoulder on the shank of the punch. We thus materially simplify the construction of the machine by dispensing with an independent top set and operating devices therefor. The presser-foot 22 is raised before the feeding of the work by an arm, 23, bearing against a collar, 24, on the presser-bar 25, a rock-shaft, 26, journaled in bearings on the arm *a'* and having an arm, 27, and a cam, 28, on the shaft *b*, the arm 27 having a roll which bears on said cam. The rock-shaft is also provided with an arm, 29, which may be connected by a rod with a suit-

able foot-lever, whereby the operator may raise the presser-foot when he desires to insert or remove the work.

The spring 21 enables the roadway to be pushed or held back from its delivering position, so that the eyelets may be omitted whenever desired. To enable the operator to thus hold back the roadway, we provide a bell-crank lever, 30, which is pivoted at 31 to the frame *a*, a slide, 32, pivoted to one arm of said lever and bearing against the roadway-supporting lever 15, and a connecting-rod, 33, connecting the bell-crank lever 30 with a foot-lever. The operator by depressing said foot-lever can force the slide 32 against the lever 15, and thus displace the roadway.

The shaft *c* is provided with a loose pulley, 34, adapted to slide on the shaft and having a clutch, 35, on its hub adapted to engage a clutch, 36, affixed to the shaft. Said pulley is engaged with a bar, 37, which is adapted to move in fixed guides 38 38, and is provided with a sliding pin, 39, which is pressed upwardly by a spring, 40, and is connected by a rod, 41, with a foot-lever below the machine. On the clutch 36 is formed a cam-shaped flange, 42, one side of which is inclined. When said pin is released by the operator, it springs upwardly, so that it bears against the inclined side of the flange 42, and is forced outwardly thereby with the bar 37 and the pulley 34, which is engaged with said bar by a fork, 43, on the latter entering a groove in the hub of the pulley. This movement separates the pulley from the clutch 36 and at the same time causes a wedge, 44, secured to the bar 37, to raise a brake-shoe, 45, resting on it, and to press said shoe against the periphery of the disk *l'*, thus instantly stopping the operation of the machine. When the operator depresses the pin 39 and disengages it from the flange 42, a spring, 46, on the bar 37 moves said bar so as to engage the pulley 34 with the clutch 36 and at the same time move the wedge from under the brake-shoe 45, thus starting the machine.

When the machine is used in eyeleting corsets or other articles made of cloth, we prefer to employ a punch with a conical pointed end, as shown in Fig. 4. To prevent the point of the punch from being injured by the eyelet-engaging spindle, we make a cavity, 47, in the upper end of the latter, as shown in Fig. 13.

In some cases it is preferable to form a V-shaped groove in the end of the punch, and with a punch so formed we use a pointed spindle formed to bear only against the apex of the groove of the punch, as shown in Fig. 14, and avoid dulling the cutting-edges thereof.

We claim—

1. In an eyeleting-machine, the combination of the combined punch and top set, a horizontally-reciprocating carrier therefor, a vertically-reciprocating slide supporting said carrier, a work plate or table, a die-block and a vertically-reciprocating carrier therefor, a vertically-reciprocating bottom set having an eyelet-engaging finger, and an oscillating or

reciprocating roadway, all arranged and operating substantially as set forth.

2. The combination of the combined punch and top set, the carrier therefor, the vertically-reciprocating slide having a guide or way on which said carrier is reciprocated horizontally, the reciprocating bar engaged with the carrier, and means, substantially as described, for varying the reciprocating movement of the carrier, and thereby varying the feed movement of the punch, as set forth.

3. The combination of the combined punch and top set, the carrier therefor, the vertically-reciprocating slide having a guide or way on which the carrier is reciprocated horizontally, means, substantially as described, for varying the length of the reciprocating movements of the carrier and punch, a movable stop for said carrier, and means for adjusting said stop and for holding it at any point to which it may be adjusted, as set forth.

4. The combination of the punch and top set, the carrier therefor, the means for reciprocating the carrier vertically, the sliding bar *r*, the slotted lever *t*, and means for oscillating said lever, whereby the carrier is reciprocated horizontally, and the adjustable fulcrum *u* for said lever, whereby the length of the reciprocating movements of the carrier may be adjusted, as set forth.

5. The combination, with the punch and operating mechanism therefor, substantially as described, of the work-table, the die-block having a female die to co operate with the punch, the carrier *f'*, to which said block is detachably secured, and the devices for vertically reciprocating the die-block carrier, as set forth.

6. The combination, in an eyeleting-machine, of the punch and die-block detachably secured to the machine, the eyelet inserting and upsetting devices, and the eyelet reservoir and roadway secured to the machine by means, substantially as described, whereby said reservoir and roadway can be readily removed and replaced, as set forth.

7. The reservoir having the agitator, combined with the angular sleeve 3, supporting the reservoir, and the shafts 5 6, geared together, as described, one of said shafts being detachably engaged with the hub of the agi-

tator, while the other is provided with operating devices whereby said shafts and agitator are oscillated, as set forth.

8. The combination of the reservoir and roadway, the latter having the lug 14 and the former having the agitator provided with a projecting shank, 12, the oscillating lever 15, having a socket to receive the lug 14, and the fixed sleeve 3, supporting the reservoir and provided with the oscillating socketed shaft 6, in the socket of which the shank of the agitator is removably inserted, as set forth.

9. The combination, with the eyelet inserting and setting devices, of the pivoted roadway, a spring which presents said roadway to the eyelet-inserting finger and permits said roadway to be held back from said finger, and an oscillating lever whereby the roadway is moved back automatically, as set forth.

10. The combination, with the eyelet inserting and setting devices, of the pivoted roadway, a spring which presents said roadway to the eyelet-inserting finger and permits said roadway to be held back from said finger, and an oscillating lever whereby the roadway is moved back automatically, and devices, substantially as described, whereby the operator may hold the roadway back to intermit the insertion of the eyelets, as set forth.

11. In the eyeleting-machine herein described, the combination of the shaft *c*, the clutch 36, attached thereto, having the cam-shaped flange 42, the sliding driving-pulley, the sliding spring-impelled bar 37, engaged with said pulley and provided with the spring-impelled pin adapted to engage the flange 42, and provided with means whereby it may be depressed by the operator, the wedge 44, secured to said bar, and the brake-shoe 45, arranged to be pressed by said wedge against a disk on the shaft *c*, all arranged and operating substantially as set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 7th day of October, 1887.

LORENZO D. HAWKINS.
JOHN C. PAIGE.

Witnesses:

C. F. BROWN,
A. D. HARRISON.