

June 9, 1931.

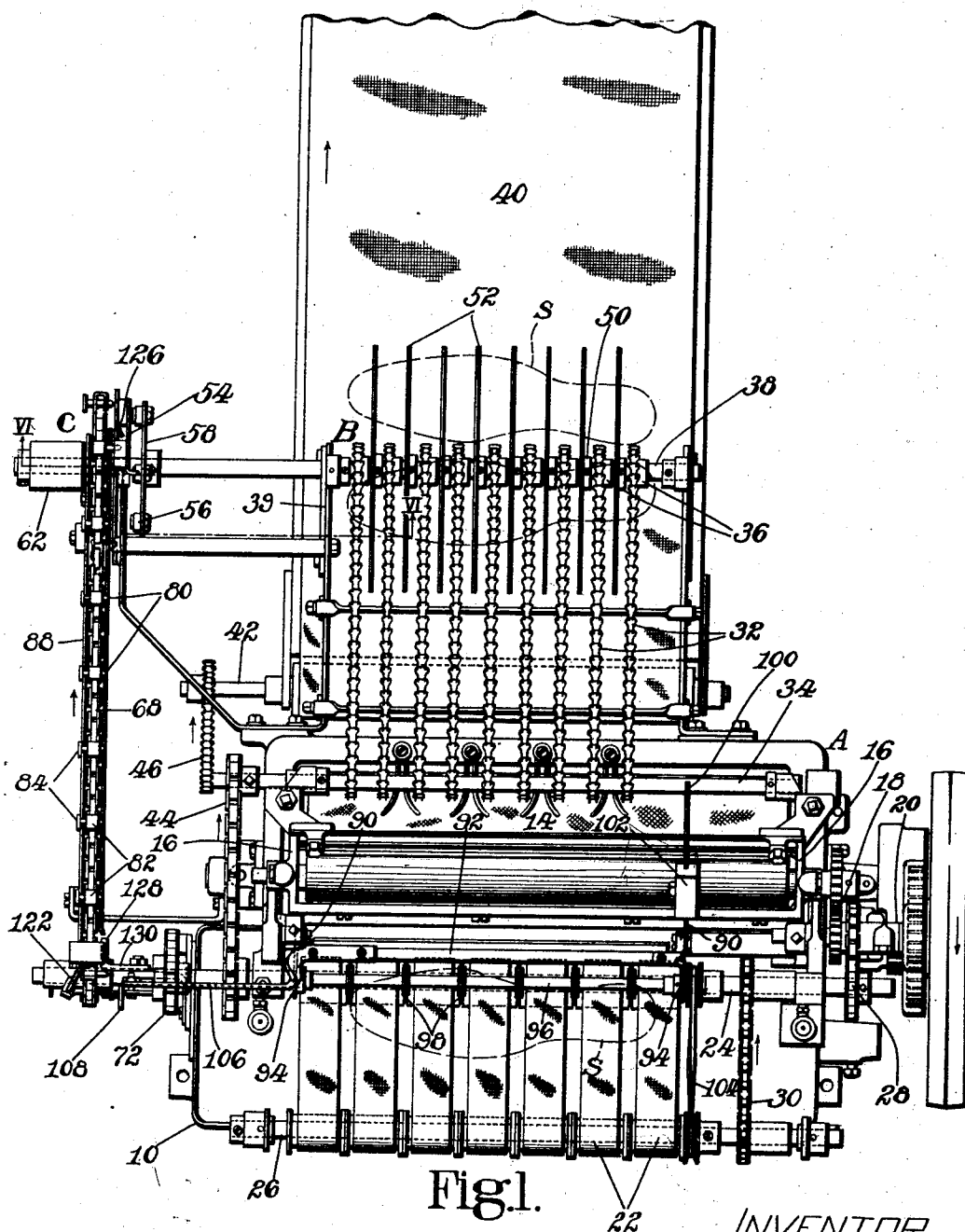
S. J. FINN

1,808,810

POSITIONING APPARATUS

Original Filed May 16, 1927

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

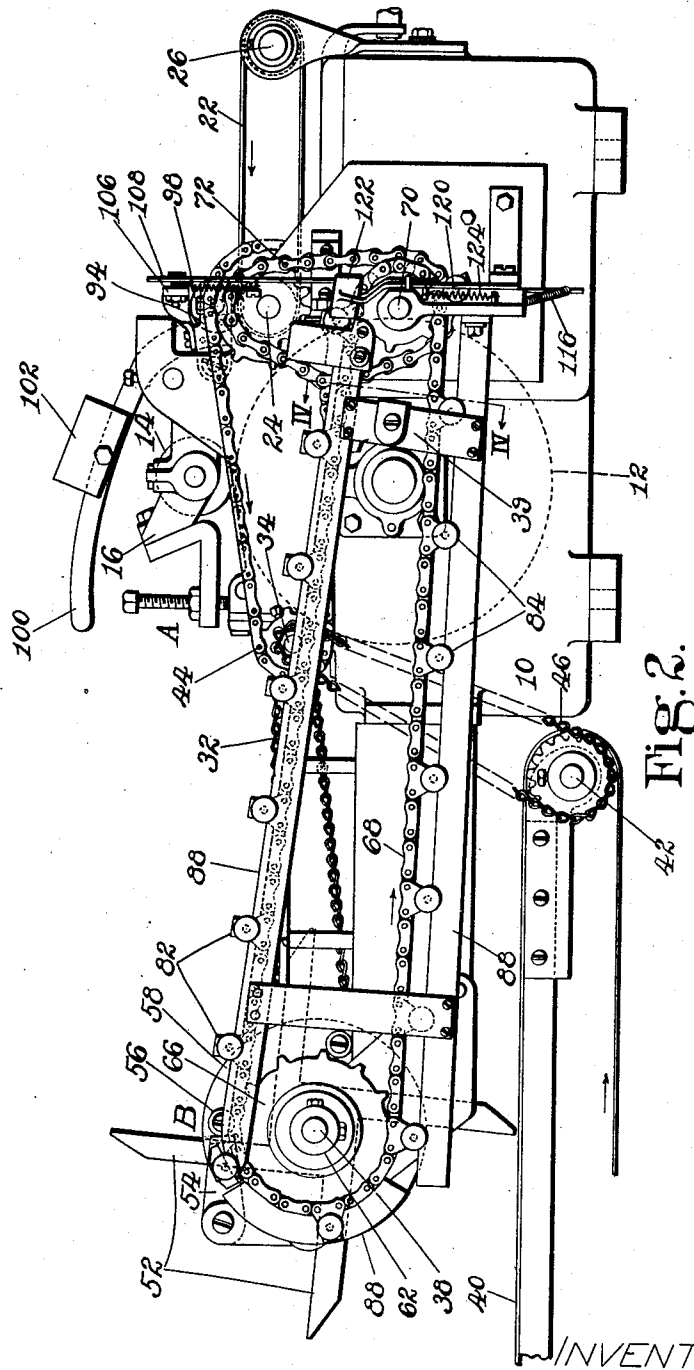


Fig. 2.

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4 Sheets-Sheet 3

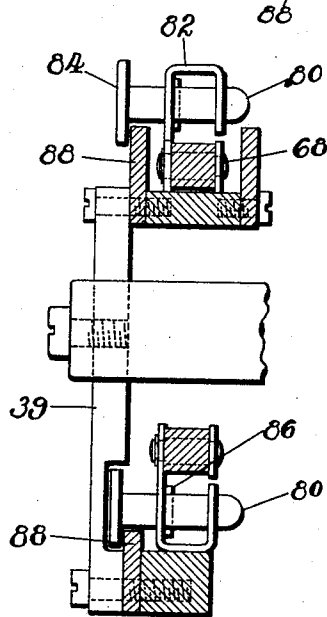
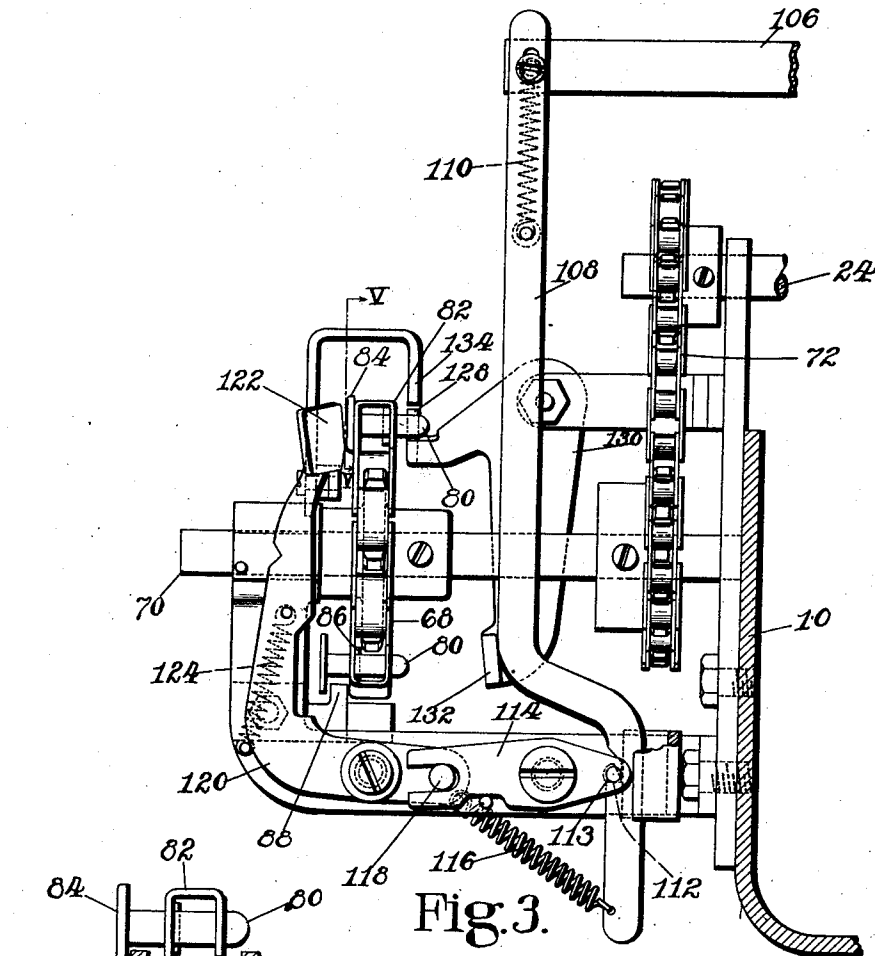


Fig. 4.

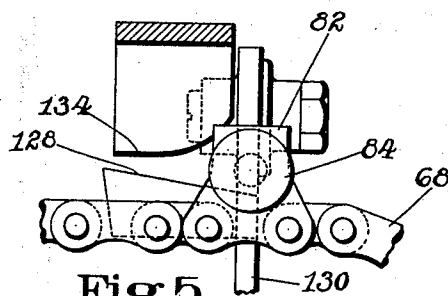


Fig. 5.

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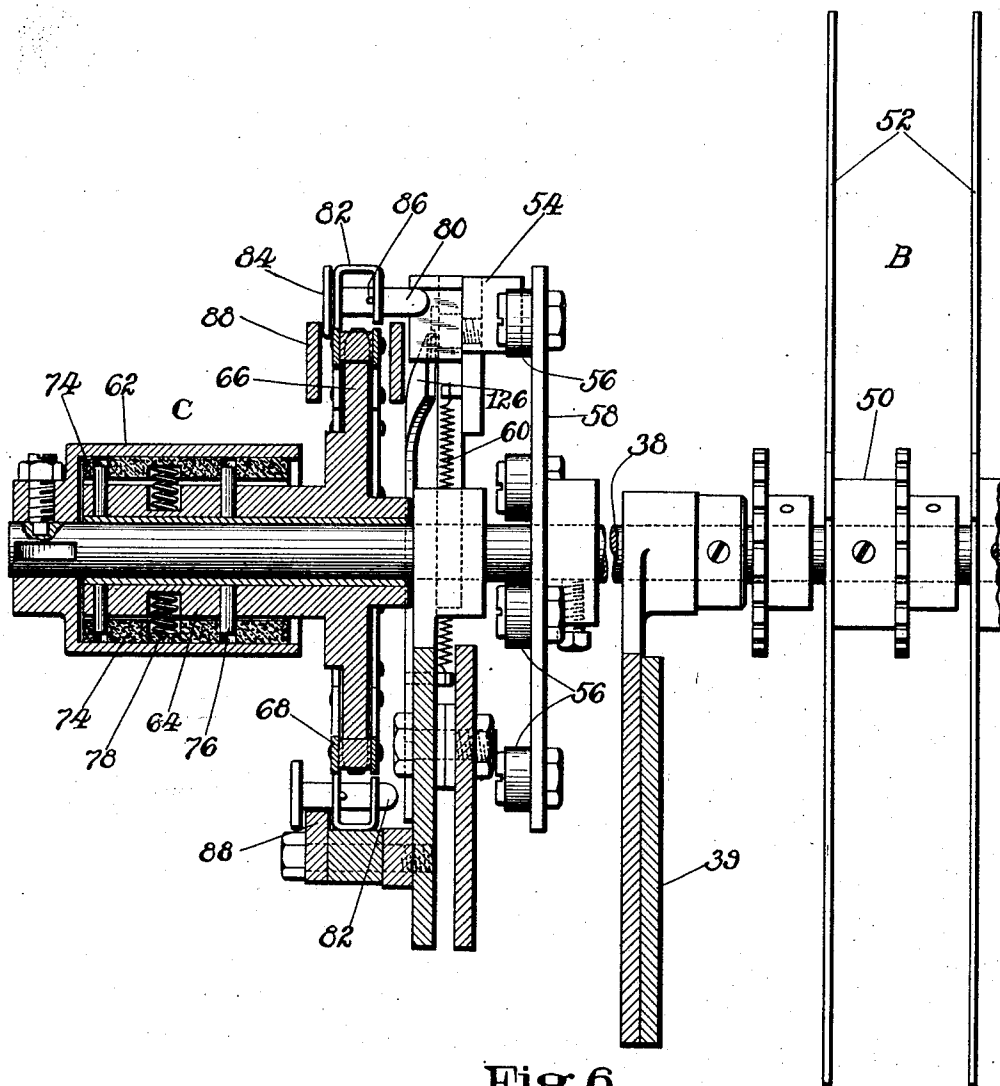


Fig. 6.

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UNITED STATES PATENT OFFICE

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POSITIONING APPARATUS

Refiled for abandoned application Serial No. 191,806, filed May 16, 1927. This application filed November 23, 1929. Serial No. 409,409.

This invention relates to positioning apparatus, particularly to that employed for the inversion of objects. The present application is substituted for that filed in my name in the United States Patent Office on May 16, 1927, the latter bearing the Serial No. 191,806.

In certain operations, as in the coating of such work-pieces as the insoles of shoes with cement, an apparatus applies the coating upon the under side of the piece, so that before said piece is delivered to a surface upon which it is to rest for some time, a drying conveyor for example, its position must be changed, as by inversion, to prevent its adhesion to the supporting surface.

An object of my invention is to effect such a positioning operation with certainty, so each of the work-pieces may be acted upon properly, regardless of the rate at which they are received, this being accomplished by relatively simple means having little disturbing effect upon the coating which the work may carry. To gain this end, movable work-positioning means is controlled by means under the influence of the work and including an element governed by said work during travel past the element toward the positioning means. For imparting motion to the inverting or positioning means, I have shown driving means, preferably frictional, which may be latched to normally hold the inverting means against movement and released at the appropriate time for operation. This control I may exercise through means which operates synchronously with delivery of work-pieces, traveling with them in their advance, say from a coating apparatus to the positioning means, this unlatching or other controlling means being preferably set by the work at the receiving side of the coating apparatus in preparation for its action. After thus acting, it is restored to normal for another operation. Retaining means is illustrated, which acts upon the controlling members in both their active and inactive positions to prevent accidental displacement. By this or an equivalent controlling organization, there is provided an inverting or positioning device, which is

operated in constant time-relation with the work-pieces coated, so that accuracy of operation is insured. As herein disclosed, a series of arms intermittently movable between spaced conveyors, which bring the work-pieces for inversion, are stopped in proximity to the conveying surfaces. These arms provide for certain engagement with the work-pieces, and have little effect upon their coated faces. To release these arms for their operation, an endless member, traveling with the conveyors, may be employed, this endless member carrying a series of pins or other members movable into and out of action upon the latch which temporarily holds the arms in receiving position. Since, if the apparatus is designed for proper operation upon narrow work-pieces, it might, unless this is guarded against, repeat the controlling action upon the positioning means for a single piece when wide pieces were operated upon, I have included in the apparatus means arranged to disconnect portions of the controlling means to limit this control to once for each piece of work. More specifically, a controlling member or pin, when set for action, produces movement of a member which prevents a repetition of the setting action for the same piece of work. This may be by rendering ineffective connections through which the setting is effected.

A particular embodiment of my invention appears in the accompanying drawings, in which

Fig. 1 is a top plan view of the improved apparatus;

Fig. 2, a side elevation thereof, looking from the left in Fig. 1;

Fig. 3, an enlarged detail in elevation of the pin-setting elements directly associated with the chain which carries said pins; and

Figs. 4, 5 and 6 are, respectively, sections on the line IV—IV of Fig. 2, the line V—V of Fig. 3, and the line VI—VI of Fig. 1.

The invention is illustrated in connection with an apparatus A for applying a coating of cement to such work-pieces as the soles appearing at S in Fig. 1. This cementer includes a tank 10 for the coating substance, in

which tank is journaled an applying roll 12, and upon which is carried a movable pressure-roll 14 turning in arms 16 pivoted at opposite sides of the top of the tank. Power is applied to the rolls through gearing, indicated at 18, from a driving shaft 20 to rotate them to advance the work from right to left, as viewed in Fig. 2. The work is delivered to the cementing rolls by a conveyor, which may consist of a series of belts 22 spaced somewhat from one another and operating over an inner shaft 24 journaled adjacent to the bite of the rolls 12 and 14 and an outer shaft 26 rotatable above the rear wall of the tank. The shaft 24 is driven by sprocket-gearing 28 from the driving shaft, while sprocket-gearing 30 transmits motion from the shaft 24 to the shaft 26. At the opposite side of the applying and pressure-rolls from the delivery-conveyor is a horizontally extending conveyor made up of spaced chains 32 operating over rolls upon an inner shaft 34 and rolls 36 rotatable about an outer shaft 38, the first of these shafts being journaled transversely of the tank, and the second upon a frame 39 extending forwardly therefrom. These chains 32 receive the coated work and advance it toward a conveyor 40, of which but a portion is shown. This may be for carrying the soles for some distance to dry them, and may deliver to a stacking apparatus. It is shown as supported at the end adjacent to the cementing apparatus upon a shaft 42. The chains 32 are driven at the same speed as the belts 22, which is also substantially the peripheral speed of the coating and applying rolls, by sprocket-gearing 44 from the shaft 24. The conveyor 40 is shown as receiving power through sprocket-gearing 46 from the shaft 34.

Between the conveyors 32 and 40 is interposed a device B, which engages soles lying with their coated sides down upon the first-mentioned conveyor, and delivers them to the drying conveyor 40 in an inverted position. The support for this device is furnished by the shaft 38, about which turn the rolls 36, this shaft having fixed between such rolls hubs 50, from each of which extend four uniformly spaced arms 52, shown as substantially ninety degrees apart and tangential to the hubs. The length of these arms, which extend in four alined series transversely of the conveyor-chains 32, is such that each series will probably engage for inversion the widest work which the cementing machine is to operate upon. A friction driving device C exerts a constant tendency to rotate the inverting device, but this is normally resisted by a latch 54 pivoted upon the frame 39 and engaged by some one of a series of projections 56 from the outer face of a disk 58 fast upon the shaft 38. These projections 56 are spaced to correspond to the arms 52, so that, when the inverting device is held

against rotation by the latch 54, a particular series of the arms will lie just below the conveying surface of the chains 32 or substantially horizontal, while the next series of arms in advance of these is in an approximately vertical position near the outer ends of the chains. A spring 60 (Fig. 6) holds the latch 54 against a portion of the frame in its projection-engaging relation. The driving device C herein utilized consists of a casing 62 secured at its outer end to the shaft 38 and being spaced from said shaft. Within this casing extends an elongated hub 64 from a sprocket-wheel 66 arranged to rotate about the shaft 38. This sprocket-wheel is constantly driven by a chain 68 from a shaft 70, which receives movement from the shaft 24 by way of sprocket-gearing 72. Within the casing 62 are opposite segments 74, guided by pins 76 projecting from the hub of the sprocket 66 and forced outwardly into frictional engagement with the casing by springs 78 seated in alined depressions in the hub and segments. The engagement between the segments and casing is sufficient to cause the rotation of the shaft 38, and consequently the revolution of the arms 52 for the performance of their inverting function when the latch 54 is carried away from a contacting projection upon the disk 58. When, however, the latch lies in the path of the projections and the disk is held against turning, the segments slip idly over the interior of the casing.

To cause the device B to properly invert the work, it must act only when a single sole is fully above a series of the arms 52, which are below the conveying surfaces of the chains 32. To bring this about, the action of the inverting device is timed by the soles themselves, they acting to set one of a series of members which travel with the soles as they advance from the cementer, this set member releasing the inverting device from its latch for a single partial rotation as the sole is in the desired relation to the arms which are to carry it to the drying conveyor. These traveling members may consist of pins 80 mounted to slide horizontally through U-shaped supports 82 secured to the chain 68, the extent of movement being limited by a head 84 formed upon the outer extremity of each pin and by a lateral projection 86. The pins are regularly spaced along the chain 68, and are sufficiently close to one another to be properly available for the control of the inverting device when the narrowest soles are acted upon at the most rapid rate by the cementing machine. Fixed upon the frame at the outer side of the chain 68 is a bar 88 so located that, by the engagement with its edge of the inner or the outer face of the head of any of the pins, said pin may be temporarily maintained against accidental displacement, respectively either in its outer inactive rela-

tion, in which it produces no effect upon the inverting device, or in its inner active position, in which it contacts with the latch 54 to lift this from the path of the projections 56 and thus free the inverting device for operation. The pins may be shifted longitudinally from one position to the other through interruptions in the bar 88 adjacent to the shaft 70 and also beyond the latch 54.

To selectively set the pins for action under the control of the soles, there is pivoted, by means of arms 90 upon the tank 10 above the delivery-end of the conveyor 22, a bar 92 (Fig. 1), in rearwardly extending arms 94 of which is journaled a transverse shaft 96. Spaced from one another along the shaft 96 and fixed to it over the spaces between the belts 22, are thin-edged disks 98. One of the arms 90 may have a forward extension 100 carrying a weight 102 adjustable along it. This serves as a counterbalance for the disks, so that the resistance which the rolls 98 oppose to movement by the soles may be varied. To further reduce the resistance to the feeding of the work which might be produced by these rolls, they may be rotated in a clockwise direction (Fig. 2) by a belt 104 (Fig. 1) from the shaft 26. From the arm 94 at the end of the bar 92 toward the chain 68 is an extension 106. Upon the outer end of the extension is pivoted a link 108 having some capacity for vertical yield by virtue of a spring-connection 110 (Fig. 3). Near the lower extremity of the link is a depression having its bottom wall 112 substantially horizontal to engage a pin 113 projecting from a lever 114 fulcrumed upon a bracket mounted upon the side of the tank. A spring 116 holds the link 108 and lever 114 together with the wall 112 in normal engagement with the pin. The lever 114 is articulated at 118 to a bell-crank lever 120 fulcrumed upon the bracket and provided at its upper end with an inclined contact-surface 122. This surface is movable by the connections just described, actuated from the disks 98 under the influence of the soles delivered to the cementing apparatus, into the path of the heads 84 when the pins 80 are in their inactive positions. Normally, the lever 120 is so held by a spring 124 that the surface 122 lies clear of the heads of the pins, the rolls 98 being at this time lowered, ready for actuation by the work.

Considering a sole S as placed by the operator upon the conveyor-belts 22, this will be carried by the belts against the rolls 98, which will be raised with little resistance, and will correspondingly lift the bar-extension 106. This, through the link 108 and the levers 114 and 120, will carry the surface 122 into the path of the heads 84 of the controlling pins, so that one of these pins, which is substantially aligned transversely with the sole, will be thrust inwardly, its head at this time moving through the space between por-

tions of the bar 88. The setting of the pins, it should be noted, is in synchronism with the delivery of the soles to the cementing machine. Now, as the sole continues in its advance to receive its coating from the rolls 12 and 14 and then upon the chains 32, the projected pin travels with it until the sole, coated upon its under side, is above the inner horizontal series of arms 52. At this time, the set pin 80 reaches the latch 54, and, contacting with its under side, lifts it above the projection 56, which has been in engagement with it. This frees the shaft 38, allowing the friction driving device C to act to rotate the inverting device B. As this occurs, the arms which are beneath the sole elevate it from the chains 32, and, as the revolution of the arms continues, the succeeding series, which has occupied such a position that they prevent movement of the work beyond the desired point, will receive the sole with its uncoated surface down. As these receiving arms move farther, the sole slides down their inclined edges, and is deposited upon the conveyor 40 with the coated side up. Since the arms 52 are narrow and the only force acting to press the work against them consists of the weight of a single piece, they produce little effect upon the coating. After passing the latch 54, the pin which has released the inverting device arrives at the space in the bar 88, and at the same time its inner end strikes a stationary cam 126, which thrusts it back to its initial position, its head now passing along the outside of the retaining bar until it is again set under the influence of another sole.

It is, of course, necessary, as has already been pointed out, to have the controlling pins 80 close enough to function in connection with the narrowest work-pieces fed at the most rapid rate. With this arrangement, it might prove that wide soles would hold up the disks 98 until the contact-surface 122 set another pin in addition to that controlled when the forward edge of the sole reached the disks. This would destroy the desired definite time-relation between the feeding and coating of the soles and the operation of the inverting device. This repetition of the setting action for a single work-piece may be guarded against in the following manner: Situated in the path of the inner end of a pin immediately after it has been set in its active position is an inclined surface 128 (Fig. 3) upon a bell-crank lever 130 fulcrumed upon a bracket extending from the tank above the lever 114. A downwardly extending arm of the lever 130 has a portion 132 overhanging the outer edge of the link 108. As the set pin advances toward the latch 54, it strikes the inclined surface of the lever 130, forcing the portion 132 against the link 108. This removes the wall 112 from contact with the pin 113, and the link is raised by the spring 110, which

was tensioned when the lever 120 was positioned. This separation between the portions of the connections frees the surface 122 from the control of the disks, and immediately after the head of the set pin has passed the surface, the spring 124 restores the lever 120 to its inactive position. At this time, the edge of the link 108 rests against the pin 113, the depression being above the pin. When the sole which has produced the setting operation has traveled from beneath the disks and these resume their normal depressed position, the link is lowered until cooperation is established between its depression and the pin 113. To prevent the thrust exerted by the surface 128 upon the pin from rendering this ineffective to disconnect the link 108, there is supported above this surface a stationary abutment 134, along which the pin travels and is held against rising as it acts upon the lever.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. The combination with movable work-positioning means, of means including an element governed by the work during the travel of said work past the element toward the positioning means for controlling the movement of the positioning means.

2. The combination with movable work-positioning means, of means under the influence of the work for controlling the movement of the positioning means, and means arranged to disconnect portions of the controlling means to limit control of the positioning means to once for each piece of work.

3. The combination with a movable work-positioning member, of driving means therefor, means for successively advancing work to the positioning member, and means under the influence of the work and including a plurality of movable members traveling therewith, respective members controlling successively the application of power by the driving means to the positioning member.

4. The combination with means for delivering work-pieces, of a member operable to position the delivered pieces, and traveling means operating synchronously with the advance of the work-pieces toward the positioning member to control the operation of said member.

5. The combination with means for advancing work-pieces, of a member operable to position the advanced pieces, and means set by the work in its advance and traveling with said work to control the operation of the positioning member.

6. The combination with means for advancing work-pieces, of a member operable to position the advanced pieces, means set by the work in its advance and traveling with said work to control the operation of the positioning member, and a member movable

by the set member and arranged to prevent a repetition of the setting action for the same piece of work.

7. The combination with an intermittently operable inverting member, of means including an element governed by objects to be inverted during the travel of said objects past the element toward the inverting member for controlling the operation of the inverting member.

8. The combination with a normally stationary member revoluble in one direction only to invert objects, of rotatable driving mechanism, and means under the control of an object to be inverted for rendering the mechanism effective to drive the inverting member.

9. The combination with a normally stationary inverting member and driving mechanism therefor, of means for advancing work-pieces to the inverting member, and controlling means for the driving mechanism traveling with the advancing means and movable by the work-pieces from an inactive to an active position.

10. The combination with a coating apparatus, of an inverting device at the delivery side of the apparatus, and means movable by work-pieces for operating the inverting device.

11. The combination with a coating apparatus, of an inverting device at the delivery side of the apparatus, and means at the receiving side of the coating apparatus under the influence of the pieces to be coated for controlling the inverting device.

12. The combination with a conveyor, of an inverting member to which the conveyor delivers, driving means for the inverting member, a member traveling with the conveyor and arranged to occupy an inactive position and an active position for the control of the driving mechanism, and means under the influence of a work-piece for moving the controlling member to its active position.

13. The combination with a conveyor, of an inverting member to which the conveyor delivers, driving mechanism for the inverting member, members traveling with the conveyor and arranged to occupy an inactive position and an active position for controlling the driving mechanism, means under the influence of a work-piece for moving a controlling member to its active position, and means under the influence of the thus moved controlling member for preventing the action of the same work-piece upon another controlling member.

14. The combination with a conveyor, of an inverting member to which the conveyor delivers, driving means for the inverting member, a member traveling with the conveyor and arranged to occupy an inactive position and an active position for the control of the driving mechanism, means under the influ-

ence of a work-piece for moving the controlling member to its active position, and means for retaining the controlling member in such active position until it has operated.

15 15. The combination with a conveyor, of an inverting member to which the conveyor delivers, driving means for the inverting member, a member traveling with the conveyor and arranged to occupy an inactive position and an active position for the control of the driving mechanism, means under the influence of a work-piece for moving the controlling member to its active position, and means acting after its operation for returning the controlling member to its inactive position.

20 16. The combination with a conveyor, of an inverting member to which the conveyor delivers, driving means for the inverting member, a member traveling with the conveyor and arranged to occupy an inactive position and an active position for the control of the driving mechanism, means under the influence of a work-piece for moving the controlling member to its active position, means acting after its operation for returning the controlling member to its inactive position, and retaining means acting upon the thus-retained controlling member.

30 17. The combination with spaced conveyors situated side by side, of a shaft provided with series of arms revoluble between the conveyors, driving mechanism for the shaft, means for stopping the rotation of the shaft with a series of arms in proximity to the conveying surfaces, and means controlled by the conveyed work for releasing the shaft.

40 18. The combination with spaced conveyors situated side by side, of a shaft provided with series of arms revoluble between the conveyors, driving mechanism for the shaft, means for stopping the rotation of the shaft with a series of arms in proximity to the conveying surfaces and with a second series arranged for engagement by the conveyed objects, and means controlled by the conveyed work for releasing the shaft.

50 19. The combination with spaced conveyors situated side by side, of a shaft provided with series of arms revoluble between the conveyors, driving mechanism for the shaft, means for stopping the rotation of the shaft with a series of arms in proximity to the conveying surfaces, a coating apparatus delivering to the conveyors, and means for releasing the shaft from the stopping means in definite time-relation with the work-pieces acted upon by the coating apparatus.

60 20. The combination with a conveyor, of a rotatable inverting device co-operating with the conveyor, friction driving mechanism for the inverting device, a latch arranged to hold the inverting device against rotation, and means traveling with the conveyor for releasing the inverting device from the latch.

21. The combination with a conveyor, of a rotatable inverting device co-operating with the conveyor, friction driving mechanism for the inverting device, a latch arranged to hold the inverting device against rotation, and a series of members traveling with the conveyor and movable in their travel to either clear or engage the latch. 70

22. The combination with a conveyor, of a rotatable inverting device co-operating with the conveyor, driving mechanism, means for rendering the driving mechanism effective or ineffective to turn the inverting device, an endless member traveling with the conveyor, and a series of pins movable upon the member into and out of position to act upon said means. 80

23. The combination with a conveyor, of a rotatable inverting device co-operating with the conveyor, driving mechanism, means for rendering the driving mechanism effective or ineffective to turn the inverting device, an endless member traveling with the conveyor, a series of pins movable upon the member into and out of position to act upon said means, and a member movable by objects to be inverted to set the pins in their active position. 85

24. The combination with a conveyor, of a rotatable inverting device co-operating with the conveyor, driving mechanism, means for rendering the driving mechanism effective or ineffective to turn the inverting device, an endless member traveling with the conveyor, a series of pins movable upon the member into and out of position to act upon said means, a member movable by objects to be inverted to set the pins in their active position, and a member movable by a set pin and arranged to prevent a repetition of the setting action of the object. 90

25. The combination with a conveyor, of a rotatable inverting device co-operating with the conveyor, driving mechanism, means for rendering the driving mechanism effective or ineffective to turn the inverting device, an endless member traveling with the conveyor, a series of pins movable upon the member into and out of position to act upon said means, a member movable by objects to be inverted to set the pins in their active position, and a member lying in the path of the set pins after they have acted and arranged to return them to normal. 105

26. The combination with a coating apparatus, of a conveyor delivering thereto, a conveyor receiving coated pieces from the coating apparatus, a rotatable inverting device to which the receiving conveyor delivers, frictional driving means for the inverting device, a latch for holding the inverting device against the frictional drive, a chain for operating the frictional driving means, pins movable upon the chain for engagement with the latch, an actuating member movable by the 120

work-pieces upon the delivering conveyor, and a setting member movable into the path of the pins and connected to the actuating member.

5 27. The combination with a coating apparatus, of a conveyor delivering thereto, a conveyor receiving coated pieces from the coating apparatus, a rotatable inverting device to which the receiving conveyor delivers, 10 frictional driving means for the inverting device, a latch for holding the inverting device against the frictional drive, a chain for operating the frictional driving means, pins movable upon the chain for engagement with 15 the latch, an actuating member movable by the work-pieces upon the delivering conveyor, a setting member movable into the path of the pins and connected to the actuating member, and means for rendering ineffective 20 the connections between the actuating and the setting members.

28. The combination with a coating apparatus, of a conveyor delivering thereto, a conveyor receiving coated pieces from 25 the coating apparatus, a rotatable inverting device to which the receiving conveyor delivers, frictional driving means for the inverting device, a latch for holding the inverting device against the frictional drive, 30 a chain for operating the frictional driving means, pins movable upon the chain for engagement with the latch, an actuating member movable by the work-pieces upon the delivering conveyor, a setting member movable 35 into the path of the pins, connections between the actuating member and setting member and including separable portions, and a lever movable by a set pin and arranged to separate portions of the connections.

40 29. The combination with a coating apparatus, of a conveyor delivering thereto, a conveyor receiving coated pieces from the coating apparatus, a rotatable inverting device to which the receiving conveyor delivers, frictional 45 driving means for the inverting device, a latch for holding the inverting device against the frictional drive, a chain for operating the frictional driving means, pins movable upon the chain for engagement with 50 the latch, an actuating member movable by the work-pieces upon the delivering conveyor, a setting member movable into the path of the pins and connected to the actuating member, and a restoring member acting upon the 55 set pins after they have passed the latch.

30. The combination with a coating apparatus, of a conveyor delivering thereto, a conveyor receiving coated pieces from the coating apparatus, a rotatable inverting device 60 to which the receiving conveyor delivers, frictional driving means for the inverting device, a latch for holding the inverting device against the frictional drive, a chain for operating the frictional driving means, pins 65 movable upon the chain for engagement with

the latch, an actuating member movable by the work-pieces upon the delivering conveyor, a setting member movable into the path of the pins and connected to the actuating member, a restoring member acting upon the set pins after they have passed the latch, and a retaining bar in contact with which both the set and restored pins travel and arranged to temporarily retain their positions.

In testimony whereof I have signed my name to this specification.

SIDNEY J. FINN.

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