

May 5, 1959

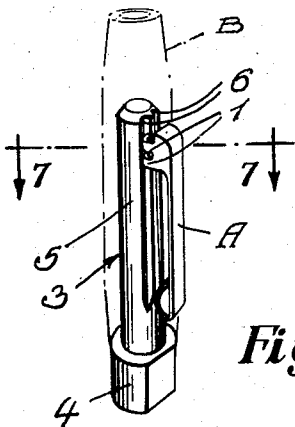
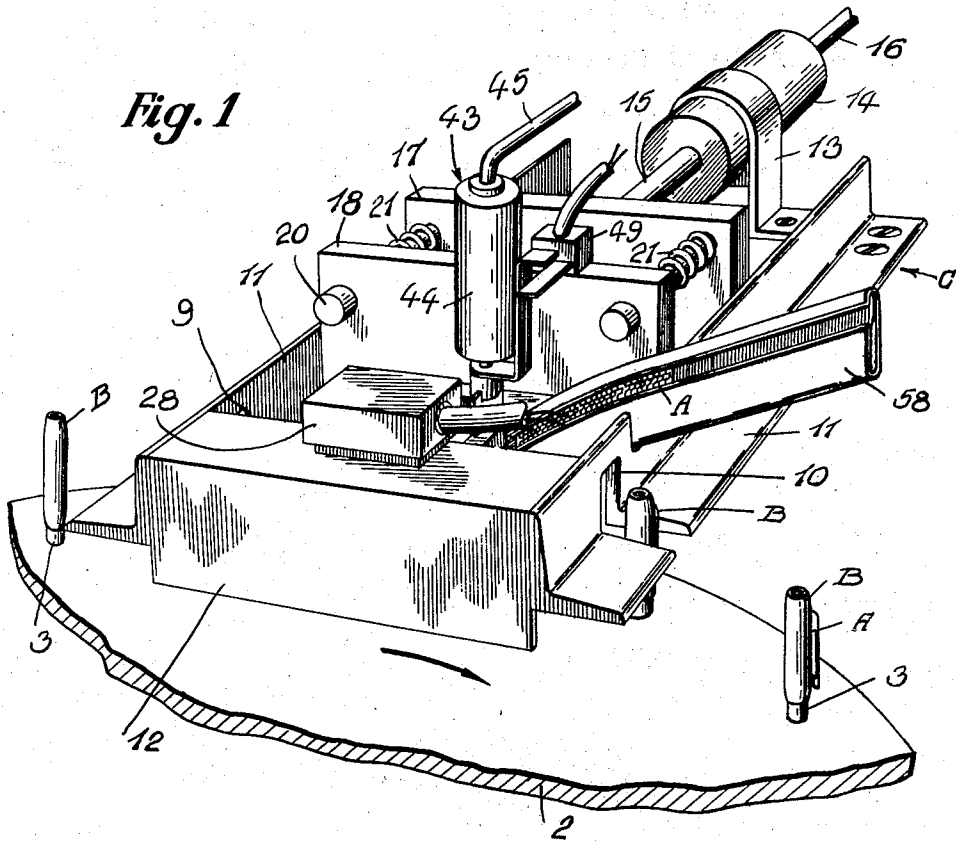
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2,884,634

MACHINE FOR ATTACHING CLIPS TO PEN OR PENCIL CAPS

Filed Aug. 21, 1958

4 Sheets-Sheet 1



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Fig. 2

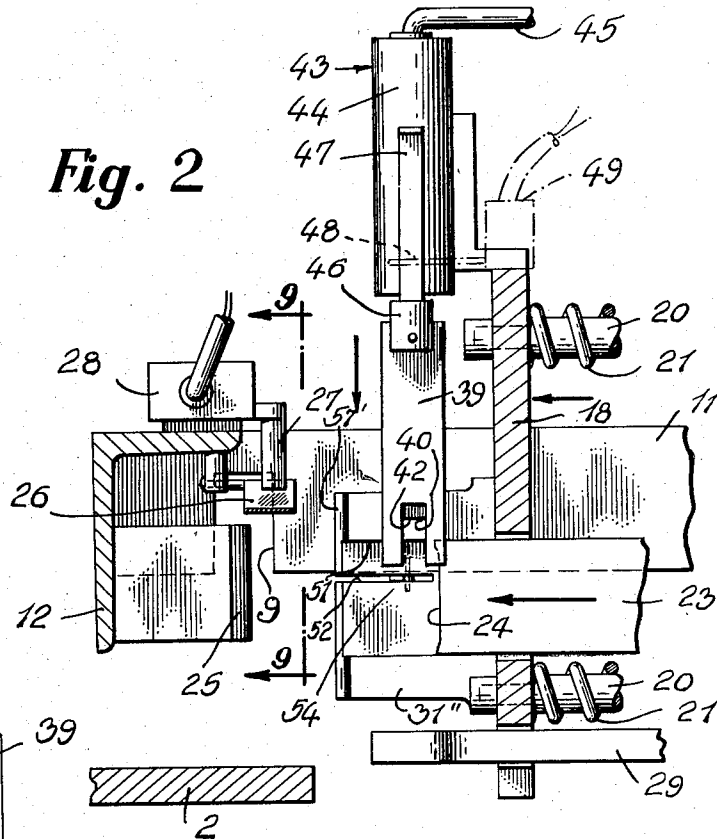
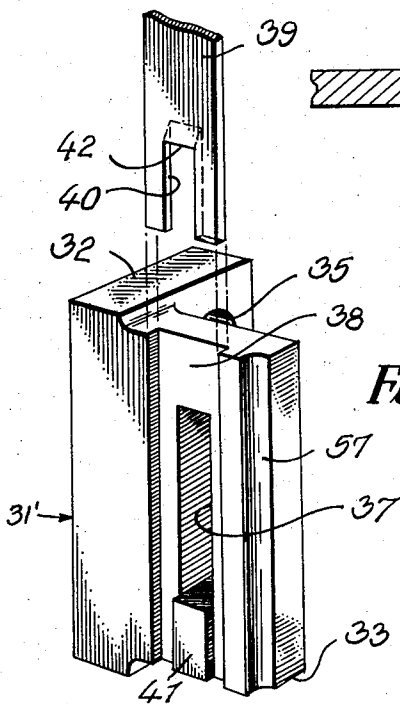


Fig. 4



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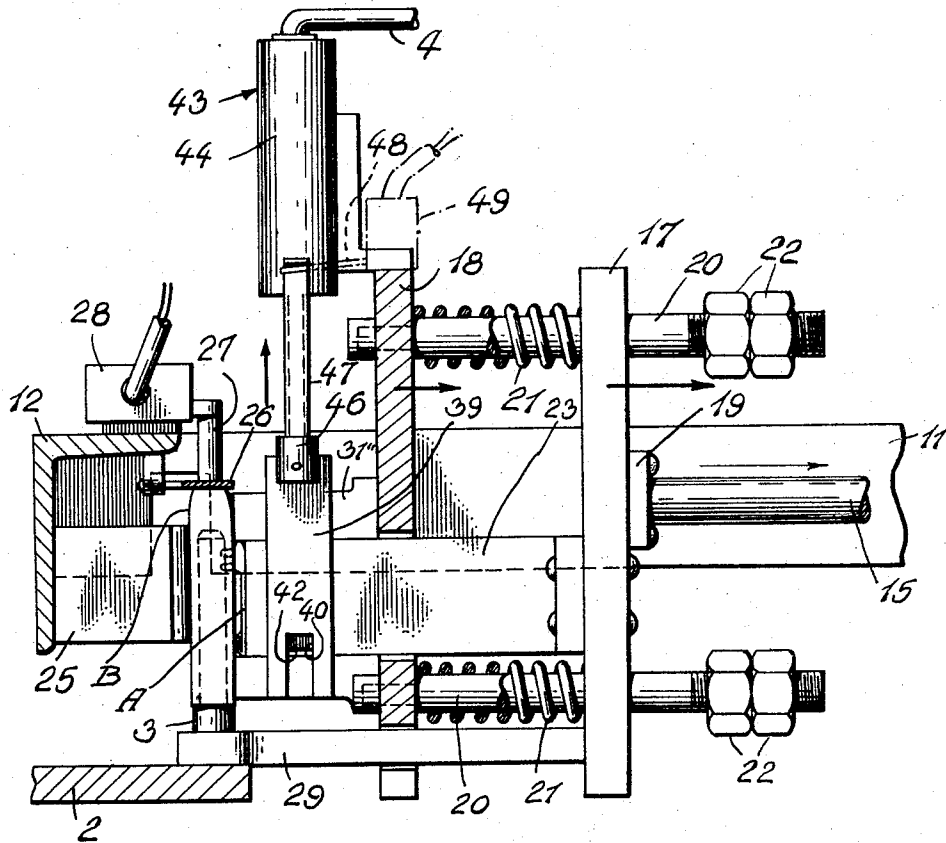


Fig. 3

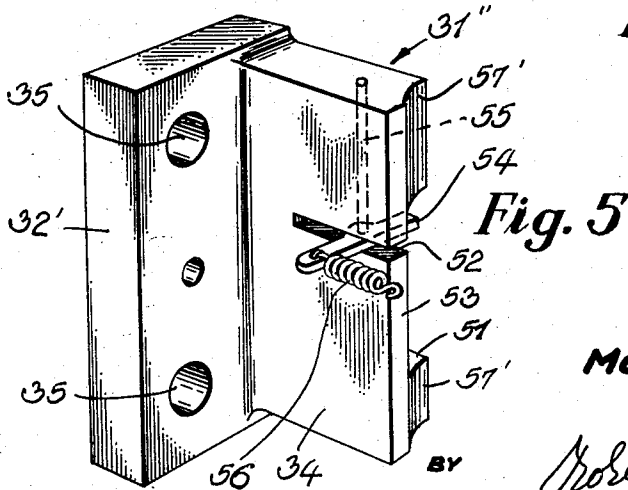


Fig. 5

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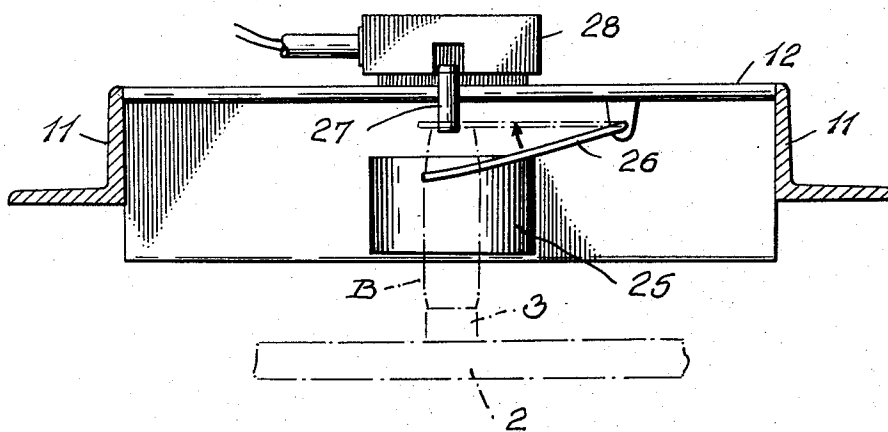
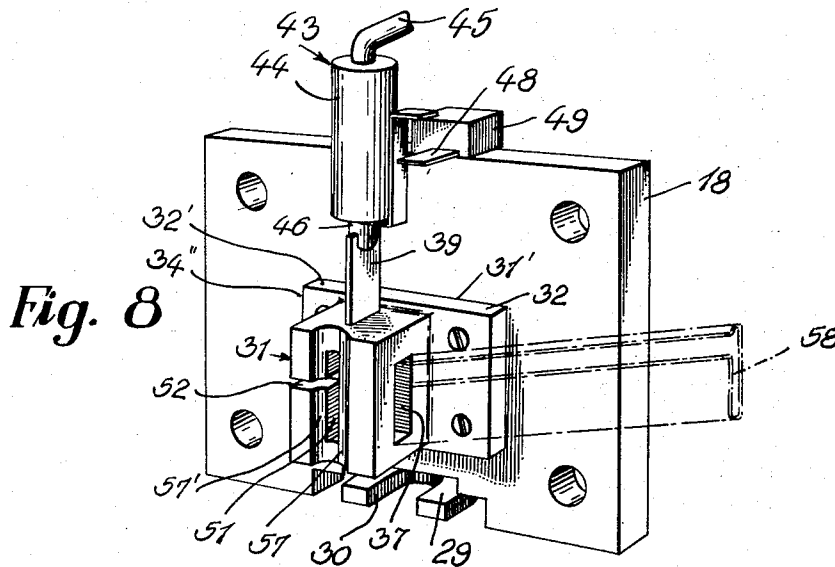


Fig. 9

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2,884,634

MACHINE FOR ATTACHING CLIPS TO PEN OR PENCIL CAPS

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Application August 21, 1958, Serial No. 756,377

13 Claims. (Cl. 1—3)

The present invention relates to a machine for automatically attaching clips to caps of pens, pencils and the like.

The general object of the present invention is the provision of a machine of the character described which is relatively simple in construction, efficient in use and practically failure proof.

Another important object of the present invention is the provision of a machine of the character described which operates in an automatic manner and in which means are provided for accurately registering the clip with the cap during the clip attaching operation.

Yet another important object of the present invention is a machine of the character described which can operate at a very rapid rate, all the movable elements effecting short strokes.

The foregoing and other important objects of the present invention will become more apparent during the following disclosure and by referring to the drawings in which:

Figure 1 is a perspective view of the machine showing part of the rotatable table carrying the pen or pencil through the machine;

Figure 2 is a partial longitudinal section of the machine showing the clip pusher and the clip separator in retracted positions;

Figure 3 is a longitudinal section of the machine similar to that of Figure 2, but with other elements shown, and illustrating the clip pusher at the end of its active stroke and the clip separator in operative position;

Figure 4 is a perspective view of one half of the cap holding block and of part of the clip separator;

Figure 5 is a perspective view of the other half of the cap holding block;

Figure 6 is a perspective view of one of the posts mounted on the rotatable table and supporting a pen or pencil cap and showing a clip secured to the cap;

Figure 7 is a cross-section along line 7—7 of Figure 6 and showing the cap in full lines;

Figure 8 is a front perspective view of the cap engaging and clip feeding assembly of the machine; and

Figure 9 is a section along line 9—9 of Figure 2.

Referring now more particularly to the drawings in which like reference characters indicate like elements throughout, the machine of the present invention is designed to automatically attach clips A to caps B of pen, pencils or the like. The clips A are of the type which are provided with pairs of tongues 1 which are strong enough to be forced through the material of the cap B and which are adapted to be bent inwardly, as shown in Figure 7, against the inner face of the cap B to secure the clips A in firm position.

The machine of the present invention comprises a circular horizontal table 2 which is rotatable about a vertical axis and which carries a plurality of equally spaced posts 3 arranged on a circle concentric with the axis of rotation of table 2, and on which the caps B are mounted for passage through the assembly C. Each

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post 3 consists of a base 4 and of a stem 5 which is provided with two grooves 6 which extend longitudinally along the stem and which are spaced a distance apart corresponding to the spacing between the tongues 1 of each pair. The grooves 6 have a semi-circular cross-section and when the tongues 1 are forced against the same, said tongues are made to enter the grooves and be bent by the latter inwardly towards each other, as shown in Figure 7.

The table 2 rotates in the direction of the arrow in Figure 1, and the marginal portion of said table moves underneath the forward part of the assembly C. The caps B enter through an inlet 9 in assembly C and the caps B, each provided with a clip A, emerge through the outlet 10. The caps B entering the machine have an imperforate side wall and are made of a material soft enough to allow pressure insertion of the tongue of the clip A therethrough.

The clipping machine C comprises a fixedly mounted rigid frame consisting of side members 11 of L-shaped cross-section and a front transverse member 12 of inverted L-shaped cross-section which is secured to and extends between the opposed vertical flanges of the side members 11 at the forward ends of the latter. A bracket 13 is secured to the rear ends of the side members 11 and rigidly supports the cylinder 14 of a double acting ram unit, the piston rod 15 of which extends horizontally, forwardly of the cylinder 14. A conduit 16 communicates with the cylinder 15.

Two vertical plates 17 and 18 are mounted for reciprocating horizontal movement between the side members 11, there being guiding means (not shown) for guiding said plates. The rear plate 17 is rigidly secured to the forward end of the piston rod 15, as clearly shown at 19 in Figure 3, while the front plate 18 is supported by the rear plate 17 and is elastically connected to the latter by means of four bolts 20 which are rigidly connected to the front plate 18 and extend rearwardly of the latter to slidably extend through holes made in the rear plate 17. Coil springs 21, which surround the bolts 20 and extend between the two plates 17 and 18, urge said two plates away from each other with the rear plate 17 abutting against nuts 22 on the rear threaded ends of the bolts 20. The rear plate 17 carries a forwardly extending pusher member 23 in the form of an elongated plate disposed in a vertical plane and having a front edge 24 conforming to the external shape of the clip A, and adapted to engage the same for ramming or pushing said clip against a cap B during the clip attaching operation. The pusher plate 23 freely extends through a slot made in the front plate 18.

The tongues 1 of the clip A are pushed through the material of the cap B against the post 3, while the latter, together with the cap, are held stationary against an anvil 25 which is rigidly secured to the front transverse member 12 of the frame of the machine. The anvil 25 has a convex outer face corresponding to the radius of curvature of the circular path described by the inside of the caps B when the table 2 rotates about its vertical axis.

As each cap B successively moves into clip attaching position opposite the anvil 25, the top of said cap rides underneath a downwardly extending sensing member 26, which is pivoted to the front transverse member 12 as shown in Figure 9, thereby raising said sensing member 26 and causing the same to abut against actuating member 27 of an electric switch 28. The switch 28 is electrically connected to the controls (not shown) for the operation of the cylinder and piston unit 44 (to be described hereinafter) and prevents this operation if there is no cap B on the post 3. The rear plate 17 carries a forwardly projecting locating member 29 which has a front recess 30 adapted to engage the base 4 of the

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post 3 to positively locate said post exactly opposite the pusher plate 23 during the clip attaching operation.

The front plate 18 mounts a clip feeding block, generally indicated at 31, which also serves to clamp the cap B during the clip attaching operation. The block 31 is made in two parts 31' and 31'', shown in Figures 4 and 5, respectively. Each half part of the block 31 consists of a short length of a heavy L-shaped bar providing an attachment flange 32 and 32', and a forwardly extending flange 33 and 34 respectively. The flanges 32 and 32' are adapted to be rigidly secured to the front plate 18 flat against the same by means of bolts passing through bolt holes 35 and with the free flanges 33 and 34 in face to face contact. Flange 33 of half block 31' is provided with an elongated aperture 37 serving as a feeding passage for the clips A. Furthermore, the inner face of the free flange 33 is provided with a vertical groove 38 in which a separator blade 39 is received for vertical slidable movement. The separator blade 39 has a notch 40 at its lower end engageable with a central boss 41 projecting within the groove 38 just underneath the aperture 37. The notch 40 has a tapered transverse edge 42 defining a knife edge for facilitating the separation of a clip to be attached to the cap at the clip attaching position from the remaining clips fed through aperture 37. The separator blade 39 is actuated in its vertical movement by means of a cylinder and piston unit 43 which is in turn actuated by switch 28. The cylinder 44 of said unit is rigidly secured in upright position on top of the front plate 18 and is connected to a supply of fluid under pressure through line 45. The unit 43 is double acting for positively moving the separator blade upwardly or downwardly. The head 46 of the piston rod of the cylinder and piston unit 43 is rigidly secured to the separator blade 49 at the upper end thereof and carried an upwardly extending tripping member 47 of L-shape adapted to move the actuating member 48 of a switch 49 at the lower end of the stroke of the piston rod. Upon actuation of the actuating member 48, the switch 49 is closed thereby causing the actuation of the ram unit 14. Thus, if the separator blade 39 is blocked by a misplaced clip A during its downward stroke, the tripping member 47 will fail to actuate and close the switch 49 and, therefore, the clipping operation will not be effected.

The half block 31'', shown in Figure 5, is provided on the smooth inner face of its free flange 34 with a horizontally extending groove 51 for the free passage of the pusher plate 23. The free flange 34 is further provided with a slit 52 which is horizontally disposed and opens at the front edge 53 of said free flange 34. A lever 54 is pivoted intermediate its ends about a vertical pin 55 and extends into the groove 51 and in the path of the pusher plate 23. The outer end of the lever 35 is connected to a spring 56 which is secured at its other end to the front portion of the free flange 34. The spring 56 urges the free end of lever 54 rearwardly with respect to the clipping machine that is, towards the attachment flanges 32. The free end of the lever 54 serves as a holder for temporarily maintaining the clip A in proper position within the groove 51 from the time said clip is fed into said groove until the tongues 1 of the clip are made to engage the cap B under the forward movement of edge 24 of the pusher plate 23. More particularly, the free end of the lever 54 is disposed opposite the clip feeding aperture 37 of the half block 31' and is adapted to extend under the lower pair of tongues of the clip A fed into the groove 51.

The front edge of each half block 31' and 31'' is provided with a longitudinally extending, vertically disposed groove 57, 57' adapted to form, when joined together, a concave recess for contacting and positioning the cap B in clip attaching position against the anvil 25.

The assembly of the front plate 18, two half blocks 31' and 31'', separator blade 39 and its actuating cylinder

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and piston unit 43, and switch 49 is shown in Figure 8; said assembly further includes a magazine 58 for housing a plurality of clips A and for feeding said clips through the feeding aperture 37; the magazine 58 is inserted into and secured within said aperture 37 at one end and has a sufficient length to hold a great number of clips A in side by side relationship with their tongues 1 facing forwardly of the machine. The magazine 58 is inclined so that the clips A will move under gravity towards the aperture 37. To facilitate movement of the clips, the magazine 58 may be vibrated, if desired.

The machine in accordance with the present invention operates as follows:

After completion of the attachment of a clip to a cap B, the table 2 rotates through a predetermined angle to bring the next cap B into clip attaching position opposite the anvil 25, whereby said cap closes the switch 28 which initiates the operation of the actuating cylinder and piston unit 43 of the separator blade 39. Assuming that a clip A is already in position within the groove 51 with its lower pair of tongues 1 supported by the free end of the lever 54, the separator blade 39 moves downwardly to separate said clip from the remaining clips in the magazine 58; the length of the lever is such that it will not prevent downward movement of the separator blade 39 and the latter serves to laterally position the clip within the groove 51.

Upon completion of the stroke of the unit 43, arm 47 actuates switch 49 which initiates operation of the ramming unit 14 which moves the entire assembly of the rear and front plates 17 and 18 forwardly until the front plate 18 is stopped because the grooves 57, 57' of the block 31 positively engage the cap B and press the same against anvil 25. Upon continuing forward movement of the ram unit 14, the rear plate 17 continues to move forwardly, thereby causing the locating member 29 to start to engage the base of post 3 and simultaneously bringing the front edge 24 of the pusher plate 23 in engagement with the clip A held on the lever 54. The clip A is displaced forwardly thereby pivoting the lever 54 which retracts within the slit 52 and allows passage of the clip and pusher plate 23. The lever 54 clears the clip after the tongues of the latter have contacted the side wall of the cap B, whereby said clip is always maintained in the exact vertical position for proper clip attaching operation until it is in actual engagement with the cap. Further movement of the pusher plate 23, presses the tongues 1 of the clip A through the material of the cap and into engagement with the grooves 6 of the stem 5, thereby bending said tongues against the inner face of the cap. The pusher plate 23 then starts its reverse stroke and the separator blade 39 simultaneously starts its upward stroke whereby, when the front edge 24 of the pusher plate 23 clears the aperture 37, the separator blade 39 has reached its uppermost position and clears said clip feeding aperture 37, and the holding lever 54 has resumed its original position under the action of the spring 56. Another clip is fed into groove 51 with its lower pair of tongues 1 sliding over the lever 54 to be maintained at the proper level within the chamber defined by the groove 51. Meanwhile, the table 2 has rotated to discharge the cap B provided with a clip A from the assembly C and to bring into operative position the successive cap B already mounted on a post 3.

Should the clips A be improperly disposed within the magazine 58 or if there is a defective clip, the separator blade 39 will not reach the end of its downward stroke but will be blocked by the defective clip whereby the switch 49 will fail to operate and the next clip attaching operation will not be effected. Similarly, the operation will not be effected if there is no cap on the post 3 in operative position, the sensing member 26 failing to close switch 28.

The movements described hereinabove have short strokes and can be effected rapidly whereby the machine,

in accordance with the present invention, will have a very high output.

It will be noted that during the clip attaching operation the cap B is very accurately positioned and is maintained in said position by the cooperation of the locating member 29, the anvil 25 and the block 31. Similarly, the clip A is laterally exactly positioned between the two half blocks 31' and 31'' and accurately vertically positioned by the lever 54 until its tongues 1 actually engage the wall of the cap B; the separator blade 39 insures that only one clip is fed to the block 31 at a time.

The table 2 is rotated step by step by any suitable means.

While a preferred embodiment according to the present invention has been illustrated and described, it is understood that various modifications may be resorted to without departing from the spirit and scope of the appended claims.

I claim:

1. A machine for attaching clips to caps of pens, pencils and the like comprising, in combination, a cap support movable to bring a cap to a clip attaching station, means disposed at said station to clamp said cap in a predetermined position, said means including a block pressed against said cap, said block having a cavity opening opposite said cap and having a lateral passage for feeding a clip into said cavity, a pusher plate movable through said cavity to engage said clip in said cavity and press the same against said cap, and power means to actuate said pusher plate.

2. A machine as claimed in claim 1, wherein said cap support includes an upright stem having longitudinally extending grooves therein facing said pusher plate when said cap support is in said station, said cap being inserted over said cap support and said clip having projecting tongues adapted to be inserted through said cap and be bent by engagement with said grooves upon the pressing action of said pusher plate.

3. A machine as claimed in claim 2, wherein said means for clamping said cap at said predetermined position includes an anvil disposed opposite said block and adapted to engage said cap at said station.

4. A machine as claimed in claim 3, further including means to move successively a plurality of cap supports along a circular path, said anvil having a convex cap engaging face along which said caps slide when reaching said station.

5. A machine as claimed in claim 1, further including means for accurately positioning said clip in said cavity including a horizontally disposed spring pressed lever pivotally mounted in said block and extending through said cavity and adapted to engage the tongues of said clip to support the latter at a predetermined level within said cavity, said lever pivoting freely under the clip pressing movement of said pusher plate and retracting during this pivotal movement out of said cavity to allow passage of said pusher plate.

6. A machine as claimed in claim 1, further including a separator blade vertically movable through said block to take an operative position blocking communication between said cavity and said lateral passage and a retracted position opening said communication, said separator blade isolating one clip in said cavity from adjacent clips.

7. A machine as claimed in claim 6, further including a sensing member, sensing the presence of a cap at said station and controlling the operation of said separator blade when detecting said presence and preventing operation of said separator blade when detecting absence of a cap at said station.

8. A machine as claimed in claim 6, further including electric control means operated by the operation of said

separator blade and controlling the operation of said power means, said electric control means preventing operation of said power means when said blade fails to reach its operative position.

9. A machine as claimed in claim 1, further including a first plate directly connected to said power means and mounting said pusher plate and a second plate resiliently connected to said first plate and having an opening for the free passage of said pusher plate, said block being directly secured to said second plate.

10. A machine for attaching clips to caps of pens, pencils and the like comprising, in combination, a circular table rotatable about a central axis, a plurality of posts rigidly secured to said table and disposed along a circle concentric with the axis of rotation of said table, each post adapted to engage and support a cap thereon, and having two longitudinally extending spaced parallel grooves facing radially outwardly with respect to the axis of rotation of said table, said table being rotatable step by step to successively bring each said post and a cap supported thereon to a clip attaching station, an anvil fixedly disposed above said table at said clip attaching station, said anvil having a convex surface engaged by a cap at said clip attaching station, a frame overlying part of said table and radially and outwardly extending therefrom, said anvil being secured to the overlying portion of said frame, a ram unit mounted on said frame, a pusher plate secured to said unit for reciprocating movement towards and away from said anvil to press and attach a clip onto said cap at said clip attaching station, a block resiliently connected to said pusher plate and movable towards and away from said cap at said clip attaching station and adapted to engage said cap ahead of the clip pushed by said pusher plate to clamp said cap in a predetermined position at said station, said block having a longitudinal cavity for the free passage of said pusher plate and having a lateral passage for feeding clips into said cavity, a magazine for holding a plurality of clips side by side in communication with said lateral passage, said clips having projecting tongues and being fed into said cavity with said tongues facing the cap at said clip attaching station, a separator blade vertically movable through said block adjacent said pusher plate and adapted to take an operative position closing said lateral passage to isolate a clip in said cavity from the remaining clips in said magazine and a retracted position clearing said lateral passage for the admission of a clip into said cavity, power means for actuating said separator blade and means for maintaining a clip in said cavity in a predetermined position until engagement of said clip with said cap under the action of said pusher plate.

11. A machine as claimed in claim 10, further including sensing means for detecting the presence or absence of a cap at said clip attaching station, said sensing means initiating the operation of said separator blade upon detecting the presence of a cap at said clip attaching station and preventing the operation of said separator blade when detecting the absence of a cap at said clip attaching station.

12. A machine as claimed in claim 11, further including electric control means operable to prevent operation of said ram unit upon failure of said separator blade to reach its operative position blocking said lateral passage.

13. A machine as claimed in claim 10, wherein said means for holding a clip in said cavity comprises a lever pivoted so as to have one end normally extending within said cavity to support a clip therein and so as to be freely pivotable upon forward pressing movement of said pusher plate to clear said cavity when said clip contacts said cap.

No references cited.