

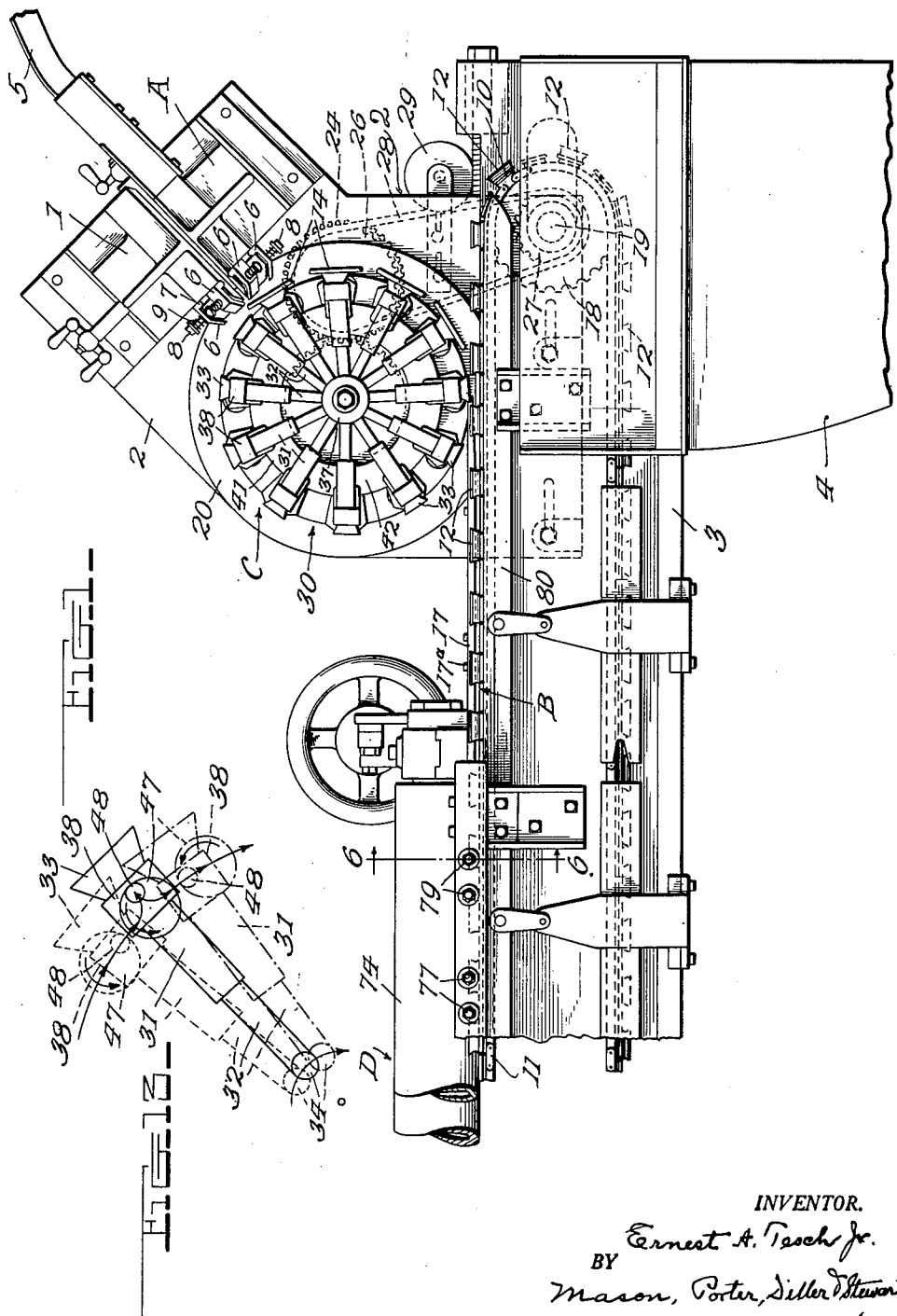
June 10, 1952

E. A. TESCH, JR
CAP FEEDING MECHANISM

2,600,138

Filed March 19, 1948

7 Sheets-Sheet 1



INVENTOR.

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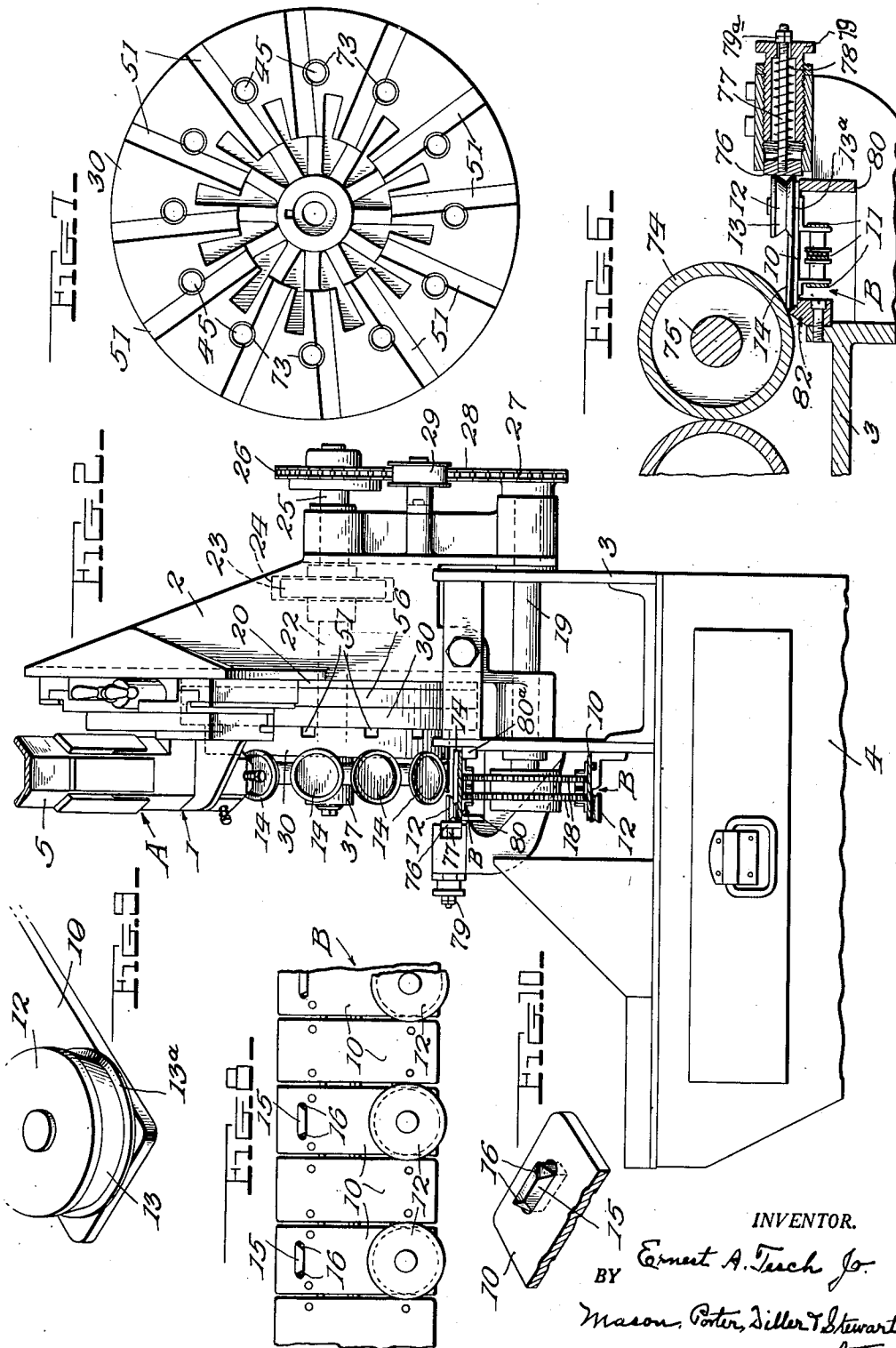
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CAP FEEDING MECHANISM

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7 Sheets-Sheet 2



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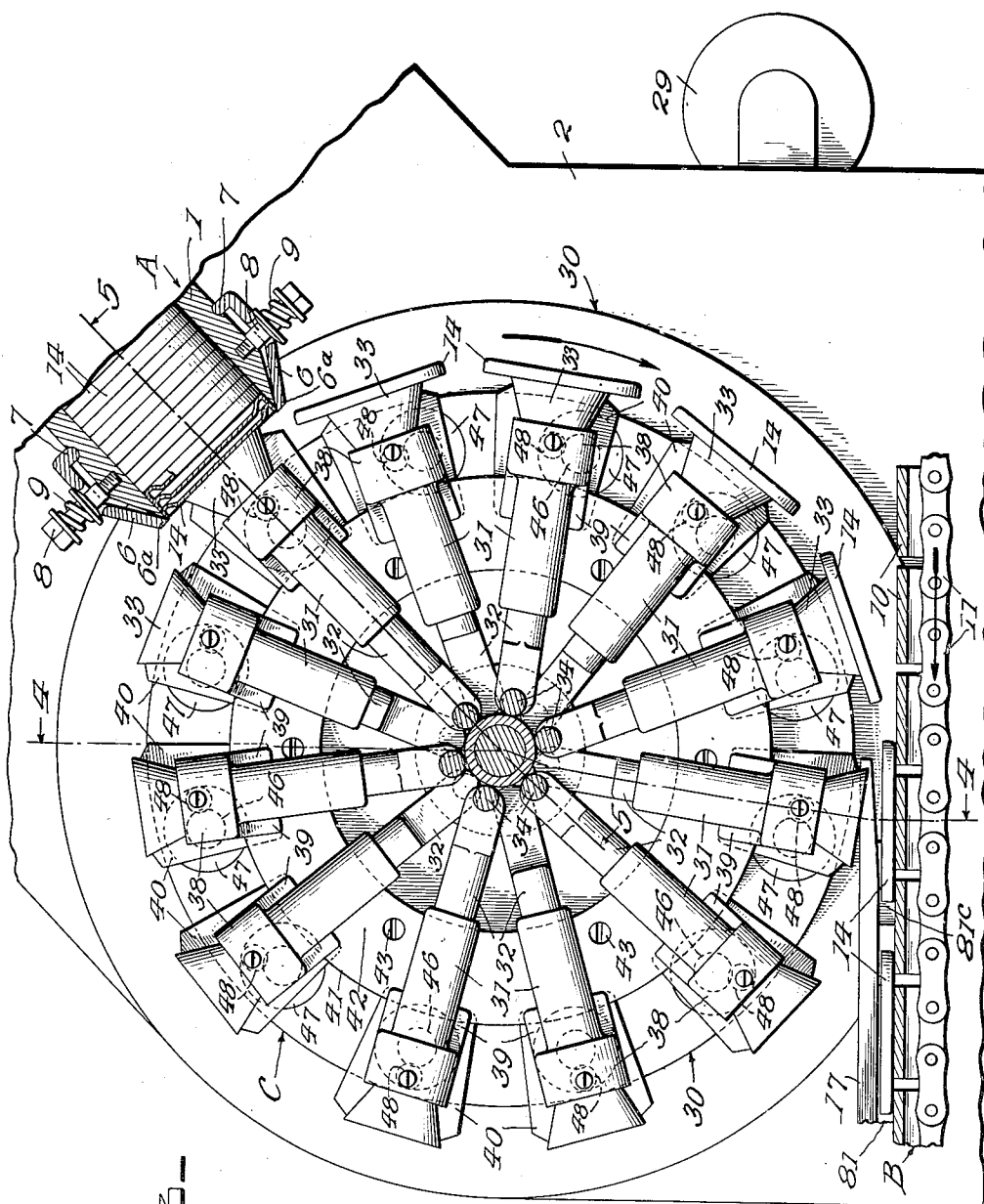
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CAP FEEDING MECHANISM

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7 Sheets-Sheet 3



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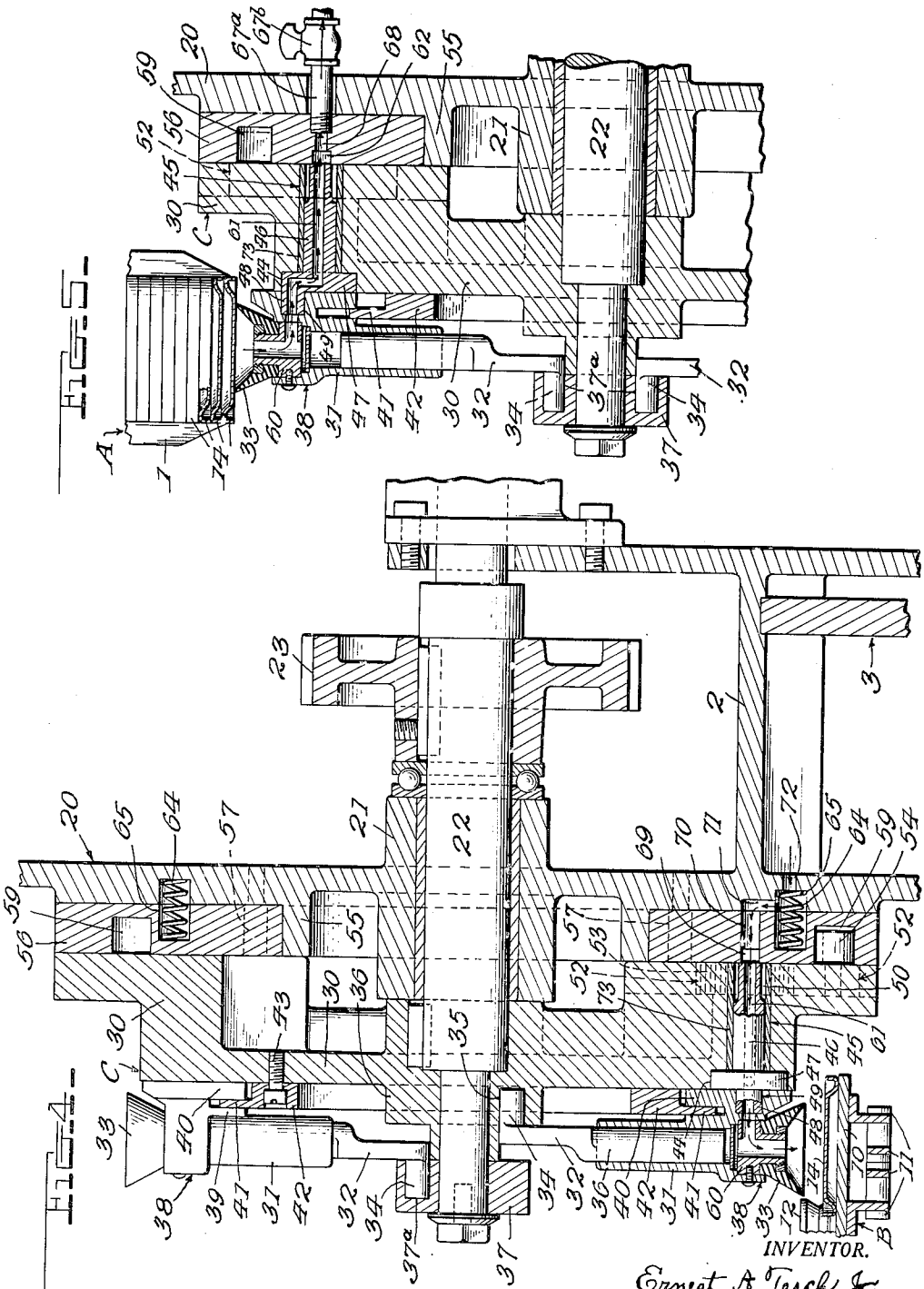
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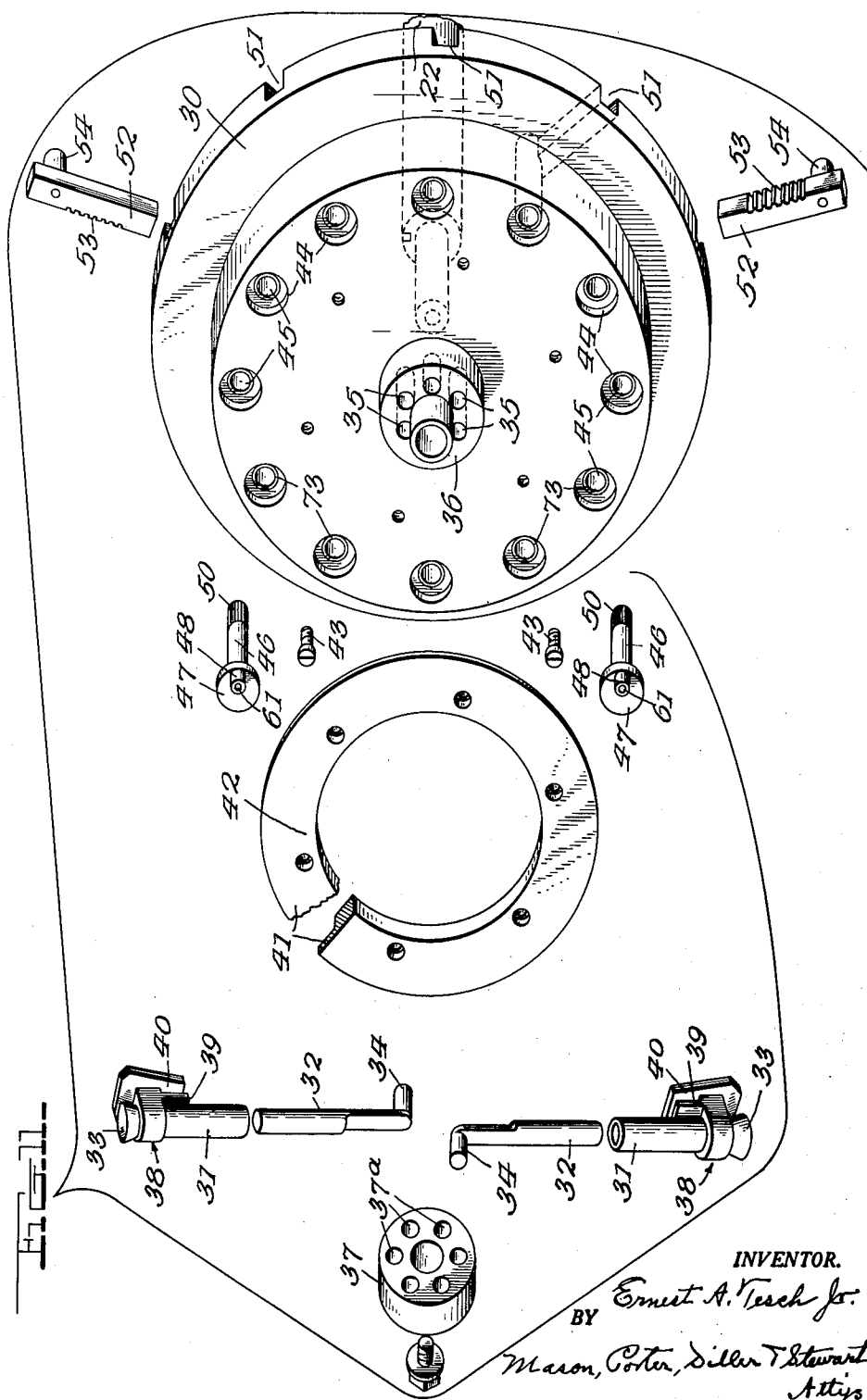
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E. A. TESCH, JR
CAP FEEDING MECHANISM

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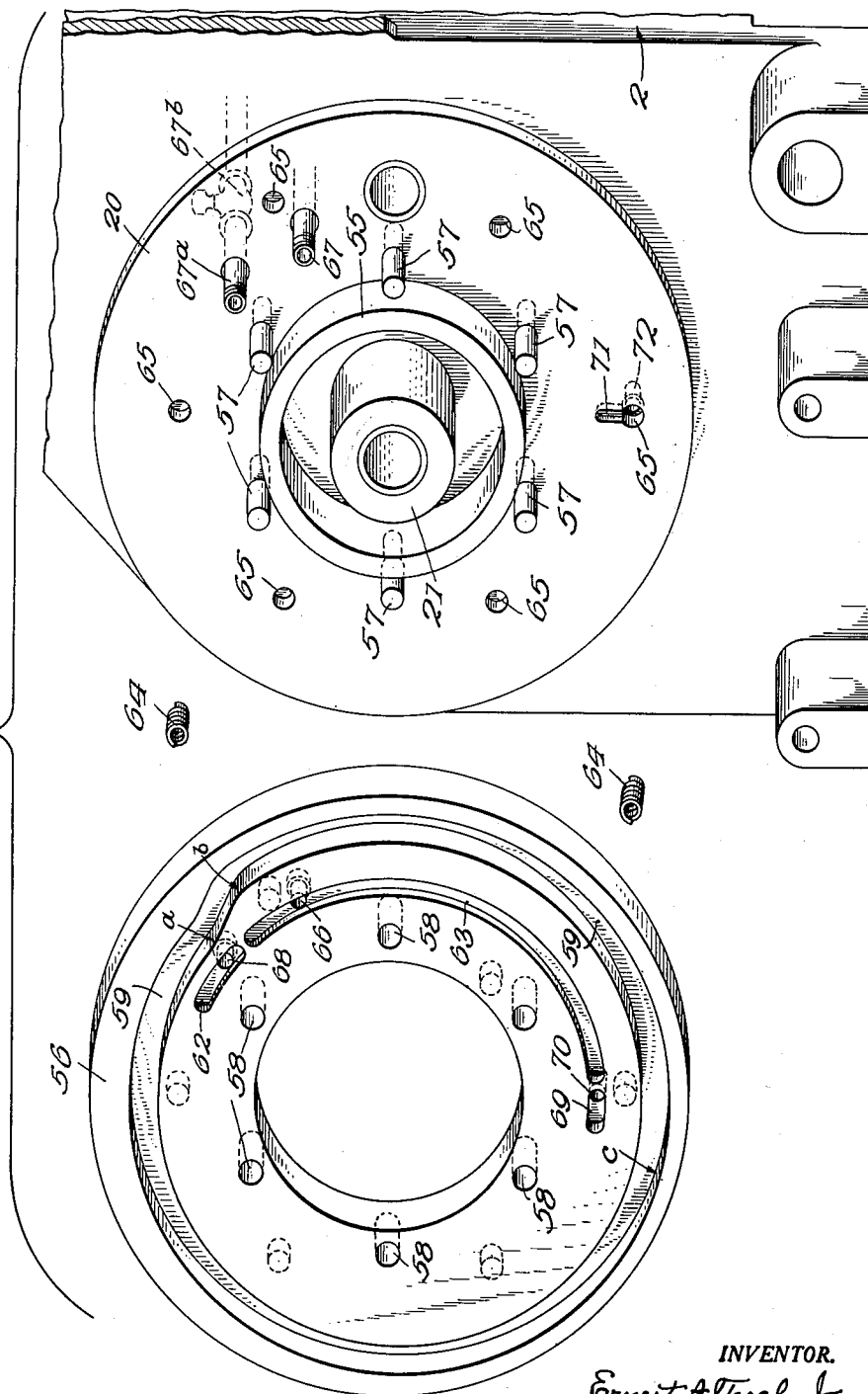
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7 Sheets-Sheet 6

FIG. 12-



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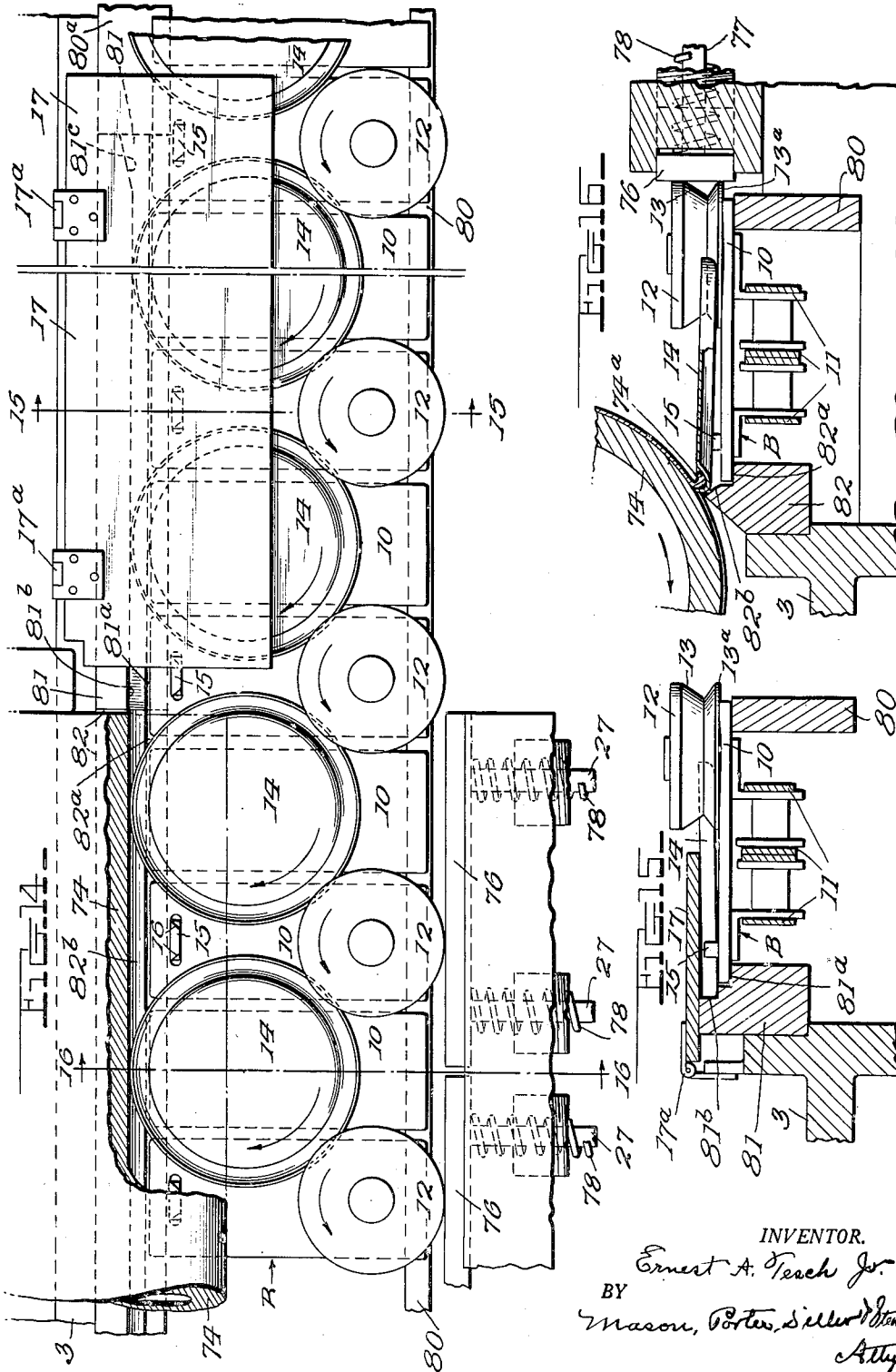
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CAP FEEDING MECHANISM

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7 Sheets-Sheet 7



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UNITED STATES PATENT OFFICE

2,600,138

CAP FEEDING MECHANISM

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Application March 19, 1948, Serial No. 15,822

13 Claims. (Cl. 113—114)

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The invention relates to new and useful improvements in a cap feeding device capable of various uses but it is especially adapted for feeding caps one after another to an apparatus for applying a sealing gasket to the cap.

An object of the invention is to provide a cap feeding device wherein a continuously rotating cap carrier removes the caps one after another from a magazine and places the same in spaced relation on a continuously moving conveyor.

A further object of the invention is to provide a cap carrier of the above type wherein a plurality of cap engaging devices mounted on and traveling with the carrier are moved in succession radially of the carrier into engagement with the caps in the magazine for stripping the cap contacted with from the stack.

A further object of the invention is to provide a cap carrying device of the above type wherein the cap engaging devices are not only moved radially of the carrier but are also given a retrograde movement on the carrier in proper timing with the rotation thereof so that the cap engaging device is substantially at a standstill relative to the circumferential travel of the carrier when contacting with the cap in the magazine.

A still further object of the invention is to provide a cap feeding device of the above type wherein suction cups are provided for engagement with the caps for stripping the same from the magazine and wherein said cups are placed under vacuum as they contact with the caps and wherein the caps are held attached to the cups until the caps are in proper position relative to a continuously moving conveyor at which time the vacuum is released and the caps are dropped onto the conveyor.

A still further object of the invention is to provide a cap feeding device of the above type wherein the caps are placed in spaced relation on a continuously moving conveyor which in turn is associated with a coating roller for applying a sealing composition to the cap.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

In the drawings which show one embodiment of the cap feeding device and the application of the same to the feeding of the caps to a coating machine:

Figure 1 is a view in side elevation showing the cap feeding mechanism, the mechanism in which the caps are stored, the continuously moving conveyor and the coating rollers of the coating machine;

Figure 2 is an end elevation of the machine showing a portion of the magazine, the cap carrier and the continuously moving conveyor associated therewith, certain of the parts being in section;

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Figure 3 is an enlarged view partly in side elevation and partly in section showing the cap carrier, a portion of the magazine and a portion of the conveyor on which the caps are placed by the cap carrier;

Figure 4 is a sectional view on the line 4—4 of Figure 3;

Figure 5 is a sectional view on the line 5—5 of Figure 3;

Figure 6 is a sectional view through a portion of the coating machine and the conveyor associated therewith said view being taken on the line 6—6 of Figure 1;

Figure 7 is a rear view of the cap carrier with the cap engaging devices and the means for operating the same removed therefrom;

Figure 8 is a plan view of a portion of the continuously moving conveyor on which the caps are placed in a predetermined spaced relation;

Figure 9 is an enlarged detail of one of the rollers on the conveyor against which the caps are placed and by which the caps are rotated while in engagement with the coating roller;

Figure 10 is a detail in perspective of the positioning lug for aiding in placing the caps on the conveyor therefor;

Figure 11 is a view showing the carrier for the caps and the parts immediately associated therewith, said parts being separated and shown in perspective;

Figure 12 is a view of the supporting bracket for the cap carrier and the control cam for operating the cap carrying device and also the vacuum manifolds for controlling the vacuum on the cup, the control cam and the supporting bracket being detached and separated from each other;

Figure 13 is a diagrammatic view showing one of the cap carrying devices and indicating in broken lines the radial and circumferential movement of the cap carrying device relative to the carrier which renders the cap carrying device substantially stationary at the time of contact with the cap in the magazine;

Figure 14 is an enlarged plan view of a portion of the conveyor in the region approaching the coating roll and also for a portion of the coating roll;

Figure 15 is a sectional view on the line 15—15 of Figure 14; and

Figure 16 is a sectional view on the line 16—16 of Figure 14.

The cap feeding device is particularly designed for feeding caps having an annular channel at the periphery thereof in which is placed a sealing gasket. The caps are of a well known construction and further description thereof is not thought necessary. A sectional view through certain of the caps is shown in Figures 3 and 16. As shown in Figure 1, the cap feeding de-

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vice is employed in connection with a coating machine, although it is to be understood that the cap feeding device may be used with other machines than coating machines.

As illustrated, the magazine in which the caps are stacked is indicated at A. The conveyor for conveying the caps is indicated at B. The cap feeding device for stripping the caps one at a time from the magazine and placing the same in a predetermined spaced relation on the conveyor B is indicated at C. The coating rollers for applying sealing composition to the peripheral channel of the cap is indicated in part at D.

The magazine may be of any desired construction. As shown, it includes a retaining head 1 which is mounted on a bracket member 2 supported by the bed of the machine 3. The bed of the machine is supported on suitable leg members one of which is indicated at 4. Associated with the retaining head 1 is a stack holder 5 in which the caps are stacked one on another and then fed into the retainer head. The caps are held in the retaining head 1 by cap retaining fingers 6, 6 (see Fig. 3). Each finger carries a projecting fulcrum lug 7 which engages a groove or recess in the wall of the retaining head. A bolt 8 threaded into the retaining head extends through an opening in the retaining finger and a spring 9 bearing on the finger yieldingly presses the end portions 6^a of the fingers against the wall of the magazine. These fingers project slightly beyond the end of the retaining head so that the caps will rest on the retaining fingers but can be stripped therefrom by means of a suction cup which grips the cap and pulls it from the magazine. Thus, only one cap at a time will be stripped from the magazine.

The conveyor on which the caps are to be placed in spaced position includes a series of cap supporting plates 10, 10 which are joined by means of links 11, 11. These links 11, 11 are connected to other links, thus making up a sprocket chain. The plates 10, 10 are provided with depending members which in turn are mounted on the pivots of the sprocket chain conveyor. Mounted on alternate plates are rollers 12, 12. These rollers are provided with a peripheral groove 13 and the caps which are indicated at 14 are placed on the plates and brought into contact with the grooved periphery of the rollers. Each cap will engage a pair of rollers. Mounted on these plates carrying the rollers are lugs 15, 15 which aid in positioning the caps on the said plates.

The plates 10 of the conveyor rest on and move along a bar 80 at the outer side of the path of travel of the conveyor. In the region of the cap feeding device there is a bar 80^a at the inner side of the conveyor path on which the plates 10 rest. When the cap is placed on the conveyor it passes underneath a cover plate 17 hinged at 17^a to the bed of the machine. This cover plate rests on a guide bar 81 and the purpose of this cover plate is to retain the caps on the plates 10 as they are moved into the recesses 13 in the rollers 12. The approached end of cover plate 17 is tapered as shown in Figure 3 to facilitate the passing of the caps beneath the cover plate. The bar 81, as shown in Figure 15, supports the plates 10 after they pass off from the bar 80^a. There is a vertical shoulder 81^b on the bar which guides the caps and this bar has a tapered receiving end 81^c so that the caps

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will be crowded by the bar along the plates and into the recesses in the rollers 12.

The bar 81 terminates just short of the coating roll 74 and extending along the coating roll is a bar 82 (see Fig. 16). This coating roll is carried by a shaft 75 and is rotated in the usual manner. The bar 82 has a supporting ledge 82^a for the plates 10 and it has an inclined camming face 82^b which terminates just short of the surface of the coating roll 74. As clearly shown in Figure 16, this bar 82 is beneath the coating roll.

On the opposite side of the conveyor from the coating roll is a spring pressed bar 76. The bar is carried by rods 77 and a spring 78 bearing against the bar at its inner end and against the sleeves 79 at its outer end forces the bar 76 inwardly toward the conveyor and the inward movement of the bar is limited by nuts 79^a. The rollers 12 on the conveyor contact this yieldingly pressed bar when the caps are brought to a point where they are about to pass the coating roll. The spring pressed bar 76 bearing on the rollers will force the caps up the camming surface 82^b so that the outer edge of the cap will be brought into contact with the surface of the coating roll 74 and will scrape coating from the roll so that it flows into the channel in the cap. Thus it is that the channel is filled with the gasket material which is placed in the usual manner as film or layer on the coating roll 74. The spring pressed bar 76 bearing against the rollers will cause the rollers to rotate in a counterclockwise direction and this will cause the caps to rotate in a clockwise direction. The contact of the cap with the coating roll also tends to rotate the cap in a clockwise direction.

The sprocket chain of the endless conveyor runs over sprocket wheels mounted on the bed of the machine. There are two sprocket wheels 18, 18 at each end of the bed and the sprocket chain includes center links which pass between these sprocket wheels. The sprocket chain is driven from the opposite end of the machine, as shown in Figure 1. The sprocket wheels are mounted on a shaft 19 which in turn is mounted in bearings carried by the bracket 2 which supports the magazine.

The cap carrier which removes the caps one at a time from the magazine and places the same in spaced relation on the conveyor B is mounted on the bracket 2. The bracket 2 is mounted on the bed so that it may be adjusted longitudinally thereof and, therefore, the sprocket wheels 18, 18, the magazine A and the cap carrier C can all be shifted as a unit on the bed for the purpose of taking up wear in the links of the conveyor. The bracket 2 is provided with an upstanding plate 20. Said plate 20 is provided with a sleeve bearing 21 in which a shaft 22 is mounted for rotation. On this shaft 22 is mounted the rotating carrier for the caps. Keyed to the shaft 22 is a gear wheel 23. The gear wheel 23 meshes with a gear wheel 24 shown in broken lines in Figure 1. This gear wheel 24 is mounted on a shaft 25 which carries a sprocket wheel 26. A sprocket wheel 27 is mounted on the end of the shaft 19, see Figure 2. A sprocket chain 28 runs over the sprocket wheels 26 and 27 and thus the carrier shaft 22 is rotated by the endless conveyor which runs over the sprocket wheels 18, 18 on the shaft 19. This will rotate the carrier for the caps in proper timing with the movement of the endless conveyor which feeds the caps to the coating roll.

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An idler 29 engages the sprocket chain and can be adjusted for taking up any slack therein.

Mounted on the shaft 22 is the cap carrier 30. Said cap carrier is in the form of a disc. This cap carrying disc is in two sections integrally connected. The front section carries the cap engaging devices and the rear section carries the devices for imparting radial and circumferential movements to the cap carrying devices. As shown more particularly in Figures 3 and 4, these cap carrying devices include an outer sleeve portion 31 and an inner rod portion 32. A suction cup 33 is mounted on this sleeve portion 31. The inner section 32 of the cap carrier is provided with a trunnion 34 and in alternate cap carriers the trunnions thereon project in opposite directions so that the pivot trunnion for one carrier will engage a socket 35 in a hub 36 formed as an integral part of the carrier 30. The shaft 22 to which the carrier is keyed carries a collar 37 at the outer end thereof which is fixed to the shaft and rotates therewith and the trunnions 34 of the inner sections 32 of the cap carrier engage pivotal sockets 37^a in said collar. As noted, these trunnions on alternate cap carriers project in opposite directions and therefore the pivotal supports for the carriers may be placed close together.

The outer section 31 of each cap carrier is formed integral with a supporting bracket 38. This bracket is provided with spaced members 39 and 40 between which a fin 41 on a ring 42 projects. This ring 42 is secured by bolts 43 to the carrier 30. The trunnions on the inner telescoping members 31 of the cap carriers permit each cap carrier to oscillate independently to a limited extent on the supporting carrier therefor. The telescoping connection between the sections 31 and 32 permits the outer section 31 to move radially of the carrier and the bracket 38 to which the outer section 31 of the carrier is connected permits this outer section not only to be moved radially but to be moved circumferentially on the fin 41 connection with the ring 42.

The carrier 30 is provided with a socket 44 for each carrier and leading from this socket to the inner face of the carrier is a bore 45 (see Figures 4, 5 and 11). A shaft 46 is mounted in each bore and is provided with a concentric head 47 which engages the socket 44. Mounted on the head 47 is a crank pin 48. This crank pin 48 engages a socket 49 in the bracket 38 and when the crank is rotated or oscillated through 180 degrees, it will move this supporting bracket and the portion 31 of the cap carrier radially and circumferentially of the carrier 30. On the inner end of the shaft 46 is a pinion 50. On the back side of the rotating carrier 30 are slots 51, 51, one for each shaft 46 (see Figures 7 and 11). These slots are on radial lines at one side of the axis of the shaft 46. A rack bar 52 is mounted in the slot 51 for reciprocation. This rack bar carries teeth 53 which mesh with the pinion 50 on the shaft 46. When these rack bars are moved endwise, they will oscillate the shaft 46. Each rack bar carries a roller 54.

The supporting plate 20 has an inwardly projecting sleeve hub 55 and mounted on this sleeve hub is a cam disc 56. Said cam disc is shown in detail in Figure 12. The cam disc 56 is held in a stationary position on the hub 55 of the supporting bracket 20 by pins 57 which engage sockets 58 in the cam disc. This cam disc is provided with a groove 59 on its face adjacent the

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carrier 30 which in part is concentric to the axis of rotation of the carrier and in part eccentric to said axis. The rollers 54 on the rack bars travel in this cam groove 59 of the stationary cam disc 56 and the rack bars will be moved endwise when the cam or eccentric portions of the groove are engaged by the rollers.

The vacuum cup 33 carried by the outer section 31 of each carrier is secured to a nipple 60 which is mounted in the outer end of the cap carrier section 31. This nipple has a passageway leading to the cup and a passageway leading to a port 61 extending lengthwise of and all the way through the shaft 46. It is through these passageways that the suction cup may be put under vacuum at the proper time for stripping the caps from the magazine. The cam disc 56, as shown in Figure 12, is provided with a groove 62 which is relatively short and disposed concentric to the axis of rotation of the carrier 30 and also with a groove 63 which is relatively long and disposed concentric to the axis of rotation of the carrier 30.

The cam disc 56 is accurately machined on the face thereof and contacts a machined face on the rotating carrier. This cam disc while it is held from rotation is pressed tightly against the carrier by means of springs 64 which are disposed in sockets 65 formed in the supporting bracket 20.

Inasmuch as the grooves 62 and 63 are in the face of the cam disc 56 which contacts with the carrier, the carrier will close these grooves and they become headers for controlling vacuum which is to be placed on the cap carrying suction cups. A port 66 is connected with the header 63. This port extends through the cam disc 56. A pipe 67 extends through an opening in the plate 20 and is threaded into the cam disc so as to make connection with the header 63. Associated with the header 62 is a port 68 which likewise extends through the cam disc and a pipe 67^a is threadedly connected to this port. The pipe 67^a is provided with a valve 67^b. These two pipes 67 and 67^a are connected to a source of vacuum and this places the headers 62 and 63 under vacuum. There are times, as will be referred to hereafter, when it is desirable to cut off the header 62 from the vacuum source and this is accomplished through the closing of the valve 67^b. There is also a header 69 formed in the outer face of the cam disc 56 and this header is connected to a port 70 which leads to a radial groove 71 in the plate 20 and from this radial groove to a passage 72 leading to the atmosphere (see Figure 4). The purpose of the header 62 is to place the vacuum cup under vacuum as it approaches and contacts with and strips a cap from the magazine. The distance between the headers 62 and 63 is very short and a cap which is stripped from the magazine will be held to the suction cup until it is brought into connection with the header 63. While the suction cup connection to the header 63 is passing along said header, the cup will be held under vacuum and the cap retained in firm engagement with the vacuum cup. When the header 69 is reached by the port leading to the suction cup, then the vacuum will be broken as this header is connected through ports to the atmosphere. This breaking of the vacuum will cause the cup to release the cap and it will drop onto the conveyor beneath the same. As noted above, the timing of the cap feeding mechanism relative to the conveyor is such that the caps will be placed in succession one after another between the rollers on the conveyor and the positioning lugs 15.

The shaft 46 is mounted in a bushing 73 in the carrier 30 and the bushing is cut away at one side so that the teeth of the rack can engage the pinion on the inner end of the shaft 46. This shaft 46 is oscillated by movements of the rack bar through an arc of substantially 180 degrees. The carrier 30 rotates in a clockwise direction. The rack bar is on the advance side of the shaft with which it cooperates and therefore when it is moved outward, it will rotate the shaft 46 in a counterclockwise direction. This imparts to the suction cup a retrograde movement relative to the movement of the carrier which is continuous in a clockwise direction.

In Figure 13, the retrograde movement of the suction cup carrying means on the carrier 30 is illustrated. In the broken lines at the left is the position of the crank 48 on the shaft 46 at the time when the suction cup approaches the magazine. The roller 54 on the rack bar associated with the cup is at this time moving along the concentric portion of the groove 59. As the roller moves into the section which is eccentric, it will be moved outward and as it moves outward it will carry the rack bar outward to the full extent of its stroke. This occurs while the roller is passing along the section of the cam groove between the points a and b in Figure 12. This movement of the rack bar turns the shaft 46 through an arc of 180 degrees. When the carrier is moving in a clockwise direction, the shaft 46 is moved by this rack bar in a counterclockwise direction and therefore the crank pin 48 moves the cap carrier in a reverse direction from the movement of the carrier while the cap carrier is at the same time traveling with the carrier. The rearward movement of the cap carrier is gradually accelerated until the full line position is reached in Figure 13 and then it is decelerated until the crank pin reaches the position shown in the broken line at the right of Figure 13. The rotations of the shaft then stop.

The timing of the moving parts in such that owing to this retrograde movement of the cup relative to the forward movement of the same on the carrier, the cup is brought to a substantial standstill as it contacts the cap in the magazine. It is moving outward into contact with the cap and then it moves inwardly so as to strip the cap from the magazine. At the moment of contact, however, there is little or no movement of the suction cup relative to the magazine.

The cam groove 56 which operates the rack bars is concentric to the axis of rotation of the carrier from the point b to the point c and from the point c around to the point a it is eccentric. The rack bar after it has moved the suction cup outwardly to contact with the cap and then inwardly until it has stripped the cap from the magazine remains radially stationary until the point in the cam groove c is reached, after which this rack bar will be gradually again moved outwardly, thence inwardly, and the cup will be brought back to the initial position where it is ready to be moved through another cycle for stripping a cap from the magazine.

It is believed that the operation of the cap feeding device for supplying caps to a conveyor and by the conveyor to a coating roll will be obvious from the detailed description given above.

The caps are removed in succession one at a time by the cap carrying devices on the continuous rotating carrier. These cap carrying devices are so constructed and operated that they have a short retrograde movement at the time

that the suction cup contacts with the cap and at this moment the retrograde movement of the cap carrying device is substantially at the same speed as the forward rotating movement of the carrier itself. This enables the caps to be very efficiently gripped and withdrawn from the stationary stack holder. The cap is suspended by the carrier until it is directly over the conveyor and then the suction on the cup is broken and the cap drops onto the conveyor. The cap will pass underneath the cover plate so as to be retained on the conveyor and the guide bar will force the cap along the plates of the conveyor into contact with the rollers forming a part of the conveyor. When the cap approaches the coating roll, these rollers make contact with a spring pressed bar and will force the cap at the inner side thereof upwardly along a cam ledge on the guide bar into contact with the coating roll. When it is desired to stop the machine, the valve 67 is first closed which cuts off the suction from the cups that strips the caps from the magazine while retaining the suction on the remainder of the caps on the carrier and thus it is that the caps on the carrier will be delivered onto the conveyor and may be fed on through the machine and properly coated while the taking of further caps from the magazine stops.

As noted above, the cap feeding device is a continuously operating device and the caps are placed on a continuously traveling conveyor and carried across the coating roll without stopping. This lends itself to a very high speed machine. This high speed cap feeding device may be used in connection with other types of machines where caps are operated upon or treated in some way, and while said cap feeding device has novel advantages when used in connection with a coating machine, it has equal advantages of high speed when used for other purposes.

It is obvious that many changes in the details of construction of the cap feeding device, the conveyor and the coating mechanism may be made without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. The combination of a stack holder for caps and a feeding mechanism associated therewith comprising a continuously rotating carrier, a plurality of cap carrying devices disposed substantially radially of said carrier, each cap carrying device including an inner section pivoted to the carrier so as to swing in a plane parallel with the face of the carrier and an outer section having telescoping engagement with the inner section and connected to the carrier so that it may move radially of the carrier as well as circumferentially of the carrier, and means operating in succession on the outer section of said cap carrying devices for moving the same radially into contact with a cap in the stack holder and for simultaneously giving thereto a circumferential retrograde movement on the carrier as said cap carrying device moves toward and from the stack holder.

2. The combination of a stack holder for caps and a feeding mechanism associated therewith comprising a continuously rotating carrier, a plurality of cap carrying devices disposed substantially radially of said carrier, each cap carrying device including an inner section pivoted to the carrier so as to swing in a plane parallel with the face of the carrier and an outer section having telescoping engagement with the inner section and connected to the carrier so that it may

move radially of the carrier as well as circumferentially of the carrier, and means operating in succession on the outer section of said cap carrying devices for moving the same radially into contact with a cap in the stack holder and for simultaneously giving thereto a circumferential retrograde movement on the carrier as said cap carrying device moves toward and from the stack holder, each cap carrying device including a suction cup and means for placing said cup under vacuum as it moves into contact with a cap in the stack holder.

3. The combination of a stack holder for caps and a feeding mechanism associated therewith comprising a carrier mounted for continuous rotation about a horizontal axis and in a vertical plane extending longitudinally of the stack holder, a plurality of cap carrying devices disposed substantially radially of said carrier, each cap carrying device including an inner section pivoted to the carrier so as to swing in a plane parallel with the face of the carrier and an outer section having telescoping engagement with the inner section and connected to the carrier so that it may move radially of the carrier as well as circumferentially of the carrier, and means operating in succession on the outer section of said cap carrying devices for moving the same radially into contact with the cap in the stack holder and for simultaneously giving thereto a circumferential retrograde movement on the carrier as said cap carrying device moves toward and from the stack holder.

4. The combination of a stack holder for caps and a feeding mechanism associated therewith comprising a carrier mounted for continuous rotation about a horizontal axis and in a vertical plane extending longitudinally of the stack holder, a plurality of cap carrying devices disposed substantially radially of said carrier, each cap carrying device including an inner section pivoted to the carrier so as to swing in a plane parallel with the face of the carrier and an outer section having telescoping engagement with the inner section and connected to the carrier so that it may move radially of the carrier as well as circumferentially of the carrier, and means operating in succession on the outer section of said cap carrying devices for moving the same radially into contact with the cap in the stack holder and for simultaneously giving thereto a circumferential retrograde movement on the carrier as said cap carrying device moves toward and from the stack holder, each of said cap carrying devices including a suction cup and means for placing said cup under vacuum as it moves into engagement with a cap in the stack holder.

5. The combination of a stack holder for caps and a feeding mechanism associated therewith comprising a continuously rotating carrier, a plurality of cap carrying devices disposed substantially radially of said carrier, each cap carrying device including an inner section pivoted to the carrier so as to swing in a plane parallel with the face of the carrier and an outer section having telescoping engagement with the inner section and connected to the carrier so that it may move radially of the carrier as well as circumferentially of the carrier, and means operating in succession on the outer section of said cap carrying devices for moving the same radially into contact with a cap in the stack holder and for simultaneously giving thereto a circumferential retrograde movement on the carrier as said cap carrying device moves toward and from the stack holder, the

speed of circumferential retrograde movement on the cap carrying device at the moment of contacting the cap in the stack holder being substantially the same as the forward speed of the carrier so that said cap carrying device is in effect stationary so far as circumferential movement is concerned when contacting the cap and stripping the same from the stack holder.

6. The combination of a stack holder for caps and a feeding mechanism associated therewith comprising a carrier mounted for rotation about a horizontal axis, a plurality of cap carrying devices disposed substantially radially of said carrier, each cap carrying device including an inner section pivoted to the carrier so as to swing in a plane parallel with the face of the carrier and an outer section having telescoping engagement with said inner section and connected to said carrier so that it may move radially of the carrier as well as circumferentially of the carrier, and means operating in succession on the outer sections of the cap carrying devices for moving the same radially into contact with the cap in the stack holder and for simultaneously giving thereto a circumferential retrograde movement on the carrier as the cap carrying device moves toward and from the stack holder.

7. The combination of a stack holder for caps and a feeding mechanism associated therewith comprising a carrier mounted for rotation about a horizontal axis, a plurality of cap carrying devices disposed substantially radially of said carrier, each cap carrying device including an inner section pivoted to the carrier so as to swing in a plane parallel with the face of the carrier and an outer section having telescoping engagement with said inner section and connected to said carrier so that it may move radially of the carrier as well as circumferentially of the carrier, and means operating in succession on the outer sections of the cap carrying devices for moving the same radially into contact with the cap in the stack holder and for simultaneously giving thereto a circumferential retrograde movement on the carrier as the cap carrying device moves toward and from the stack holder, each cap carrying device including a suction cup and means for placing said suction cup under vacuum as it moves into contact with a cap.

8. The combination of a stack holder for caps and a feeding mechanism associated therewith comprising a carrier mounted for rotation about a horizontal axis, a plurality of cap carrying devices disposed substantially radially of said carrier, each cap carrying device including an inner section pivoted to the carrier so as to swing in a plane parallel with the face of the carrier and an outer section having telescoping engagement with said inner section and connected to said carrier so that it may move radially of the carrier as well as circumferentially of the carrier, and means operating in succession on the outer section of the cap carrying devices for moving the same radially into contact with the cap in the stack holder and for simultaneously giving thereto a circumferential retrograde movement on the carrier as the cap carrying device moves toward and from the stack holder, each cap carrying device including a suction cup and means for placing said suction cup under vacuum as it moves into contact with a cap, the speed of circumferential retrograde movement on the suction cup at the moment of contacting the cap in the stack holder being substantially the same as the forward speed of the carrier so that said

cap carrying device is in effect stationary so far as circumferential movement is concerned when contacting the cap and stripping the same from the stack holder.

9. The combination of a stack holder for caps and a feeding mechanism associated therewith comprising a carrier mounted for rotation about a horizontal axis, a plurality of cap carrying devices disposed substantially radially of said carrier, each cap carrying device including an inner section pivoted to the carrier so as to swing in a plane parallel with the face of the carrier and an outer section having telescoping engagement with said inner section and connected to said carrier so that it may move radially of the carrier as well as circumferentially of the carrier, a shaft associated with each cap carrying device and mounted in said carrier for rotation, a crank mounted on said shaft and having a roller engagement with the outer section of the cap carrying device, a radially movable rack bar mounted on said carrier, a roller carried by said rack bar, a stationary cam in which the rollers of the rack bars travel, said stationary cam being shaped so as to move said shaft for imparting a retrograde movement to the cap carrying device as it is moved into contact with a cap in the stack holder.

10. The combination of a stack holder for caps and a feeding mechanism associated therewith comprising a carrier mounted for rotation about a horizontal axis, a plurality of cap carrying devices disposed substantially radially of said carrier, each cap carrying device including an inner section pivoted to the carrier so as to swing in a plane parallel with the face of the carrier and an outer section having telescoping engagement with said inner section and connected to said carrier so that it may move radially of the carrier as well as circumferentially of the carrier, a shaft associated with each cap carrying device and mounted in said carrier for rotation, a crank mounted on said shaft and having a roller engagement with the outer section of the cap carrying device, a radially movable rack bar mounted on said carrier, a roller carried by said rack bar, a stationary cam in which the rollers of the rack bars travel, said stationary cam being shaped so as to move said shaft for imparting a retrograde movement to the cap carrying device as it is moved into contact with a cap in the stack holder, each cap carrying device including a suction cup, a passageway extending through the shaft associated with the cup and connected to the cup, a header formed in the outer face of said stationary cam with which said passage makes connection for creating a vacuum on the cover, said header being connected to a source of vacuum.

11. The combination of a stack holder for caps and a feeding mechanism associated therewith comprising a carrier mounted for rotation about a horizontal axis, a plurality of radially disposed cap carrying devices mounted on said carrier, each cap carrying device including an inner section having a laterally projecting trunnion engaging sockets in the carrier, the trunnions of the cap carrying devices being arranged so as to extend alternately in opposite directions so that the pivotal centers of the cap carrying devices may be placed relatively close together, each cap carrying device including an outer section, and means operating in succession on said outer sections of the cap carrying devices for moving the same radially into contact with a cap in the stack

holder and for simultaneously giving to the cap carrying device a circumferential retrograde movement on the carrier about its pivotal connection thereto as the cap carrying device moves toward and from the stack holder.

12. The combination of a stack holder for caps and a feeding mechanism associated therewith comprising a continuously rotating carrier, a plurality of cap carrying devices disposed substantially radially of said carrier, each cap carrying device including an inner section pivoted to the carrier so as to swing in a plane parallel with the face of the carrier and an outer section having telescoping engagement with the inner section and connected to the carrier so that it may move radially of the carrier as well as circumferentially of the carrier, and means operating in succession on the outer section of said cap carrying devices for moving the same radially into contact with a cap in the stack holder and for simultaneously giving thereto a circumferential retrograde movement on the carrier as said cap carrying device moves toward and from the stack holder, a continuously moving endless conveyor mounted for movement beneath said cap carrier, said conveyor having a series of plates carried thereby, and means for releasing the caps in succession from the carrier for placing the same in predetermined spaced relation on said conveyor.

13. The combination of a stack holder for caps and a feeding mechanism associated therewith comprising a continuously rotating carrier, a plurality of cap carrying devices disposed substantially radially of said carrier, each cap carrying device including an inner section pivoted to the carrier so as to swing in a plane parallel with the face of the carrier and an outer section having telescoping engagement with the inner section and connected to the carrier so that it may move radially of the carrier as well as circumferentially of the carrier, and means operating in succession on the outer section of said cap carrying devices for moving the same radially into contact with a cap in the stack holder and for simultaneously giving thereto a circumferential retrograde movement on the carrier as said cap carrying device moves toward and from the stack holder, each cap carrying device including a suction cup and means for placing said cup under vacuum as it moves into contact with a cap in the stack holder, a continuously moving endless conveyor disposed beneath said cap carrier and having a series of plates on which the caps are to be placed, and means for releasing the suction on the cups in succession so as to place said caps in predetermined spaced relation on said conveyor plates.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,628,008	Taliaferro	May 10, 1927
1,904,720	Douglass	Apr. 18, 1933
1,942,885	Tevander	Jan. 9, 1934
2,052,568	Heald	Sept. 1, 1936
2,059,546	Brandenburg	Nov. 3, 1936
2,076,116	Brinton	Apr. 6, 1937
2,195,545	Stobb	Apr. 2, 1940
2,325,774	Hohl	Aug. 3, 1943