

Sept. 28, 1937.

A. J. JONSSON

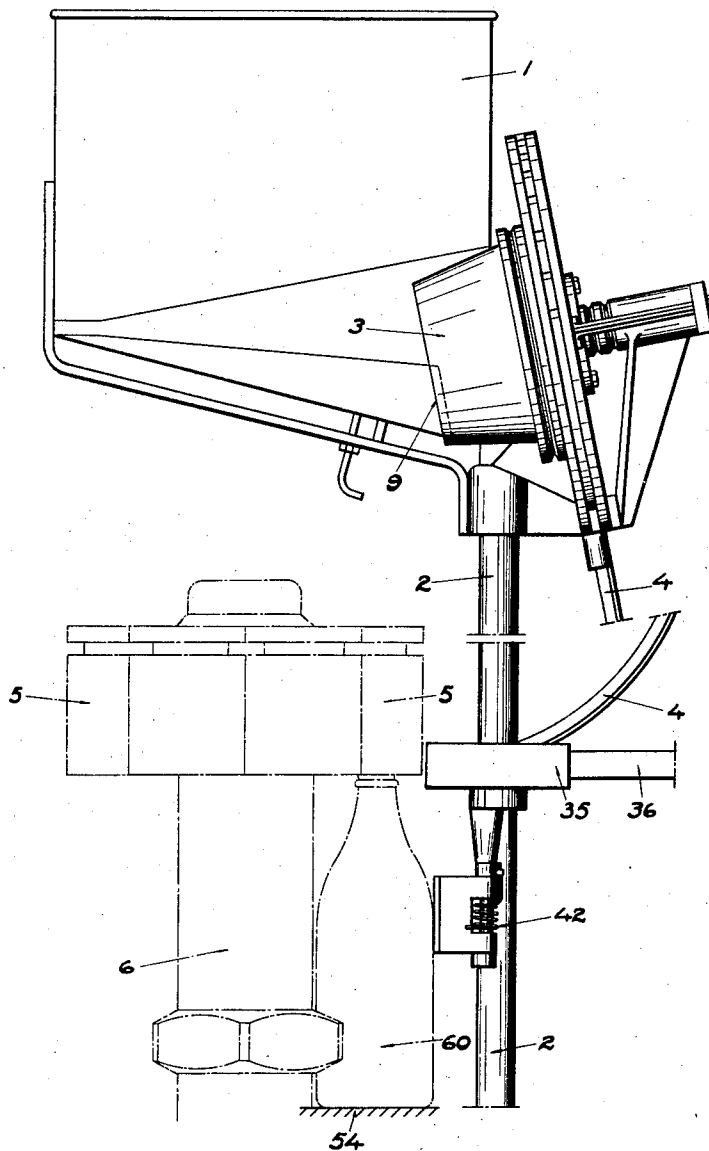
2,094,256

DEVICE FOR AUTOMATICALLY FEEDING CAPS TO A CAPPING MECHANISM

Filed Oct. 28, 1933

5 Sheets-Sheet 1

Fig. 1.



Anders Josef Jonsson
INVENTOR

Per Otto Lund
his ATTY.

Sept. 28, 1937.

A. J. JONSSON

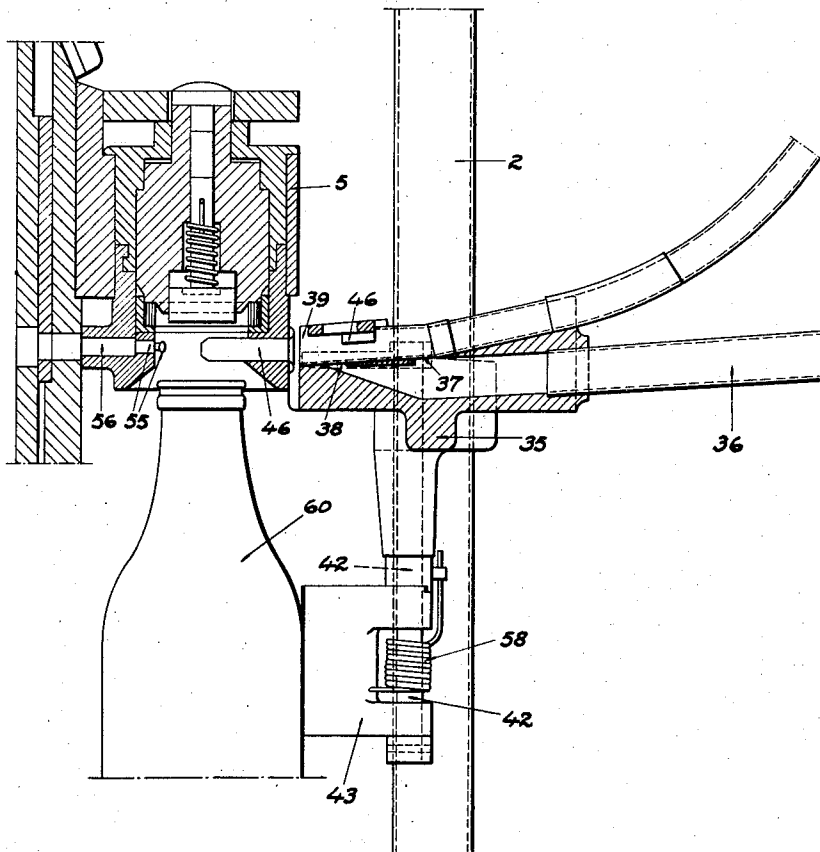
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5 Sheets-Sheet 2

Fig. 2.



Anders Josef Jonsson
INVENTOR

By *O. J. Jonsson*
his ATT'Y.

Sept. 28, 1937.

A. J. JONSSON

2,094,256

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5 Sheets-Sheet 3

Fig. 3.

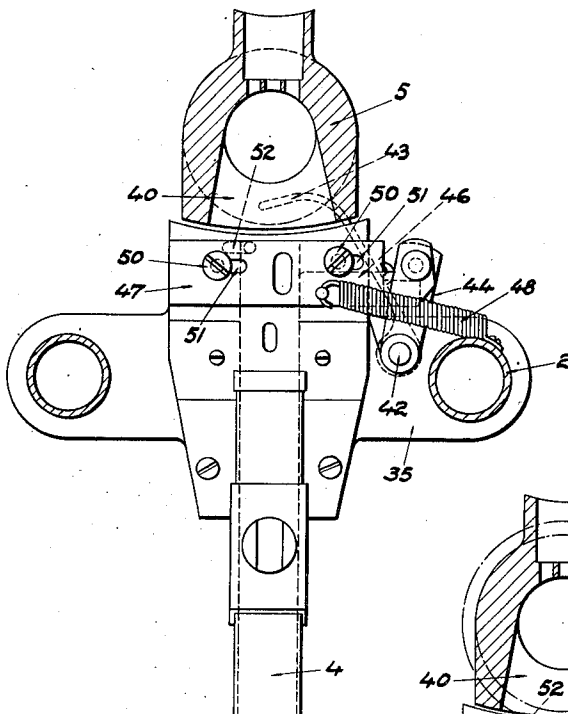


Fig. 4.

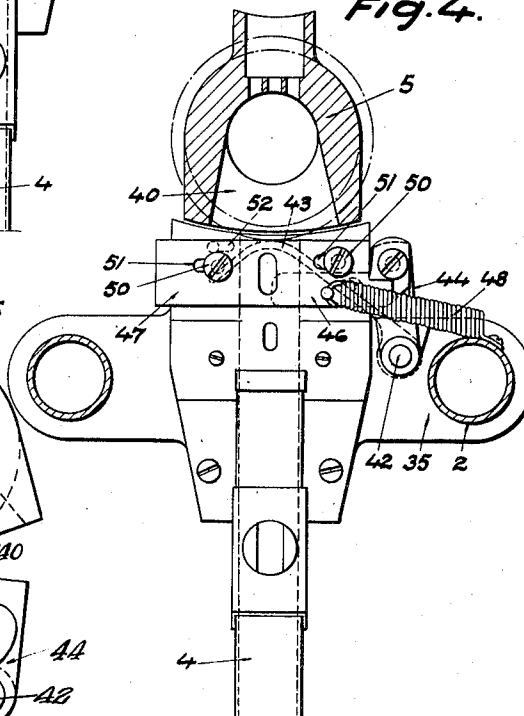
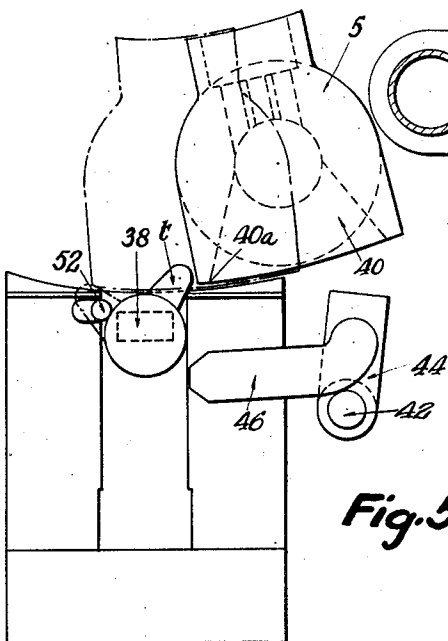


Fig. 5.

Anders Josef Jonsson
INVENTOR

R. O. Ostrom
his ATT'Y.

Sept. 28, 1937.

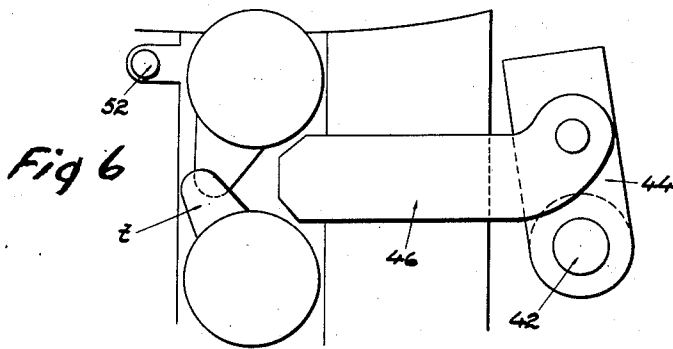
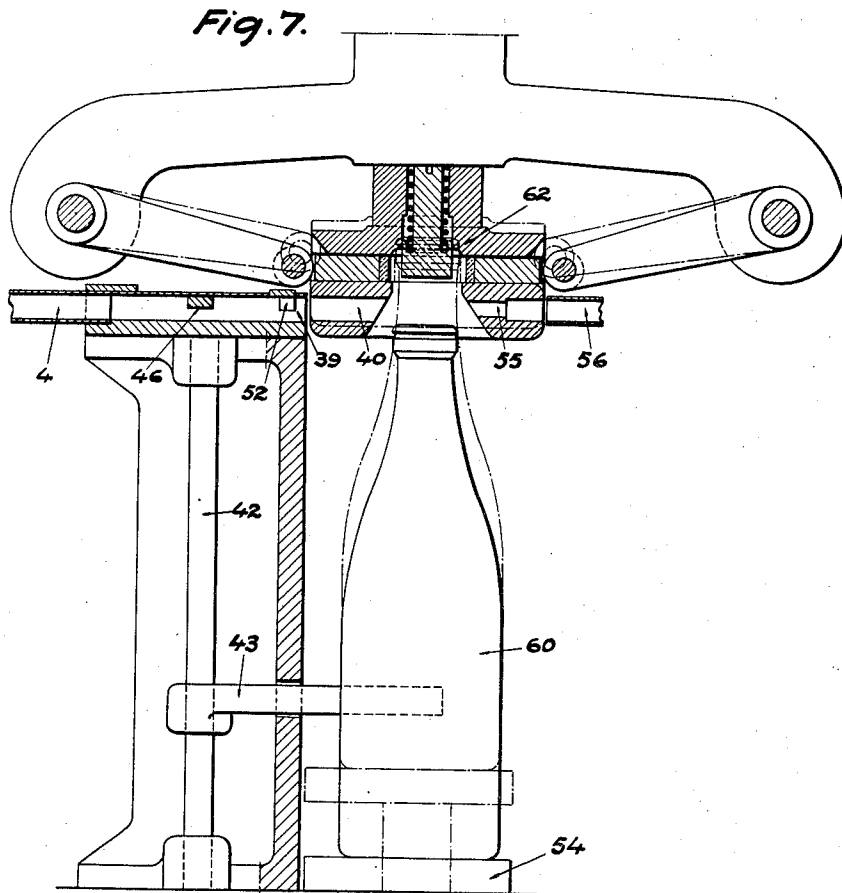
A. J. JONSSON

2,094,256

DEVICE FOR AUTOMATICALLY FEEDING CAPS TO A CAPPING MECHANISM

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5 Sheets-Sheet 4



Anders Josef Jonsson
INVENTOR

By *Odin*
his ATTY.

Sept. 28, 1937.

A. J. JONSSON

2,094,256

DEVICE FOR AUTOMATICALLY FEEDING CAPS TO A CAPPING MECHANISM

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5 Sheets-Sheet 5

Fig. 8.

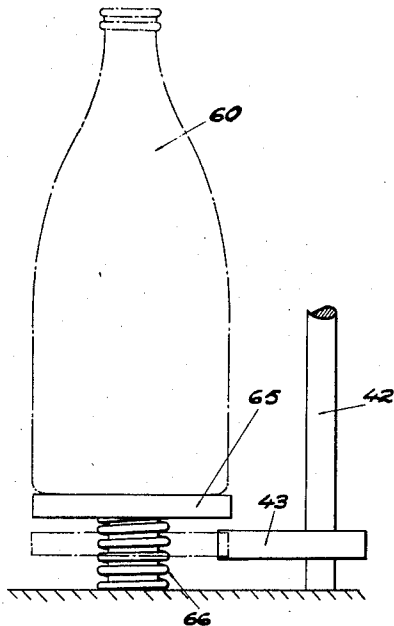


Fig. 9.

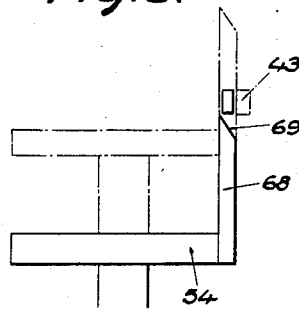
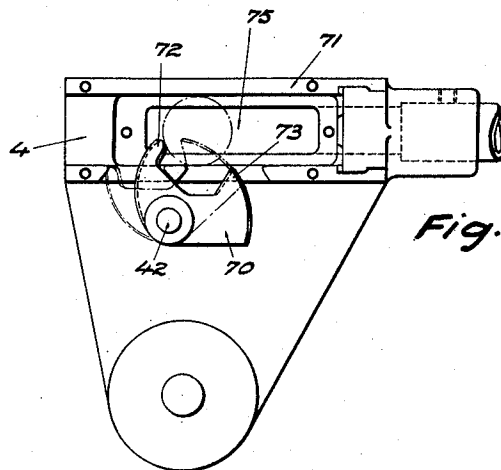


Fig. 10.

Anders Josef Jonsson
INVENTOR

By *Otto Munk*
his ATT'Y.

UNITED STATES PATENT OFFICE

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DEVICE FOR AUTOMATICALLY FEEDING
CAPS TO A CAPPING MECHANISM

Anders Josef Jonsson, Linköping, Sweden

Application October 28, 1933, Serial No. 695,714
In Sweden June 20, 1931

7 Claims. (Cl. 226—88.1)

This invention relates to a device for automatic feeding of caps, particularly caps having a tear-off tongue, from a container to a capping device, the latter generally consisting either of a number of so-called capping heads rotatable about one and the same shaft, or of a single capping head. The feeding device is constructed so as to make possible a continuous supply of caps at a rate corresponding to the production capacity of the heads, and the caps must be placed in a final position suitable for the introduction of the cap into the respective head.

In the accompanying drawings Figures 1-4 show the invention applied to a capping machine having a plurality of capping heads.

Figure 1 is a total view, partly diagrammatical, of the device drawn on a smaller scale than the other figures.

Figure 2 is a vertical section of the same device and one of the capping heads.

Figures 3 and 4 also show the same device, but viewed from above and partly in horizontal section, certain parts in Figure 4 being shown in other positions than in Figure 3.

Figures 5 and 6 are diagrammatical details drawn on a larger scale.

Figure 7 is a section of the device adapted to a capping machine having a single, i. e. non-rotating capping head.

Figures 8 and 9 are elevational views of modified details.

Figure 10 is a plan view and Figure 11 is a diagrammatical side elevational view of additional modified details.

1 indicates the container, 2 uprights of the frame supporting the container, and 3 a rotating drum, which distributes the caps from the container to a chute or a tube 4 in which they fall down to the feeding device in front of the capping heads 5. Figure 1 indicates how a number of such heads are mounted about a column 6. The construction of the container and the drum is left out here as it falls outside the scope of this invention. The lowest part of the chute 4 is situated in a frame part 35 secured to the uprights 2 at the capping heads 5. In the lowest, horizontal part of the chute the caps are fed as usual by means of a continuous air current. The compressed air piping and its openings in the bottom of the chute are indicated by 36, 37 and 38 (Figures 2 and 5).

The capping heads shown in the drawings are of the type in which the cap is introduced into the head from the side through an opening 40, and is there held in a position above the top of

the bottle by suction (the suction openings and the vacuum pipe are indicated by 55 and 56 respectively). The other constructional features of the capping head have been left out here because they do not fall within the scope of the invention. Each head has a lifting plate for the bottle, but only one, marked 54, is indicated on the drawings.

Each of the heads 5 has an introduction opening 40 and passes in front of the mouth of the chute, said mouth receiving a cap from the chute. It is necessary that each cap be blown out from the chute at the proper moment in order to enter into the head, and that the tongue *t* of the cap be turned outward from the centre of the head when the cap enters the head 5. A special mechanism described below has been provided for this purpose.

In the frame part 35 (Figures 2, 3 and 4), laterally of the chute 4, there is mounted a vertical shaft 42 traversing the frame part. On the lower end portion of the shaft there is a so-called feeler 43, and on the upper end portion of the shaft there is an arm 44 (see also Figs. 5, 6). The latter is pivoted to a stopping member 46 which is movable in a transverse direction of the chute and can be pushed some distance into the chute by turning the feeler 43 and block the chute. A slide 47 is mounted slidably above a chute in the transverse direction of the chute, said slide being held pressed against the arm 44 by means of a draw spring 48, one end of which is secured to one upright 2. The slide is guided by screws 50 in the frame part 35, grooves 51 being provided in the slide for this purpose.

On the under-side of the slide there is a pin 52 which, alternately with the part 46, in the position shown in Figures 3 and 5, is adapted to block the caps in the chute. After each discharge of a cap the members assume the positions shown for instance in Figures 3 and 5. The device operates in the following manner:

When a capping head 5 comes in the neighbourhood of the mouth 39 (Fig. 2) the bottle 60 meets the feeler 43. The latter is pushed to the side (Figure 4), the member 46 is pushed into the chute between the first and the second cap (Fig. 6) and the pin 52 is pushed out from the chute (Figures 4, 6) just when the head is in front of the mouth 39 of the chute. The first cap is blown into the head, while the next cap is stopped by the member 46. If a cap should assume the position shown with full lines in Figure 5 in the mouth of the chute it will be turned by the head into a position indicated by dot-and-dash lines

(the tongue *t* has been pushed under the pin 52). Then the tongue *t* under the influence of the air current from the opening 38 is engaged by the edge 40a adjacent to the opening 40. The rotation of the cap is continued until it is finally flung into the head with the tongue turned outward.

In order to prevent blocking of the outermost cap by a posterior cap at the blow off moment by the tongues *t* of both caps coming in contact with each other, as is indicated for instance in Fig. 6, the end of member 46 is wedge shaped and when inserted between the two caps detaches the outermost of said caps.

The application of the cap to the bottle takes place during the continued rotation of the head.

When the bottle has passed the feeler 43, the feeler and the members 44, 46, 47 and 52, under the action of the spring 48 and another spring 58 (Figures 1, 2) return to the positions shown in Figures 3 and 5, and thus the next cap comes to the blow off position.

The stationary capping head 62 according to Figure 7 resembles those mentioned above in that it has an outlet 40 provided in the side wall, and opposite said opening a suction opening 55 with a vacuum pipe 56. When capping, the top of the bottle is pushed into the head and lifts the head some distance, whereupon the cap is applied. The device shown in Figure 7 does not differ from that already described. It has a stopping member 46 and a pin 52, the feeler is operated by the bottle, etc. The head, however, is not rotatable and the change of the position of the feeler takes place when the bottle is placed on the lifting plate 54, and the bottle then holds the feeler in the given position until it is taken away. The stopping member 46 and the stopping pin 52 alternate as already described so that a new cap comes in the position to be blown off when a bottle is being removed.

As the head does not rotate it cannot co-operate in directing the tongue in the manner indicated in Figure 5. Instead, the suction opening 55 may be made so wide that there is space enough for the tongue in the opening, the cap thus fastening in the head even if the tongue be turned outward relatively to the mouth 39 when blown off.

Other embodiments of the invention are also possible without departing from the inventive idea.

Instead of allowing the bottle itself to change the place of the feeler, said change can take place indirectly, i. e. the bottle may control said change of position by means of a member actuated by the bottle. Such an embodiment, adaptable to a plurality of rotating capping heads, is shown diagrammatically in Figure 8. It is assumed that the feeler 43 changes its position under the control of a plate 65 on which the bottle is placed. Said plate is movable vertically and rests on a spring 66 which, when the plate is not occupied by a bottle, supports the plate in a position (see the full lines) where it is situated above the level of the feeler and thus cannot change the position of the same during the rotation about the column.

However, the spring is so adjusted that when the bottle is placed on the same the plate is depressed to a level with the feeler 43.

In the embodiment shown in Figure 7 the change of the position of the feeler 43 may be controlled by the lifting plate 54 or by a member connected thereto while the plate is moving up

and down, for example in the manner indicated diagrammatically in Figure 9. The lifting plate 54 is provided with an upright cam 68, the bevelled surface 69 of which during the upward motion of the plate changes the position of the feeler (here viewed from the end). During the continued motion of the plate it is held in the changed position by the remaining part of the cam, and is returned to the initial position first when the plate has arrived at the bottom position again. The present invention can, of course, also be applied to capping with tongueless caps.

Instead of making the stopping members slidable, they may be made rotatable, whereby they may be made in one piece as shown in Fig. 10. This stopping member is indicated by 70. It is fixed directly on the shaft 42, and is thus rotated by the feeler 43. It is mounted adjacent the chute 4, the lower portion of which is located in a specially constructed discharge head 71 which corresponds to the member 35 of Figures 1 and 2. The characteristic feature of the stopping member is its two stopping projections 72, 73. In Figure 10 the stopping member is shown in one stopping position in full lines, and in the other stopping position in dot-and-dash-lines. When the stopping member is being turned to the last-mentioned position, the projection 73 enters between the two outer-most caps, and pushes the outer-most cap forward while the projection 72 clears the cap so that it may be blown out from the head. At the same time the path is blocked for the cap behind. When the bottle has moved past the feeler the stopping member returns to the position shown in full lines, and the next cap is blown in position behind the projection 72. The opening 38 is located in a plate 38x covering a groove 75 extending in the discharge direction and communicating with the conduit 36. The mouth of a branch 36x of the conduit 36 constitutes the opening 37 and the air in the conduit is blown through the groove in the chute or channel 4. Figure 11 shows only the discharge head and parts of the chute 4 and conduit 36. It is clear from the above statement that the projections 72 and 73 alternate in the same way as the stopping members 46 and 52. The device shown, however, offers a considerable simplification over the stopping members 46 and 52.

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

1. A device for feeding caps to a bottle capping mechanism comprising a container for the caps, a chute extending from said container to the mouth of the capping mechanism, a compressed air pipe connected to the chute adjacent the mouth of the capping mechanism for blowing single caps out from the chute, a stopping mechanism laterally of the chute between the end of the chute and the outlet of the compressed air piping into the chute, a feeler actuated by the bottles, and a connection between the feeler and the stopping mechanism to insure the direct blowing of the first cap into position in the capping mouth immediately when a bottle is presented for capping, said stopping mechanism comprising two stopping members mounted adjacent the mouth of the chute in front of the compressed air outlet, and means controlled by said connection alternately to operate said members successively to permit and to block the passage of successive caps.

2. A device for feeding caps to a bottle capping mechanism comprising a container for the

caps, a chute extending from said device to the mouth of the capping mechanism, a compressed air pipe connected to the chute adjacent the mouth of the capping mechanism for blowing single caps out from the chute, a stopping mechanism laterally of the chute between the end of the chute and the outlet of the compressed air piping into the chute, a feeler actuated by the bottles, and a connection between the feeler and the stopping mechanism to insure the direct blowing of the first cap into position in the capping mouth immediately when a bottle is presented for capping the stopping mechanism comprising two stopping members, mounted adjacent one another in the chute, one of said stopping members viewed from the mouth of the chute having a wedge-shaped wide end, and means controlled by said connection alternately to operate said members to open and to block the passage of successive caps and to insure detaching the first cap from the next when the passage of the first cap is opened.

3. A device for feeding caps to a bottle capping mechanism comprising a container for the caps, a chute extending from said device to the mouth of the capping mechanism, a compressed air pipe connected to the chute adjacent the mouth of the capping mechanism for blowing single caps out from the chute, a stopping mechanism laterally of the chute between the end of the chute and the outlet of the compressed air piping into the chute, a feeler actuated by the bottles, and a connection between the feeler and the stopping mechanism to insure the direct blowing of the first cap into position in the capping mouth immediately when a bottle is presented for capping the stopping mechanism comprising two rigidly interconnected stopping members one of which is wedge-shaped so that when it enters between two caps it moves the first cap from the second for the purpose of permitting blowing off the first cap alone, and a pivotal mounting for said members adjacent the mouth of the chute and above the compressed air discharge opening.

4. A device for feeding caps to a bottle capping mechanism comprising a container for the caps, a chute extending from said device to the mouth of the capping mechanism, a compressed air pipe connected to the chute adjacent the mouth of the capping mechanism for blowing single caps out from the chute, a stopping mechanism laterally of the chute between the end of the chute and the outlet of the compressed air piping into the chute, a feeler actuated by the bottles, and a connection between the feeler and the stopping mechanism to insure the direct blowing of the first cap into position in the capping mouth immediately when a bottle is pre-

sented for capping the stopping mechanism comprising two stopping members rigidly connected with one another and a pivotal mounting for said members adjacent the mouth of the chute and so positioned with respect to the outlet of the compressed air piping that the current of air acts directly upon each cap which when stopped contacts with one of the stopping members.

5. A device for feeding caps to a bottle capping mechanism comprising a supply device for the caps, a chute extending from said device to the mouth of the capping mechanism, pneumatic means comprising a compressed air pipe connected to the chute adjacent the mouth of the capping mechanism to blow the single caps out from the chute, a bottle controlled stopping mechanism laterally of the chute between the end of the chute and the outlet of the compressed air piping into the chute, said mechanism being provided with means to open the chute for the outmost cap and simultaneously to block the chute for the next cap and in the following movement to block and open for the outmost cap and next cap respectively in dependence of the presence of bottles.

6. A device for feeding caps to a bottle capping head comprising a supply device for the caps, a chute extending from said device to the mouth of the capping head, pneumatic means to blow single caps out from the chute, bottle controlled stopping means disposed at the end of the chute whereby the blowing off of each cap is dependent upon the presence of a corresponding bottle, and suction means to catch and hold the cap in the capping head before the applying operation.

7. A device for feeding caps provided with a tear off tab to a bottle capping head, comprising a supply device for the caps, a chute extending from said device to the mouth of the capping head, means for moving the capping head past the chute so as to align the mouth of the capping head with said chute, pneumatic means for blowing single caps out of the chute, bottle controlled stopping means disposed at the end of the chute whereby the blowing off of each cap is dependent upon the presence of a corresponding bottle, means combined with the stopping means to control the movement of each cap to cause it to enter the head with the tab directed backwards, said means comprising a pin impeding the advancement of each cap so that only the tab may project into the path of movement of the capping head, whereby the latter will encounter any tab that may be in its path and thereby rotate the cap, and suction means to catch and hold the cap in the capping head before the applying operation.

ANDERS JOSEF JONSSON.