

July 26, 1932.

A. J. SPRAGUE

1,868,546

DETECTOR MECHANISM

Filed June 22, 1929

4 Sheets-Sheet 1

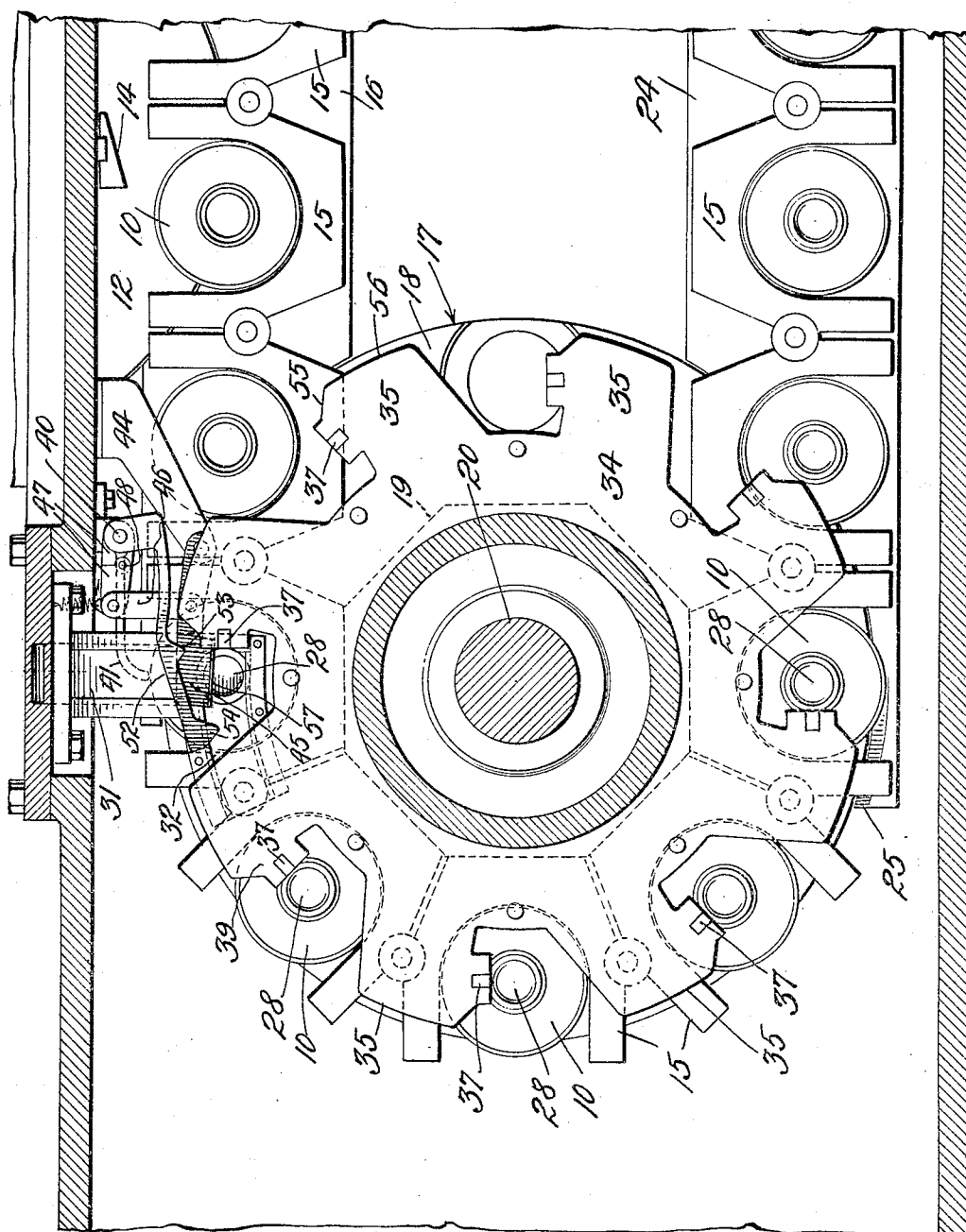


Fig. 1.

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4 Sheets-Sheet 2

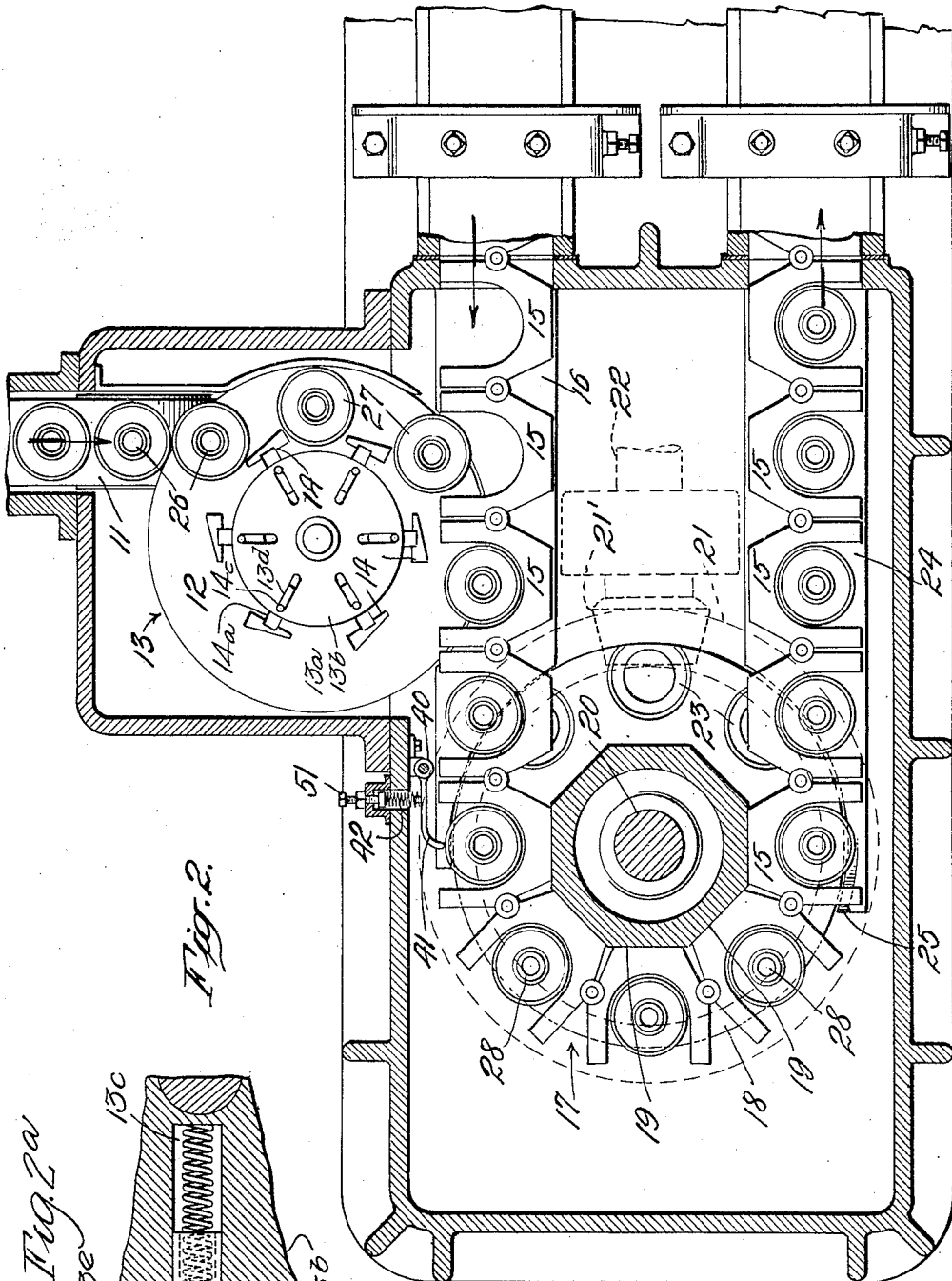
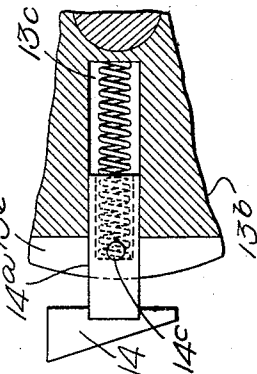


Fig. 2.

Fig. 2a



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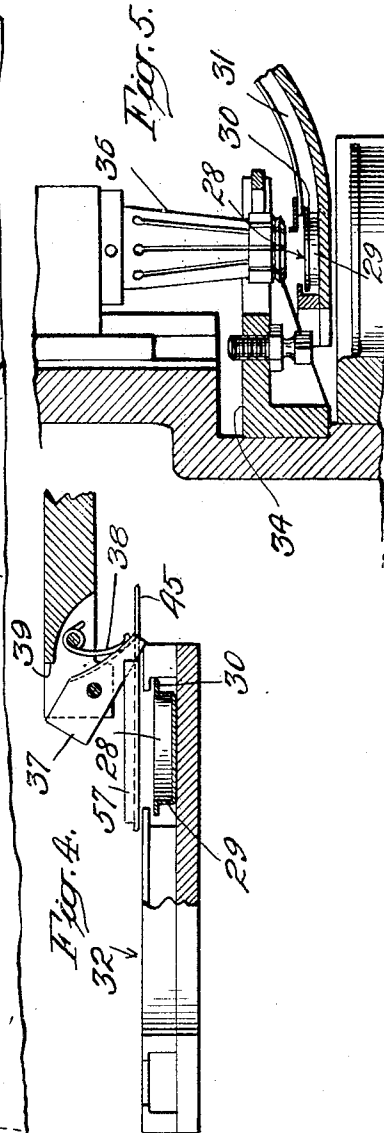
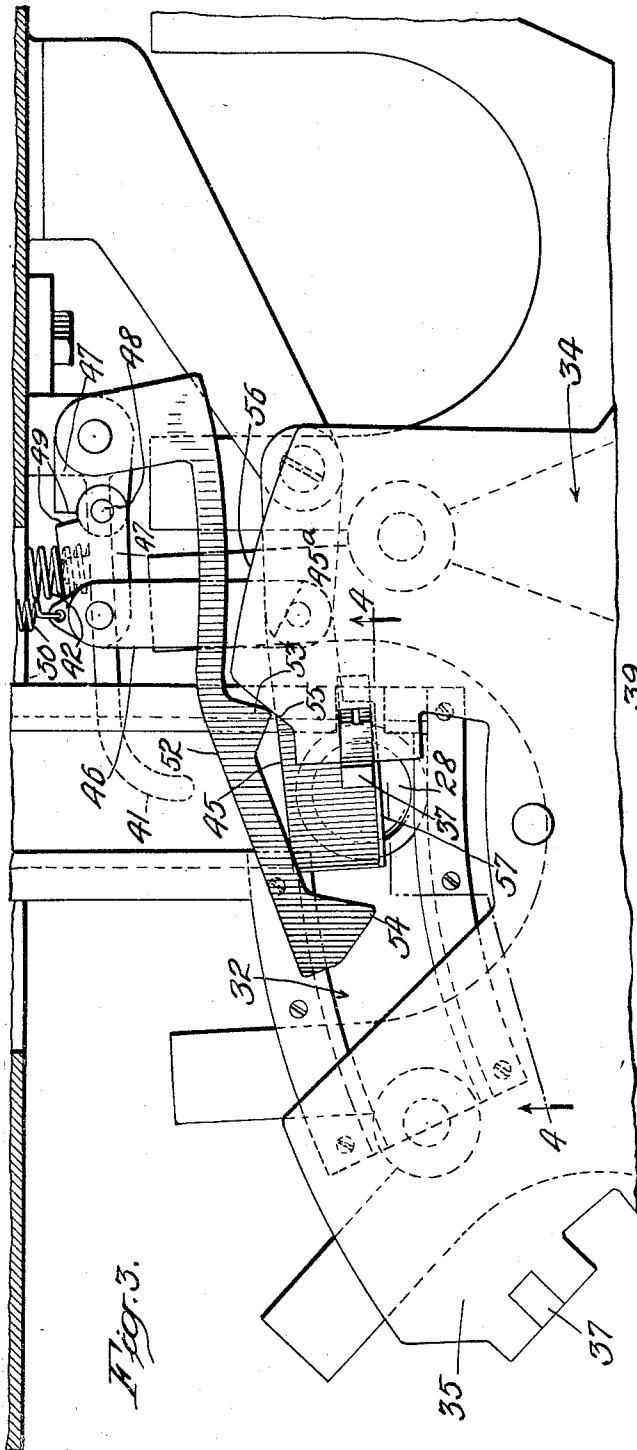
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4 Sheets-Sheet 3



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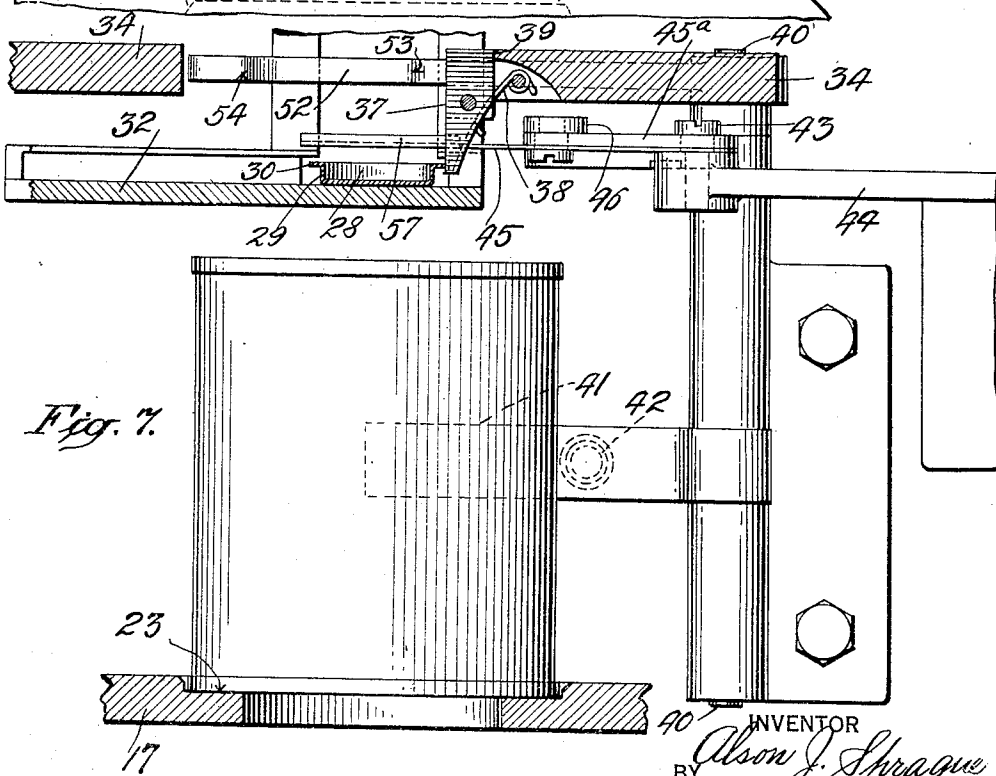
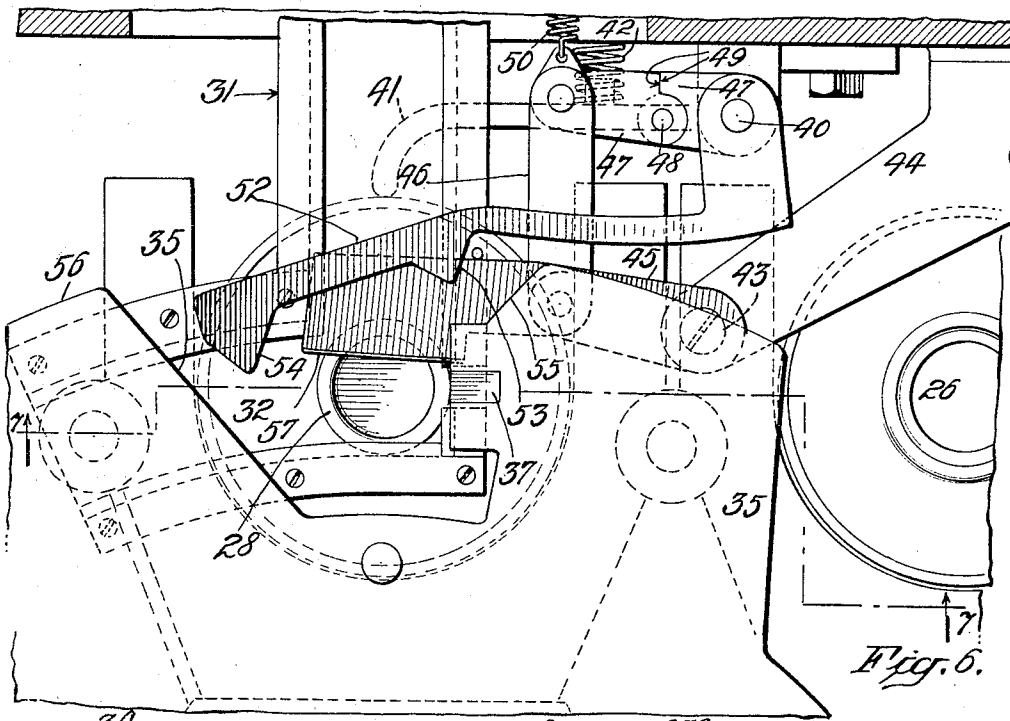
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DETECTOR MECHANISM

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4-Sheets-Sheet 4



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DETECTOR MECHANISM

Application filed June 22, 1929. Serial No. 372,841.

The invention relates to an improvement in detector mechanisms, and more particularly to an improvement in detector mechanisms especially adapted for that class of machines which operate on cans or containers filled with food.

The object of the invention is to produce an improved detector mechanism of this type. In accordance with this object one feature of the invention is the provision, in connection with means for feeding closures or caps to position for application to cans or other containers, of means for preventing the feeding of a closure or cap in case of failure to supply a can or container to receive the same. Another feature of the invention is the provision in such connection, of means for preventing the feeding of a closure or cap to a position for capping a can and controlling means for said preventing means including a device engaged by each can, as it is moved towards the capping position, to render the preventing means ineffective. Another feature of the invention is the provision in connection with cap feeding means, of a detector or feeler to engage each can as it approaches the capping zone, a device controlled by the feeler and adapted to prevent the feeding of a cap in the event that there is no can to act on the feeler, and means for holding said preventing means in effective condition for a predetermined interval and then releasing the same. A further object of the invention is the provision, in connection with cap feeding means, of a device to prevent the feeding of a cap to the capping zone, means including a detector for rendering the preventing device ineffective when a can is supplied and engages the feeler, means for holding the preventing device in effective condition (due to absence of a can in the detecting zone) until the can feeding means approaches a condition for moving another can into the detector zone, and means for restoring said detector to normal retracted position during the period in which the preventing means is held in effective position. Other features of the invention relate to the construction and arrangement of parts whereby the supply of closures or caps

may be controlled in the general manner specified.

In the accompanying drawings illustrating the preferred form of the invention, Fig. 1 is a fragmentary horizontal section taken above the rotary cap feeding means and showing the position of the parts when the feeler is held back by a can; Fig. 2 is a fragmentary view, principally in section along a horizontal plane between the cap feeding mechanism and the can feeding mechanism, the feeler being held back by a can; Fig. 2a is a fragmentary detail view, partly in section, of one of the units of the can transfer device; Fig. 3 is a view on a larger scale of the cap controlling means shown on Fig. 1 but with the parts in the positions assumed due to failure of a can to engage the feeler; Fig. 4 is a sectional view along the line 4—4 of Fig. 3; Fig. 5 is a view, partly in vertical section, illustrating part of the mechanism for inserting the cap in the top of the can and swaging or expanding it to secure it in said top of the can; Fig. 6 is a view on a larger scale of part of the structure shown in Fig. 1 and with the parts in the same position; and Fig. 7 is a sectional view taken along the line 7—7 of Fig. 6.

The improved mechanism, as illustrated, includes means for moving cans through a capping zone, means for supplying caps one by one to the capping zone, and means responsive to the presence or absence of a can to permit the cap supplying means to supply a cap, or to prevent the cap supplying means from supplying a cap, respectively. The mechanism for producing such effects is embodied in a machine in which cans are supplied one by one to a rotary member and held in proper position thereon and the caps are brought one by one and at corresponding times to the capping point by means including a device rotating simultaneously with said rotary member and about the same axis. The means for supplying the caps to the capping point include members on said rotary device to engage caps and move them to the capping position, and cooperating with the cap engaging members means responsive to the presence or absence of a can in the cor-

responding position to control the action of such cap engaging members and cause a cap to be supplied when a can is present and to prevent the supply of a cap in the event of the absence of a can.

As illustrated in the drawings, cans 10 in upright position are supplied by means including a traveling belt 11 to the upper side of a table 12 forming part of a rotatable transfer device or turret 13 which also includes yieldable devices 14 to engage the cans and deliver them, one by one and without danger of damage thereto, into outwardly facing pockets in U-shaped links 15 of a conveyor chain which moves along the upper surface of a support 16 to a rotary device 17 comprising a table 18, on which the chain rests, and a sprocket wheel or pulley 19 around which the conveyor chain passes and by which it is driven. The transfer device 13 includes a table portion 13a to carry the cans 27 and a raised central portion 13b having radial slots 13c in which are mounted the shanks 14a of the yieldable devices 14, the devices 14 being urged outwardly by springs 14b and being limited as to their outward movement by pins 14c projecting therefrom into slots 13d in the raised portion 13b. The portion 13b is also provided with recesses 13e to receive the heads or outer ends of the yieldable devices 14. As here shown the rotary device is secured to a vertical shaft 20 to which power is transmitted by means of a bevel gear 21 thereon meshing with a bevel gear 21' on a horizontal shaft 22.

The table 18 of the rotary device 17 is provided at suitable intervals with shallow sockets or seats 23 (Fig. 7) into which the cans drop when moved from the support 16 to the table 18, the peripheral wall of each socket being beveled at its upper edge to assist in guiding the lower ends of the cans into the socket. It will be evident that such sockets will maintain the cans in proper position as to spacing and prevent the cans from working out of the links of the conveyor chain while moving around the sprocket wheel 19.

It should be noted that the sockets 23 are positioned so near to the edge of the table 18 that, while they enclose large enough parts of the lower ends of the cans to prevent the cans from working out radially of the table, the cans project beyond the edge of the table. This feature is of importance and is utilized in connection with freeing the cans from the sockets just before the conveyor chain leaves the sprocket wheel 19 and travels along the support 24 which has an arcuate edge positioned close to the edge of the table 18 and is provided at its rear end with a cam 25, which may be in the form of an incline formed in the support in a position to be engaged by the portions of the cans projecting beyond the edge of the table to cam the cans upward-

ly out of the sockets so that they can be transferred freely from the table 18 to the support 24 by the chain.

Each can 10 has a central circular opening 26 in its upper head 27 and this opening is to be sealed by suitable means, such as a cap 28, placed in the hole or opening and swaged so as to form an air-tight joint between it and the edge of the hole 26. The cap 28 comprises a dish-shaped body portion 29 having at its upper edge a flat annular rim 30 (Fig. 5). The caps 28 are fed through a chute 31 to a position above the path of the openings 26 during the passage of the cans around the sprocket wheel 19, and at the beginning of a channel or cap run 32 which follows the path of the openings, the side walls of the chute and of the cap run being provided with overhanging flanges to retain the caps against accidental discharge. As the caps are fed through the chute 31 the leading cap moves into engagement with the opposite side wall of the channel 32 and, unless it is moved along the channel by suitable means, it will block the line of caps behind it.

For the purpose of supplying a cap for each can, there is provided on the rotary device 17 an annular member 34 having teeth 35 spaced so as not to interfere with the downward movement of swaging devices 36 and provided at their forward edges with means for engaging caps in the channel at the lower end of the chute 31 and advancing one cap along the channel for each can fed to the table 18. Preferably each of these cap engaging devices is in the form of a finger 37 pivoted in a slot in the corresponding tooth 35 and extending downwardly therefrom, said finger being supported for effective operation by a spring 48 which normally holds it with its upper end in engagement with a stop shoulder 39 and with its forward edge in a position to avoid interference with the operation of the corresponding swaging device. There is a swaging device 36 above each can receiving seat 23 and, as the cap at the bottom of the chute 31 is engaged and moved along the channel 32, the swaging device is inserted in the cap and, after the cap is advanced beyond the end of the channel, the swaging device is operated to depress the cap further to place it in the opening 26 of the corresponding can 10 and swage it to secure it firmly in position and effect hermetic sealing of the can. The swaging device may be of usual construction.

Obviously the caps supplying mechanism just described assures the supply of one cap for each can supplied for sealing but, unless suitable provision be made for such condition, caps might be fed to the swaging devices even when no cans are supplied for sealing. According to the present invention, this situation is met by suitable means of which the preferred form will now be described. Fixed

on a vertical shaft 40 is a detector or feeler 41 positioned to be engaged by a can beneath the end of the chute 31 and held in retracted position thereby against the action of a compression spring 42. Pivoted at 43 on a fixed bracket 44 is a tripping member or lever 45 for controlling the effectiveness of the fingers 37, and the position of this tripping lever is determined by means including a link 46 pivoted to said tripping lever and to an arm 47 mounted on said shaft 40. Preferably the tripping lever is of relatively thin material and is provided at its pivot end with a reinforcing member 45a which serves to support the corresponding end of the link 46. For reasons to be brought out more fully hereinafter, the arm 47 is hinged at an intermediate point to bend about a pin 48 and is provided at the side farthest from the tripping lever 45 with stop shoulders 49 so that the arm may be bent towards but not from the tripping lever, the stop shoulders being held in engagement ordinarily by suitable means such as the spring 42 and a tension spring 50 connected with the outer end of the link 46. This arrangement makes it possible to swing the feeler back when the tripping lever is prevented from swinging back. As indicated in Fig. 2, the compression of the spring 42 may be regulated by means such as a screw 51 engaging the outer end of the spring and secured in adjusted position by means such as a lock nut.

The detector or feeler 41 is controlled as to position not only by the cans 10 but also by mechanism which produces feeling movements thereof and preferably includes a controller 52 in the form of an arm or member fixed on the shaft 40 and extending in the general direction of the movement of the cans to the capping zone and in the plane of the member 34. This controller is provided with inwardly projecting cams or lugs 53 and 54 adapted to be engaged in that order by inclined edges or cams 55 at the forward sides of the teeth 35 of the member 34 and cammed outwardly so as to ride along the outer ends of such teeth on surfaces or dwells 56 which are substantially in the form of arcs described about the axis of the rotary device 17. This arrangement enables the retraction of the detector in two successive steps the cam 54 engaging an inclined edge 55 substantially at the time when the cam 53 runs off the dwell 56.

In operation, cans 10 are fed along the belt 11 to the transfer device 13 which supplies the cans one by one to the pockets in successive U-shaped links 15 in the conveyor chain which advances them to the table 18 of the rotary device 17 where they drop into the sockets or seats 23 and are carried past a can detecting zone at which the feeler 41 and mechanism associated therewith permit or prevent the supply of a cap 28 in accordance

with the presence or absence of a can in the detecting zone, and a cap inserting and swaging zone, and are then lifted out of the sockets 23 by the cam 25 and moved off the table 18 by the chain and conveyed along the support 24 to any desired point.

As indicated in Fig. 6, the tooth 35 at the extreme left has just moved out of the range of the cam 54 and permitted the feeler 41 to swing inwardly to feel for and engage a can which limits the inward movement of the cam to such an extent that the lever or member 45 is kept out of the path of the corresponding finger 37. The finger 37 will then engage the cap 28 in the channel 32 at the lower end of the line in the chute 31 and advance it along the channel, thereby allowing the line in the chute to advance a distance corresponding to the diameter of one cap. The cap thus advanced will be kept directly above the opening 26 of the can to be sealed and as it passes along the channel 32 the end of the inserting and swaging device 36 will be lowered to insert itself into the concave upper side of the cap and as the cap is carried off the end of the bottom of the channel to force it into the opening 26 and swage the cap so as to seal the can hermetically.

As the can advances from its Fig. 6 position, the detector or feeler 41 will ride down the surface of the can and the lever 45 will tend to swing inwardly and engage the finger 37 at its side. Further movement of the rotary device 17 will, however, bring the inclined edge 55 at the forward side of the next tooth 35 into engagement with the cam 53 on the lever or controller 52 and swing the feeler 41 and the tripping lever 45 outwardly until the cam 53 rests on the outer edge or dwell of the tooth 35 and the parts will remain in this position until the cam 54 engages the edge 55 and causes the feeler to be swung still farther outwardly preparatory to releasing it to feel for a can in the next link of the conveyor or seat in the rotary table 18.

If there is no can present in the can detecting zone the feeler 41 will swing inwardly and permit the tripping member 45 to swing to the position shown in Fig. 3 across the path of the finger 37, thereby serving as a disabling device and swinging the finger about its pivot so that it will ride up on the tripping member outside of an upwardly extending flange 57 and, while ineffective to advance a cap, will prevent outward swinging of the tripping member and consequent release of the finger until the finger has advanced to a point to clear safely the next cap to be fed. Almost immediately after the finger 37 has been shifted to engage the outer side of the flange 57 the cam 53 will engage the inclined edge 55 and the arm or lever 52 and the feeler 41 will be swung outwardly. The spring 50 then draws on the tripping lever 45 to swing it outwardly but this lever is held against such

movement and consequently the hinged arm 47 is bent about the hinge pin 48 and the stop shoulders 49 separated. As soon as the finger 37 passes beyond the end of the flange 57, the lever 45 will be released and the spring 50 will act to swing it outwardly and straighten the hinged arm 47.

It will be evident that every time a can is supplied to the can feeling zone a cap will be advanced for use therewith and that every time there is a failure to supply a can to the feeling zone the cap feeding means will be rendered ineffective.

The links 15 of the conveyor chain are substantially the same as those disclosed in my copending application Serial No. 372,842, filed June 22nd, 1929, and are adapted to fit substantially air-tight in entrance and exit air locks.

Having thus described the invention what I claim as new is:—

1. In a machine for sealing cans each having a hole in one end, the combination with means for feeding cans in succession along a path including a sealing zone in which the cans are sealed and a supply point at which a cap is placed over a corresponding can preparatory to sealing the can, of means for feeding caps to said sealing zone one by one and simultaneously with said cans including members normally movable in a path to engage successive caps at a supply point and advance them with corresponding cans as the latter pass beneath the cap supply point, and means responsive to the absence of a can beneath said supply point to shift the corresponding member out of its normal path and thereby prevent the feeding of a cap.

2. In a machine for sealing cans each having a hole in one end, the combination with means for feeding cans in succession along a path including a sealing zone in which the cans are sealed and a supply point at which caps are placed over corresponding cans preparatory to sealing the cans, of means for feeding caps to said sealing zone one by one and simultaneously with corresponding cans including devices movable to engage successive caps at a supply point and advance them with corresponding cans as the latter pass the cap supply point, and means responsive to the absence of a can adjacent to said supply point to render the corresponding cap engaging device ineffective to advance a cap.

3. In a machine for sealing cans each having a hole in one end, the combination with means for feeding cans one by one along a path including a can detecting zone and a sealing zone, and means for feeding caps to said sealing zone one by one and substantially simultaneously with corresponding cans, of a detector yieldably urged to engage a can in said detecting zone, means for retracting said detector at the time for a can

to pass out of the detecting zone and for releasing the same for detecting action at the time for the next can to be positioned in the detecting zone, and means, responsive to abnormal detecting movement of said detector due to absence of a can in the detecting zone, for preventing the movement of a corresponding cap to the sealing zone.

4. In a machine for sealing cans each having a hole in one end, the combination with means for feeding cans one by one along a path including a can detecting zone and a sealing zone and a cap runway above the path of said cans and extending toward said sealing zone, of cap feeding means including a plurality of yieldingly supported cap engaging fingers moved along said runway in accordance with the movement of cans toward said sealing zone, a member mounted for movement across the path of said fingers to engage a finger and shift it against such yielding support to render it ineffective to advance a cap, and means responsive to absence of a can in the detecting zone for causing said member to engage the corresponding finger and render it ineffective.

5. In a machine for sealing cans each having a hole in one end, the combination with means for feeding cans one by one along a path including a can detecting zone and to a sealing zone and a cap run above the path of said cans and extending toward said sealing zone, of cap feeding means including a plurality of yieldably supported cap-engaging fingers moved along said run in accordance with the movement of cans toward said sealing zone, a device movable across the path of said fingers to engage a finger and shift it against such yielding support to render it ineffective to advance a cap, means responsive to absence of a can in the detecting zone for causing said device to render the corresponding finger ineffective, and means to maintain such finger ineffective.

6. In a machine for sealing cans each having a hole in one end, the combination with means for feeding cans in succession along a path including a sealing zone, of means for feeding caps to said sealing zone at times to correspond to the feeding cans thereto and including cap engaging devices movable in a path to engage successive caps, a disabling device yieldably urged to a position to engage a cap engaging device and shift it out of said path and constructed to be locked in such position by a cap engaging device engaged thereby, a detector yieldably urged to a position to engage a can, means to retract said detector at the time for the can feeding means to move a can out of the detecting zone and to release the same at the time for a can to be positioned in the detecting zone, and a connection between said device and said detector for moving said device back and forth with said detector but adapted to yield

when said device is so locked in advanced position.

7. In a machine for sealing cans each having a hole in one end, the combination with means for feeding cans in succession along a path including a sealing zone, of means for feeding caps to said sealing zone in correspondence to the feeding of cans thereto and including cap engaging fingers movable in a path to engage successive caps, each of said fingers being pivoted to swing rearwardly about a horizontal pivot above the path of the caps and being yieldably supported against such rearward swinging to render it effective, a disabling device mounted to swing about a vertical axis into the path of each of said fingers and including a part over which each finger rides when swung rearwardly thereby and a flange projecting upwardly from the upper surface of said part and in position to engage the disabled finger from the side and prevent the swinging of the disabling member to ineffective position, a detector yieldably urged to a position to engage a can, means to retract said detector at the time for the can feeding means to move a can out of the detecting zone and to release the detector at the time for a can to be positioned in the detecting zone, and a connection between said disabling device and said detector for moving said disabling device back and forth with said detector but adapted to yield when said device is locked against return by the engagement of said flange with the side of a disabled finger.

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