Dec. 3, 1929. W. CAMERON 1,737,569

CAP FEEDING MECHANISM

Filed June 22, 1927 5 Sheets-Sheet 1

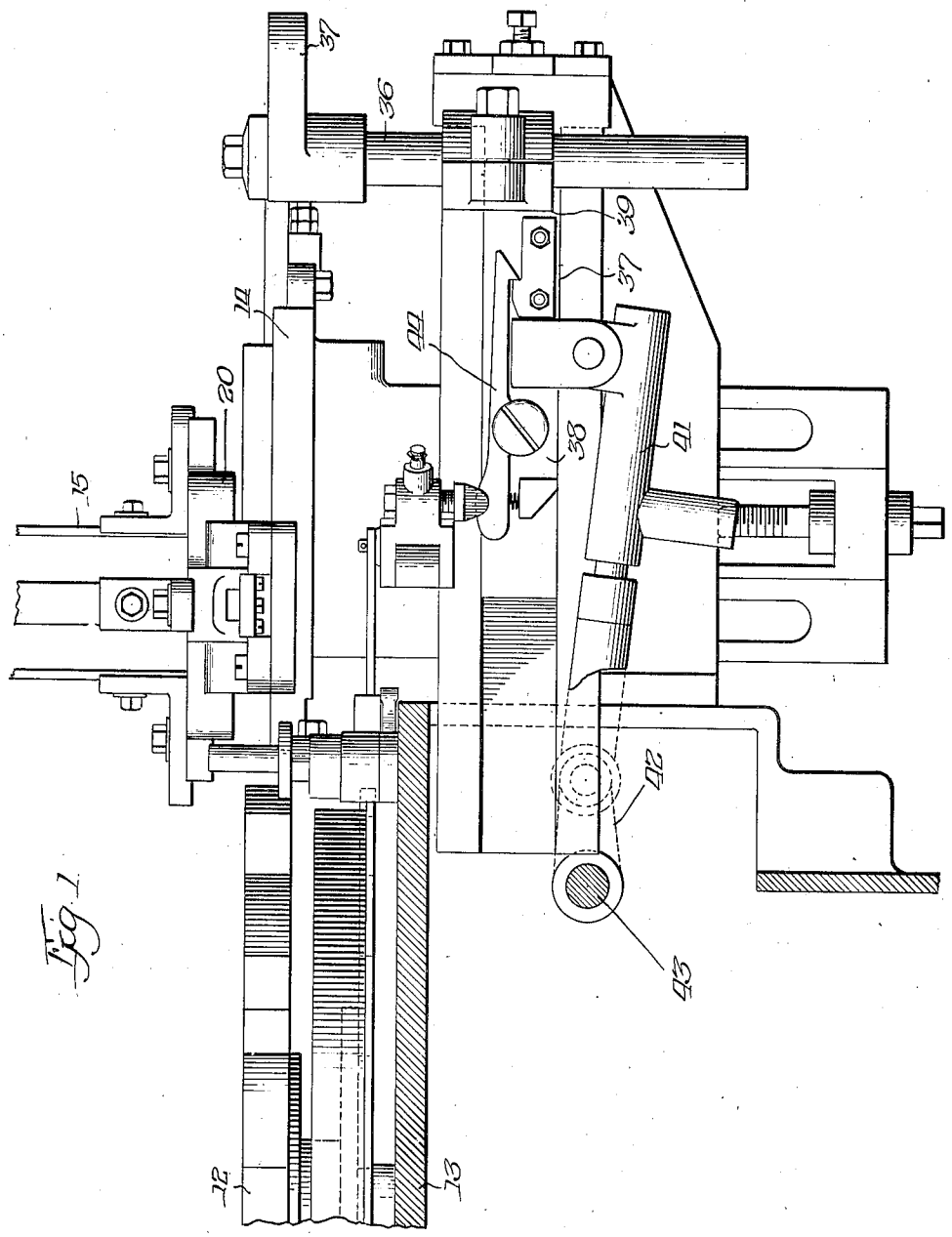


Fig. 1

Witness:
E. C. Brown

Inventor
William Cameron
By Ira J. Wilson
Atty.

Dec. 3, 1929. W. CAMERON 1,737,569

CAP FEEDING MECHANISM

Filed June 22, 1927 5 Sheets-Sheet 2

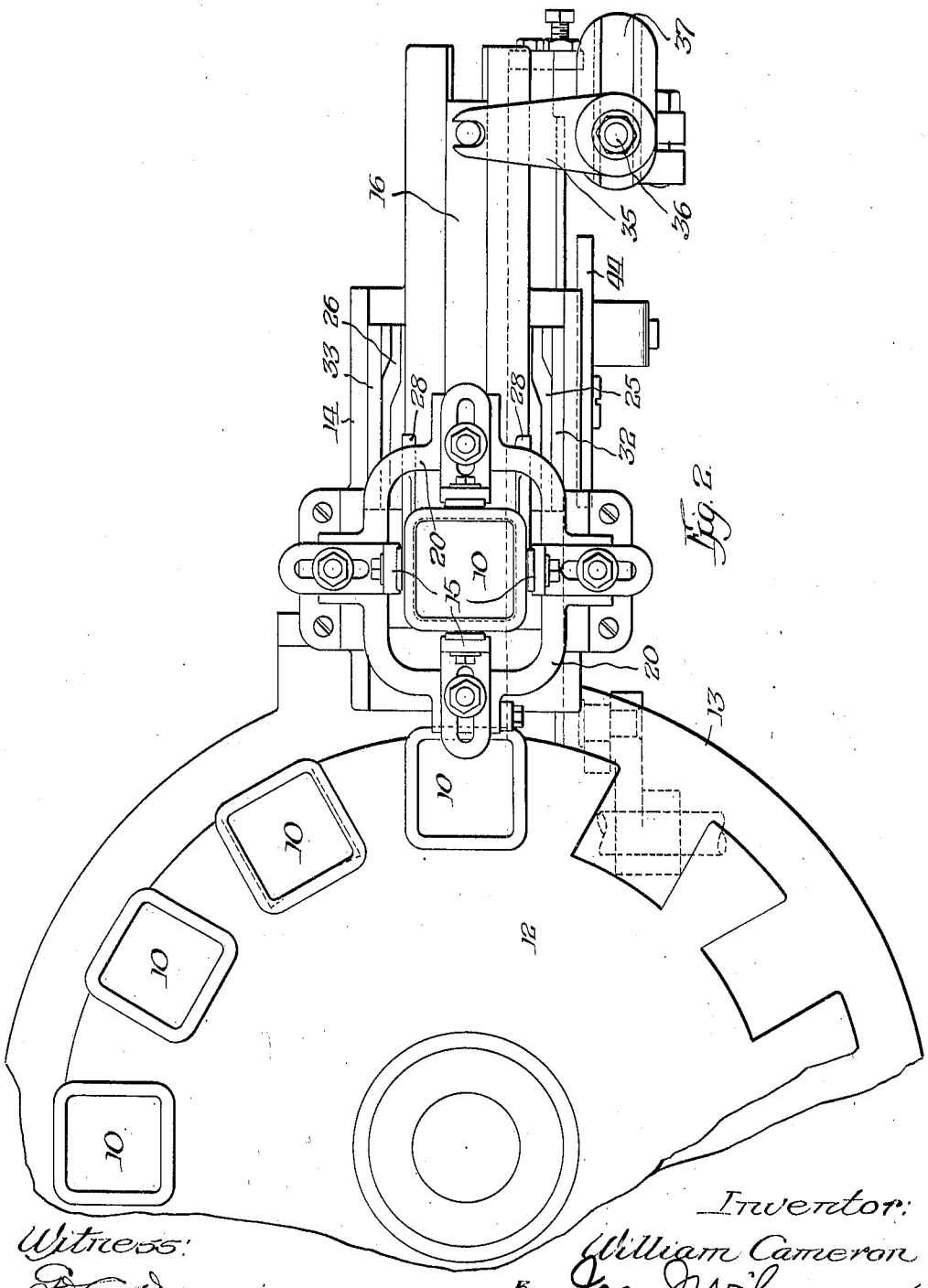


Fig. 2.

Witness:

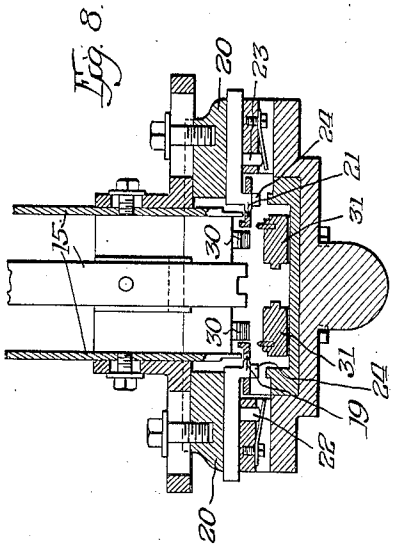
Inventor:
William Cameron
By Ira J. Wilson
Atty.

Dec. 3, 1929. W. CAMERON 1,737,569

CAP FEEDING MECHANISM

Filed June 22, 1927 5 Sheets-Sheet 3

Fig. 8.



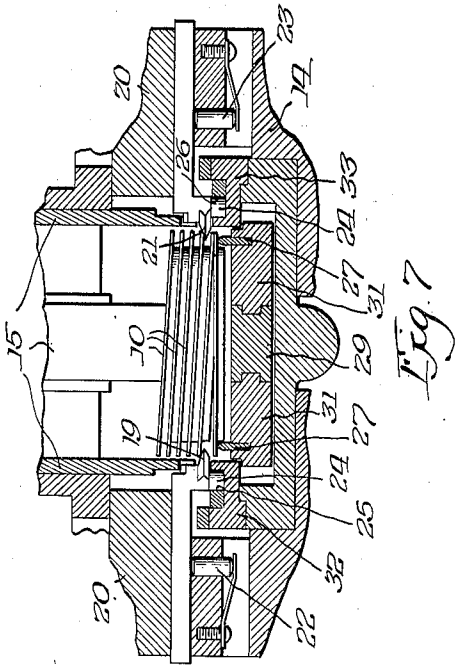
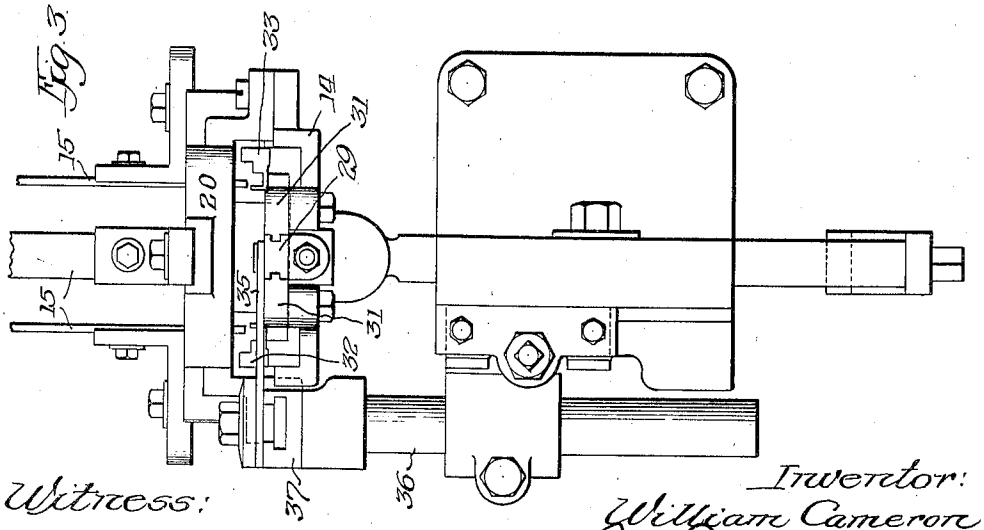


Fig. 7

Fig. 3.



Witness:

Fred C. Dorsey

Inventor:

William Cameron

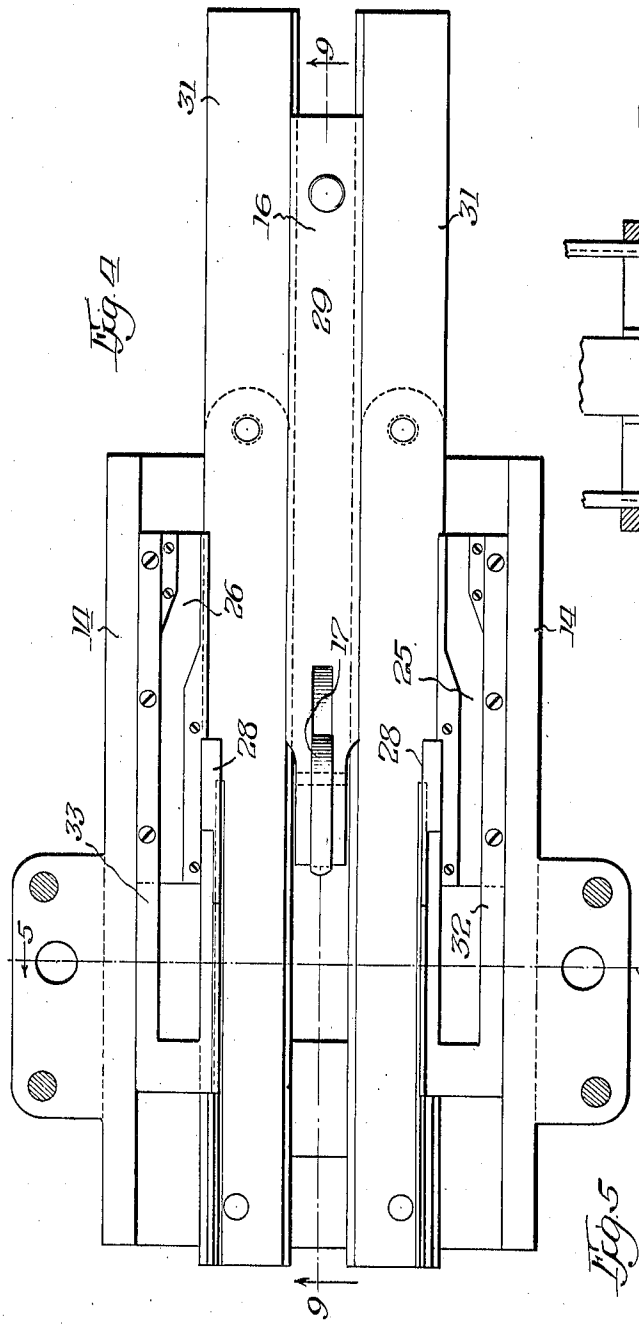
By Ira J. Wilson

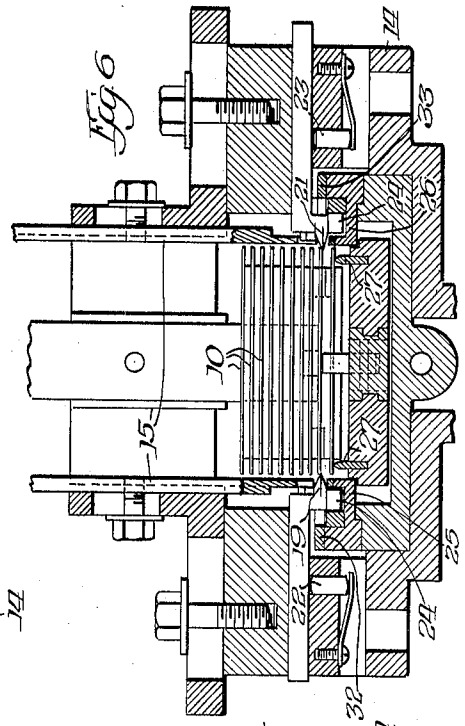
Atty

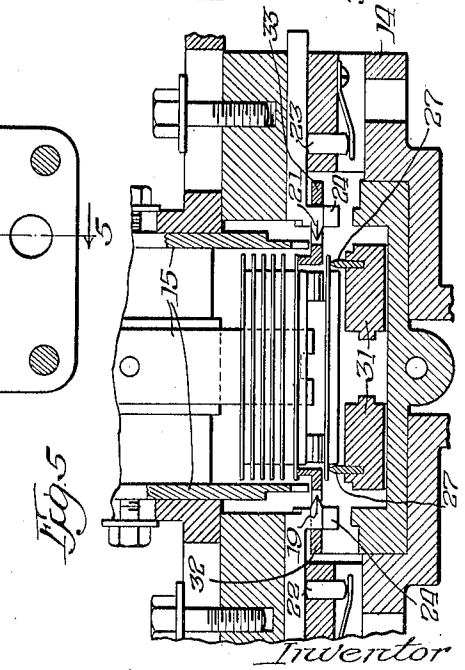
Dec. 3, 1929. W. CAMERON 1,737,569

CAP FEEDING MECHANISM

Filed June 22, 1927 5 Sheets-Sheet 4







Witness:
H. C. Dawson

Inventor
William Cameron
By Ira J. Wilson
Atty.

Dec. 3, 1929. W. CAMERON 1,737,569

CAP FEEDING MECHANISM

Filed June 22, 1927 5 Sheets-Sheet 5

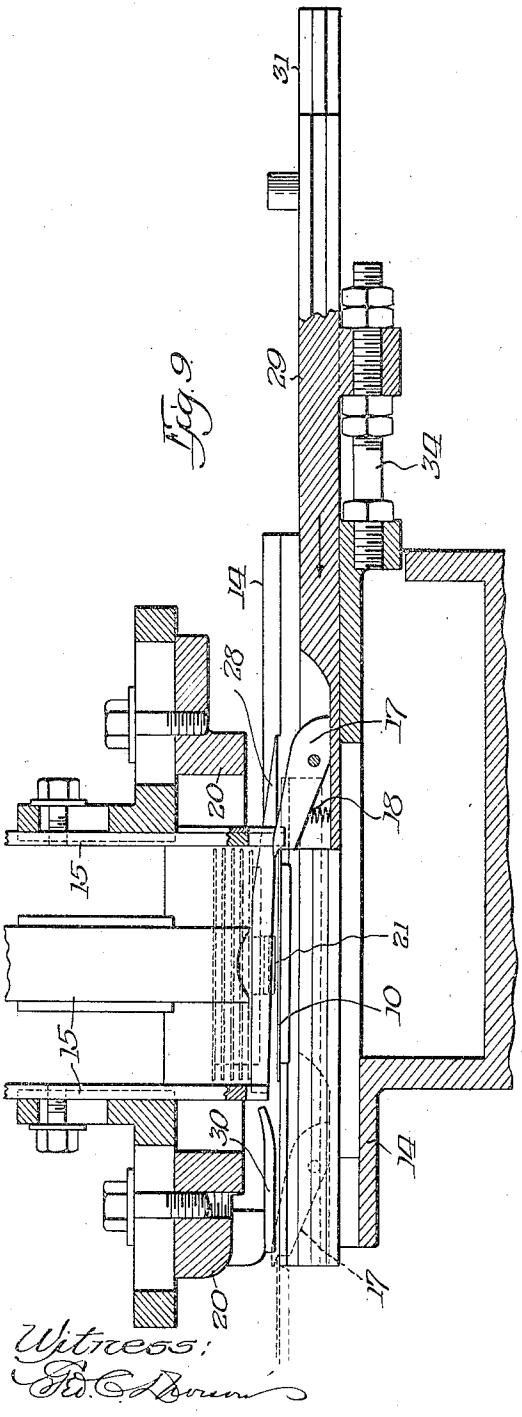


Fig. 9

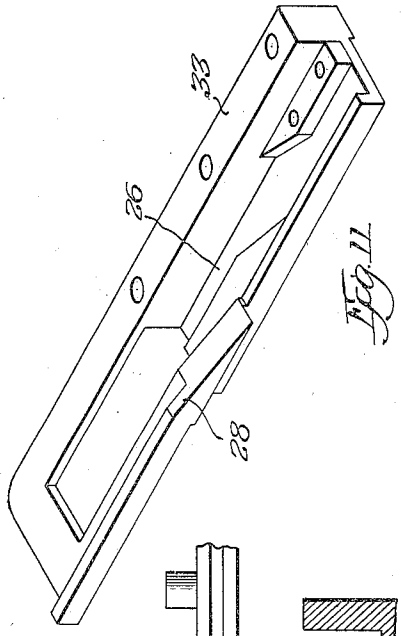


Fig. 11

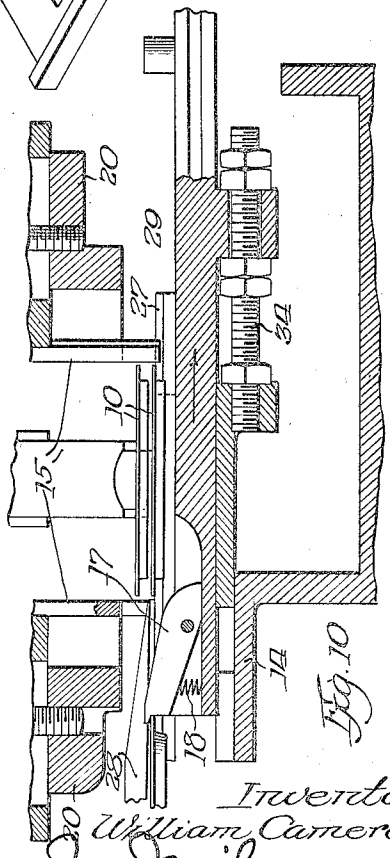


Fig. 10

Witness:
Ed. C. Bowen

Inventor
William Cameron
by Ira J. Wilson
Atty

Patented Dec. 3, 1929 1,737,569

UNITED STATES PATENT OFFICE

WILLIAM CAMERON, OF CHICAGO, ILLINOIS, ASSIGNOR TO CAMERON CAN MACHINERY CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

CAP-FEEDING MECHANISM

Application filed June 22, 1927. Serial No. 200,641.

This invention relates to machines for applying can ends, either tops or bottoms, to can bodies and more particularly to the feeding mechanism of such machines for feeding the caps from the cap magazine to a position where they may be attached to the can bodies. An example of this type of machine is illustrated in my prior U. S. Patent No. 1,621,580 for double-seaming machines, issued March 22, 1927, and in my copending application Serial No. 132,413 for square can cap seaming mechanism filed August 30, 1926.

As illustrated in the above mentioned patent and application, it has been customary in the past to provide the can caps with vertically turned flanges or curls at their edges so that they may be stacked in the magazine without nesting and to permit the lowermost cap to be easily separated from the rest of the stack and fed to the position where it may be spun on the can body. Such a provision to prevent the nesting of the caps in the magazine necessitates the use of a curling machine.

It is the primary object of this invention to do away with the necessity of a curling machine by providing a feeding mechanism which may be employed in a machine of the above type to feed uncurled caps or caps having no vertically turned flanges or other means to prevent nesting.

It is also an object of this invention to provide a feeding mechanism having the aforementioned characteristics which is efficient and capable of being conveniently adapted to machines of the above type now in use.

Other and further objects of this invention will be apparent as the same becomes better understood from an examination of the specification and claims in connection with the accompanying drawings wherein:

Fig. 1 is a fragmentary elevational view of a machine embodying this invention,

Fig. 2 is a fragmentary plan view of the same,

Fig. 3 is a fragmentary end elevation with parts omitted viewed from the left of Fig. 1,

Fig. 4 is an enlarged detail plan view of the feeding slide with parts omitted,

Fig. 5 is a fragmentary sectional view taken at the line 5—5 of Fig. 4 at the beginning of a feed stroke of the feed slide,

Fig. 6 is a similar view at or near the end of the feed stroke of the feed slide,

Fig. 7 is a view similar to Fig. 6 also taken when the feed slide is at the end of its stroke and illustrating an alternative mode of operation of the preliminary separating knives,

Fig. 8 is a view similar to Fig. 5 also with the feed slide at the beginning of its stroke and with the caps removed from the magazine,

Fig. 9 is a fragmentary longitudinal section taken at the line 9—9 of Fig. 4 with the feed slide at the beginning of its stroke,

Fig. 10 is a similar section with the feed slide at the end of its stroke and

Fig. 11 is a detail view of a part of the feed slide.

Referring to the drawings more particularly it will be seen that the same illustrate the feed mechanism for a machine for capping square cans, but it is to be understood that this machine might be modified in the light of the prior art as represented by my aforesaid patent for use in connection with round or oval cans without departing from the principles of this invention.

Number 13 represents the main frame of the machine in which is mounted a rotatable spider 12 adapted to carry the cans into position to receive the caps. This spider 12 is similar to that in my aforesaid application. The frame 13 surrounding the spider 12 supports an auxiliary frame structure including a shelf 14 extending laterally from the frame 13 and the spider. This shelf is similar to the shelf in the aforementioned application and supports a square cap magazine 15 mounted on an apertured cover 20 for said shelf and near the inner end of the shelf. The caps 10, each provided with a depressed portion and a continuous flange surrounding the same, are fed one at a time from the bottom of the stack and are advanced along the shelf 14 toward the spider 12.

The mechanism for feeding the caps comprises a slide member 16 adapted to reciprocate in guide ways formed in the shelf 14,

said member being provided with a feed dog 17 the forward end of which is normally urged into the position shown in Fig. 9 by a coiled expansion spring 18. As the slide is moved to the left as viewed in Figs. 9 and 10 on the feed stroke the dog 17 engages with the lowermost cap which has been separated from the rest of the caps as will be hereinafter explained and delivers it to the spider 12 above one of the cans carried thereby. The cap is then spun onto the can by mechanism (not shown) well known in the art.

Since the caps are not curled and are consequently nested quite closely together in the magazine it is difficult to separate the lowermost cap from the rest of the stack and raise the stack clear of said cap so that the latter may be removed by the slide. To overcome this difficulty I provide a pair of transverse knives 19 and 21 slidably carried by the cover 20 of the shelf 14 on opposite sides respectively of the magazine for preliminarily separating one or both of the opposite edges of the said cap from the corresponding edges of the cap thereabove prior to the final separation of the former. These knives are frictionally engaged by spring pressed plunges 22 and 23 respectively so that a positive actuation is required to move them. The knives 19 and 21 are each provided with a cam follower 24 which is adapted to track in cam tracks 25 and 26 respectively formed in the slide, the path of the tracks being such as to project the knives inwardly above the flange of the lowermost cap of the stack the latter resting upon a pair of spaced longitudinal tracks 27 carried by the shelf. The plane of movement of the points of the knives 19 and 21 is so closely adjacent the plane to which the tops of the tracks 27 extend that the said knives will either enter between the corresponding edges of the two lowermost caps at both sides of these caps as shown in Fig. 6 or one knife will enter between the corresponding edges of the two caps at one side and the other knife will enter above the corresponding edges of the two caps at the other side as shown in Fig. 7. In either case the action of the knives will be to preliminarily separate one or both of the opposite edges of the lowermost cap from the corresponding edges of the cap thereabove sufficiently to enable a pair of longitudinally tapered knives 28 carried by the slide to enter below one or both edges of the second from the lowermost cap upon return movement of the slide to raise the stack clear of the lowermost cap as shown in Fig. 9 so that the latter cap is free to be removed from beneath the stack on the next feed stroke of the slide.

The path of the cam tracks 25 and 26 is such as to cause the preliminary separating knives 19 and 21 to be withdrawn on the return stroke of the slide and an enlargement of the track is provided intermediate each of their ends to cause such lost motion in the actuation of the said knives that while they are projected into engagement with the caps at the end of the feed stroke they are not withdrawn until the return stroke has begun and the tapered knives 28 have engaged the caps. As the slide is retracted, the dog upon rearward movement is adapted to tilt downwardly and pass beneath the caps. Spring guides 30 carried by the shelf act to prevent the forward end of the cap from flying up as the slide moves to the left to deliver the cap.

The slide member is preferably in the form of a central slidable member 29 carried in a guideway formed between two stationary elongated members 31 attached to the shelf, and two side members 32 and 33 in which the cam tracks 25 and 26 respectively are formed. The member 29 carries the dog 17 and the members 32 and 33 each carry one of the knives 28 in addition to their respective cam tracks. The members 32 and 33 are connected by a yoke beneath the member 31 which is adjustably connected to the member 29 by means of a longitudinal screw 34 whereby the slide may be made to accommodate different sizes of caps.

The slide 16 is reciprocated by means of an arm 35 carried on the end of a shaft 36 which is in turn carried by a slide which is reciprocable in a guideway 37 formed in the auxiliary frame structure parallel to the guideway of the slide 16. The slide in the guideway 37 is in two parts 38 and 39, the former connected for reciprocation by means of a connecting rod 41 to a crank 42 on a shaft 43. The part 39 of the slide carries the shaft 36 and is normally but releasably connected to the part 38 by a spring pressed hook 44. The shaft 43 rotates in synchronism with the spider making one revolution (a forward and return movement of the slide 19) for each advance of a can by the spider. The hook 44 is adapted to be actuated by a no can no cap mechanism well known in the art and similar to that of my aforementioned application to release part 39 so that no cap will be fed when no can has been advanced by the spider to the receiving position at the inner end of the shelf 14.

The operation of the feed mechanism and its relation to the other parts of the machine will be apparent from the foregoing without further description.

The advantage of eliminating the necessity of a curling machine for providing the caps with curled edges to prevent their nesting in the feed magazine will also be apparent.

The feed mechanism by reason of its unitary construction may be conveniently installed upon machines now in use employing the old type of feed mechanism with a minimum of modification of such machines.

I am aware that many changes may be made without departing from the principles

of this invention and I therefore do not wish to be limited to the details shown or described.

I claim:

1. In a cap feeding mechanism, the combination of a magazine, and mechanism for feeding caps from said magazine including movable means for partially separating the lowermost cap from the other caps in the magazine, means independent of the first said means and operable subsequently thereto for separating said cap sufficiently to permit the same to be fed from beneath the other caps, and means for feeding said cap from said magazine.

2. In a machine for operating upon can caps, the combination of a magazine, and mechanism for feeding caps from said magazine including movable means for partially separating the lowermost cap from the other caps in the magazine sufficiently to permit the entrance of mechanism for completing such separation, mechanism adapted to enter between the partially separated cap and the rest of the stack to separate said cap sufficiently to permit the same to be fed from beneath the other caps and means for feeding said cap from said magazine.

3. In a machine for operating upon can caps, a mechanism for feeding a stack of caps provided with no vertically turned flanges or other means to prevent nesting including the combination of means for automatically separating the lowermost cap from the rest of the stack sufficiently to permit entrance of a lifting mechanism, lifting mechanism for raising the rest of the stack clear of the lowermost cap and means for subsequently feeding the same from beneath the stack.

4. In a machine for operating upon can caps, the combination of a reciprocable feed slide adapted to feed a cap from beneath a stack of caps on its forward stroke and to lift a portion of said stack upon its return stroke, and means operable before the return stroke of said slide for partly separating the lowermost cap from the stack without buckling the latter cap.

5. In a machine for operating upon can caps, the combination of a reciprocable feed slide adapted to feed a cap from beneath a stack, means operable before the return stroke of said slide for partly separating the lowermost cap from the stack without buckling the latter cap, and means operable upon the return of said slide for completing the separation of the lowermost cap and for supporting the stack above the lowermost cap.

6. In a machine for operating upon can caps, the combination of a reciprocable feed slide adapted to feed a cap from beneath the stack, means operable before the return of said slide for separating one or both of the opposite edges of the lowermost cap from the corresponding edges of the cap thereabove sufficiently to permit the subsequent lifting of the stack above the lowermost cap, and means operable upon the return of the slide for completing the separation of the lowermost cap and for lifting the stack.

7. In a machine for operating upon can caps having non-curled edges, the combination of means for separating one or both of the opposite edges of the lowermost cap of a stack of nested caps from the corresponding edges of the cap thereabove, and means subsequently operable for feeding the lowermost cap from beneath the stack.

8. In a machine for operating upon can caps, the combination of a reciprocable feed slide adapted to feed a cap from beneath a stack, means operable before the return stroke of said slide for partly separating the lowermost cap from the stack, and means operable upon the return of said slide for completing the separation of the lowermost cap, the first means separating the lowermost cap sufficiently to permit the entrance of the second means between said cap and the rest of the stack and being withdrawn after the second means has so entered.

9. In a machine for operating upon can caps, the combination of a reciprocable feed slide adapted to feed a cap from beneath a stack of caps, tapered knives carried by said slide for separating the lowermost cap from the rest of the stack upon the return stroke of the slide, and means operable before the return stroke of the slide for partly separating the lowermost cap from the stack sufficiently to permit entrance of said knives.

10. In a machine for operating upon can caps, the combination of a reciprocable feed slide adapted to feed a cap from beneath a stack of caps, means carried by said slide for separating the lowermost cap from the rest of the stack upon the return stroke of the slide, and means operable before the return stroke of the slide for partly separating the lowermost cap from the stack so as to permit the entrance of the first means therebetween.

11. In a machine for operating upon can caps, the combination of a reciprocable feed slide adapted to feed a cap from beneath a stack of caps, means carried by said slide for separating the lowermost cap from the rest of the stack upon the return stroke of the slide, and means operable before the return stroke of the slide for partly separating the lowermost cap from the stack so as to permit the entrance of the first means therebetween, the second means being withdrawn after the entrance of the first means.

12. In a machine for operating upon can caps, the combination of a reciprocable feed slide adapted to feed a cap from beneath a stack of caps, means including oppositely reciprocable knives for partly separating the lowermost cap from the stack, and means subsequently operable for completing the

separation of the lowermost cap sufficiently to permit the same to be fed by said slide.

13. In a machine for operating upon can caps, the combination of a reciprocable feed slide adapted to feed a cap from beneath a stack of caps, means operable upon the return stroke of said slide to separate the lowermost cap from the stack, and means including a pair of oppositely disposed knives for partly separating the lowermost cap from the stack sufficiently to permit the entrance of the first means therebetween.

14. In a machine for operating upon can caps, the combination of a reciprocable feed slide adapted to feed a cap from beneath a stack of caps, means operable upon the return stroke of said slide to separate the lowermost cap from the stack, and means including a pair of oppositely disposed knives for partly separating the lowermost cap from the stack sufficiently to permit the entrance of the first means therebetween, the slide being provided with cam portions for actuating the second means.

15. In a machine for operating upon can caps, the combination of a reciprocable feed slide adapted to feed a cap from beneath a stack of caps, means operable upon the return stroke of said slide to separate the lowermost cap from the stack, and means including a pair of oppositely disposed knives for partly separating the lowermost cap from the stack sufficiently to permit the entrance of the first means therebetween, the slide being provided with cam portions for actuating the second means, such cam portions including means for providing lost motion in the operation of the second, means whereby the same will not be withdrawn until the first means has entered between the lowermost cap and the rest of the stack.

16. In a machine for operating upon can caps, the combination of a reciprocable feed slide adapted to feed a cap from beneath a stack of caps, means operable upon the return stroke of said slide to separate the lowermost cap from the stack, and means for partly separating the lowermost cap from the stack sufficiently to permit the entrance of the first means therebetween, the slide being provided with cam portions for actuating the second means, such cam portions including means for providing lost motion in the operation of the second means whereby the same will not be withdrawn until the first means has entered between the lowermost cap and the rest of the stack.

17. In a machine for operating upon can caps, the combination of a reciprocable slide adapted to feed a cap from beneath a stack of caps on its forward stroke, means carried by the slide for completing the separation of the lowermost cap from the rest of the stack and lifting the rest of the stack on the return stroke of the slide, cam means carried by the slide, and means operable by said cam means for preliminary separating the lowermost cap from the rest of the stack upon the forward stroke of the slide sufficiently to permit the entrance of the first means between said cap and the rest of the stack, said cam means being provided with lost motion means whereby the preliminary separating means is not withdrawn upon the return stroke of the slide until the engagement of the first means with the stack.

18. In a machine for operating upon sheet metal members, the combination of a reciprocal feed slide adapted to feed a member from beneath a stack of members on its forward stroke and to lift a portion of said stack upon its return stroke, and means operable before the return stroke of said slide for partly separating the lowermost member from the stack without buckling the latter member.

In witness of the foregoing I affix my signature.

WILLIAM CAMERON.