March 4, 1930. J. D. FEENEY 1,748,978

MATERIAL HANDLING APPARATUS FOR PROCESSING MACHINES

Filed March 28, 1928

Fig. 2.

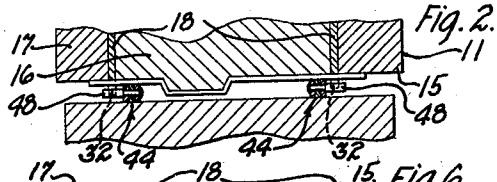



Fig. 6.

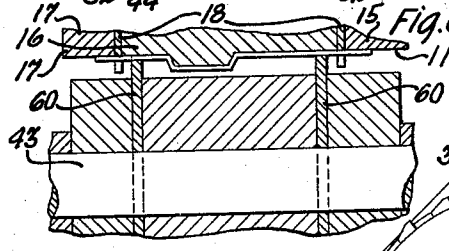



Fig. 1.




Fig. 3.

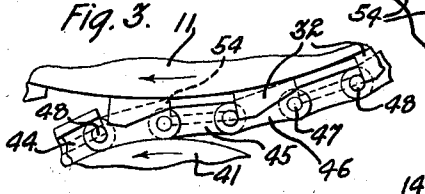



Fig. 4.

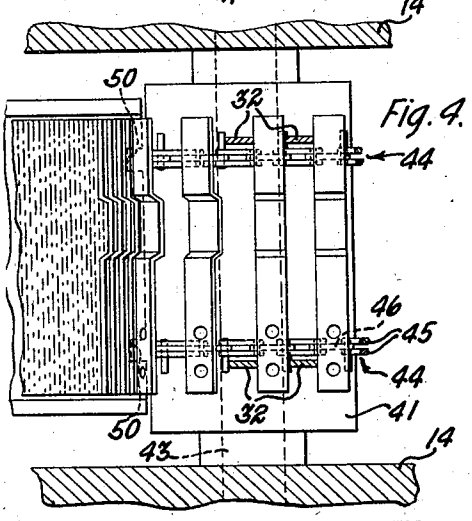
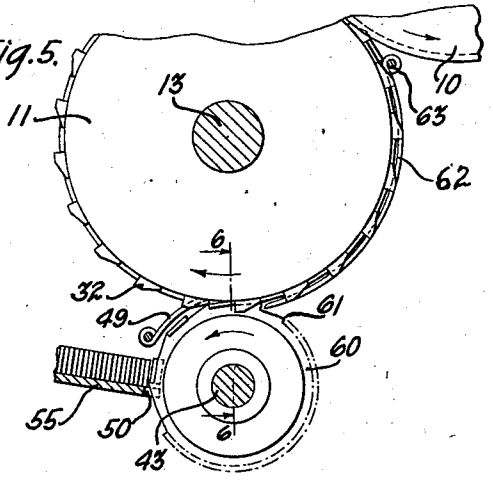



Fig. 5.




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Patented Mar. 4, 1930 1,748,978

# UNITED STATES PATENT OFFICE

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## MATERIAL-HANDLING APPARATUS FOR PROCESSING MACHINES

Application filed March 28, 1928. Serial No. 265,331.

This invention relates to a material handling apparatus for processing machines, and more particularly to such an apparatus for depositing in a predetermined position previously formed parts.

The principal object of the invention is the provision of an apparatus for positively advancing and arranging elements delivered from a processing machine.

In accordance with the general features of the invention, parts which have been formed by being subjected to two continuously rotated forming rolls are positively advanced to a position where such advancing means cooperates with an endless chain. The endless chain being provided with elements for receiving the formed parts and being driven in timed relation with respect to the forming rolls carries the parts from the lower forming roll to a position where they are successively stacked in certain arrangement and position.

Other objects and advantages of the invention will be best understood when considered in connection with the accompanying drawings, which illustrate by way of example two embodiments of the invention, and in which

Fig. 1 is a side elevational view of the apparatus with the front supporting frame removed;

Fig. 2 is a fragmentary transverse vertical section taken on line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary view showing the bottom of the lower forming roll in association with the conveyor and its adjuncts;

Fig. 4 is a fragmentary sectional view taken on line 4—4 of Fig. 1;

Fig. 5 is a side elevational view of a modified form of the invention, and

Fig. 6 is a fragmentary sectional view taken on line 6—6 of Fig. 5.

Referring now to the drawings in which like numerals designate similar parts throughout the several views, it will be readily observed that an upper forming roll 10 and a lower forming roll 11 are mounted on and keyed to shafts 12 and 13, respectively, which are suitably journaled in a pair of vertical side frames 14—14. The lower forming roll is composed of a plurality of annular sections 15, 16 and 17 and disposed between these individual roll sections are a pair of serrated disks 18—18, the purpose of which will be explained hereinafter.

The forming rolls 10 and 11 are driven at the same peripheral speed in the direction shown by the arrows in Fig. 1. The lower roll 11 thereof is positively driven by a source of power (not shown) applied to the shaft 13. The upper forming roll 10 is driven from the shaft 13 by suitable gearing comprising a gear 22 secured thereto meshing with intermeshing pinions 23—24, the latter of which meshes with a gear 25 secured to the shaft 12. In order to assure proper meshing of the gears and pinions the latter are mounted on a plate 26 which is made adjustable as to position by means of a slot 27.

Immediately above the forming roll 11 a vertical feed magazine 30 is secured to the side frames 14—14. This magazine is adapted to hold a plurality of blanks 31 to be formed in a desired position so that they can be individually removed by projections 32 of the rotating disks 18—18 and carried through the forming rolls 10—11. The lowermost blank in the magazine is supported by an arcuate plate 33 having an integral vertical portion 34 secured to the lower end of the magazine 30. Positioned above the plate 33 and similarly secured is a companion plate 35 with sufficient space therebetween to permit the passage of one of the blanks 31. These plates are provided with slots through which the projections 32 of the rotary disks 18 pass and the plates also cooperate to form a guide for the blanks as the projections remove the blanks from the magazine and feed them between the forming rolls.

The foregoing structure has only been briefly described to give a workable understanding of the forming mechanism and a more detail and thorough understanding thereof can be obtained from the pending application of C. E. Nelson et al., Serial No. 197,651, filed June 9, 1927.

Mounted adjacent the underside of the forming roll 11 are two rollers 40—41 which

are rotatable upon shafts 42—43, respectively, suitably journaled in the side frames 14—14. A pair of endless sprocket-chains 44—44 are spaced and movable upon the rollers 40—41 in such a manner that they follow the periphery of the forming roll for a short distance and engage the projections 32 of the disks 18 as will be explained. Each chain comprises a series of pairs of links 45—45 having an interconnecting link 46 interposed between each pair of links and pivoted to freely move on a pin 47; the other end of the link 46 is pivoted to another pair of links 45—45 by an extended pin 48 which projects laterally from the chain so as to be engaged by the projections 32 of the disks 18—18 as clearly shown in Fig. 2. It will be readily understood from the foregoing that the rotating projections 32 of the disks 18—18 incorporated in the lower forming roll serve to drive the chains 44—44 and their supporting rollers 40—41, which form an endless conveyor for the parts formed from blanks 31.

To maintain the formed parts in contact with the lower roll as they issue from between the forming rolls, an arcuate leaf spring 52 is securely fastened at 53 on the egress side of the rolls. This spring extends around the lower forming roll 11 to a point where the conveyor chains come in contact with the roll when the formed parts are permitted to drop onto the links 45—45 of these chains. In case any formed part adheres to the roll a stripper spring 49 bearing against the roll 11 at the point where the conveyor chains cease to follow the periphery of the roll is provided for forcing the formed part therefrom onto the chain. The interconnecting links 46 of the chains have an inclined upper surface, such that the distance from the highest point 54 thereof down to the upper faces of the links 45—45 is slightly greater than the thickness of the material being formed. A magazine 55 for receiving the formed parts is positioned at an incline directly in front of the roller 41. The bottom of this magazine is brought very close to the sprocket 41 and is provided with spaced slots 50—50 which permits the chains 44—44 to pass therethrough and consequently deposit the formed part in the magazine. In the particular embodiment shown and described herein the formed parts are placed flatwise on the conveyor chains and are delivered to or stacked edgewise in the magazine. The inclined top surfaces 54 of the links 46 in the chains transmit a camming action to the last part deposited in the magazine to force it forward or advance it therein to make room for the next part as the parts are stacked in successive order.

The operation of the apparatus is as follows: Power is applied to the shaft 13 and the forming rolls 10—11 are rotated in opposite directions. While the lower roll 11 rotates the projections 32 on the pair of disks 18 remove blanks 31 from the bottom of the magazine as they pass through the slots in the magazine guide plates 33—35. These projections 32 position and carry the blanks 31 through the forming rolls from whence they issue as formed parts. To prevent the formed parts from falling from the lower roll before they are properly positioned over the conveyor chains 44—44, the arcuate spring 52 is provided. As the formed parts travel past the end of this spring, they fall face downward upon the chains 44—44 and are conveyed thereon to the magazine 55 through the driving medium of the projecting pins 48 on the chains engaging the moving projections 32 included in the forming roll 11. The chains pass through the slots 50—50 in the bottom of the magazine 55 and the parts are deposited edgewise, being advanced therein due to the inclined upper surfaces 54 of the interconnecting links 46. From the foregoing it will be clear that the formed parts are received in a given position and rapidly stacked in a predetermined position through a simple and sturdy apparatus.

A modified form of the invention illustrated in Figs. 5 and 6 consists of replacing the chains with a pair of spaced disks 60—60 having serrations 61 analogous in shape to the upper surfaces of the chains 44—44 explained in connection with the first embodiment of the invention. These serrations 61 receive the parts, stack them edgewise, and advance them in the magazine 55 in a manner similar to that already described for the chains of the previous embodiment. An arcuate spring 62 secured at 63 on the egress side of the forming rolls 10—11 maintains the parts in contact with the periphery of the lower forming roll 11 until the parts are in a position to be received by the disks 60—60. The stripper spring 49 is provided for assuring that none of the parts will adhere to the surface of the forming roll 11. As the projections 32 carry the parts through the forming rolls 10—11 past the arcuate spring 62, the serrations 61 take the formed parts face down and convey them to the magazine 55. The disks 60—60 are driven by means of the rotating projections 32 of the roll 11 engaging the formed parts as they are supported between the serrations of the disks. These serrations pass through slots in the bottom of the magazine and the formed parts are deposited thereon and advanced therein due to the serrations pushing the last part back to subsequently stack another part.

It is believed that the foregoing conveys a clear understanding of the objects and principles prefaced above, and while but two embodiments have been illustrated, it should be understood that considerable change might be made in the construction without depart-

ing from the spirit and scope of the invention as expressed in the appended claims.

What is claimed is:

1. In a material handling apparatus for a forming mechanism, a magazine, means for receiving formed parts directly from the forming mechanism and depositing them in the magazine in predetermined relation to each other, and means carried by the first mentioned means for advancing the parts therein.

2. In a material handling apparatus for a forming roll having a plurality of spaced peripheral projections for positioning parts to be formed, means actuated by the peripheral projections for receiving the formed parts, and means carried thereby for placing the parts in predetermined relation to each other.

3. In a material handling apparatus for a forming roll having a plurality of spaced peripheral projections for positioning parts to be formed, a magazine, means actuated by the peripheral projections for receiving the formed parts, and means carried thereby for placing the parts in a predetermined position in the magazine and for advancing them therein.

4. In a material handling apparatus for a forming mechanism, means for separating the formed parts from the forming mechanism, and a rotatable means for receiving the formed parts and actuated by the forming mechanism through the parts received.

5. In a material handling apparatus for a forming mechanism, a magazine, means for separating the formed parts from the forming mechanism, a rotatable means for receiving the formed parts and actuated by the forming mechanism through the parts received, and means included in the rotatable means for placing the parts in a predetermined position in the magazine and advancing them therein.

6. In a material handling apparatus for a forming mechanism, a magazine, and a chain for receiving formed parts and delivering them to the magazine in a predetermined position including alternate links of a predetermined shape for advancing the parts in the magazine.

7. In a material handling apparatus for a forming roll having a plurality of spaced peripheral projections for positioning a part to be formed, a disk, means for maintaining the formed parts in contact with the roll for a predetermined interval, means for transferring the formed parts to the disk, and means carried by the disk for stacking the parts in a predetermined position.

8. In a material handling apparatus for a forming roll having a plurality of spaced teeth, a magazine, a plurality of spaced disks, means for maintaining the formed parts in contact with the roll for a predetermined interval, means for transferring the formed parts to the disks whereby the disks are rotated through the medium of the formed parts engaging the teeth of the roll, and means integral with the disks for placing the parts in a predetermined position in the magazine and for advancing the parts in the magazine.

9. In a material handling apparatus for a forming roll having a plurality of spaced teeth for positioning parts to be formed, means for maintaining the formed parts in contact with the roll for a predetermined interval, means driven by the teeth on the roll for receiving the formed parts, a magazine, and means for placing the parts in the magazine, said means for placing the parts having a member for advancing the parts in the magazine.

10. In a material handling apparatus for a forming roll having a plurality of spaced teeth for positioning parts to be formed, a conveyor for receiving and transferring the formed parts, and a plurality of spaced pins carried by and projecting laterally from the conveyor for driving engagement with the teeth on the forming roll.

11. In a material handling apparatus for a forming mechanism, a spring member for maintaining the formed parts in contact with the forming mechanism, a spring member for separating the parts therefrom, and means for receiving the parts from the second mentioned spring member and depositing them in predetermined relation to each other.

12. In a material handling apparatus, a conveyor for formed parts, a member projecting into the path of the parts carried by the conveyor, and cam members on the conveyor cooperating with the member to strip the parts from the conveyor.

13. In a material handling apparatus, a conveyor for formed parts, a magazine having a portion projecting into the path of the parts carried by the conveyor, and cam members on the conveyor cooperating with said portion to strip the parts from the conveyor and advance them into the magazine.

14. In a material handling apparatus, a rotary member having its periphery formed to receive and advance formed parts, an endless conveyor extending adjacent the periphery of the rotary member and adapted to receive the parts therefrom, a magazine, and means carried by the conveyor for advancing the parts from the conveyor into the magazine.

15. In a material handling apparatus, a member adapted to receive and advance formed parts, an endless conveyor extending adjacent the first mentioned member and adapted to receive the parts therefrom, a magazine extending into the path of the parts on the conveyor, and means carried by the conveyor for advancing the parts from the

conveyor into the magazine in fixed predetermined relation to each other.

16. In a material handling apparatus, a rotary member having its periphery formed to receive and advance formed parts, an endless conveyor contacting with the rotary member over a substantial portion of its periphery and adapted to receive the parts therefrom, and means for removing the parts from the conveyor.

In witness whereof, I hereunto subscribe my name this 16th day of March A. D., 1928.

JOHN DIETRICH FEENEY.