

Dec. 22, 1936.

A. J. LEWIS

2,065,319

HOPPER FEED

Filed June 1, 1935

2 Sheets-Sheet 1

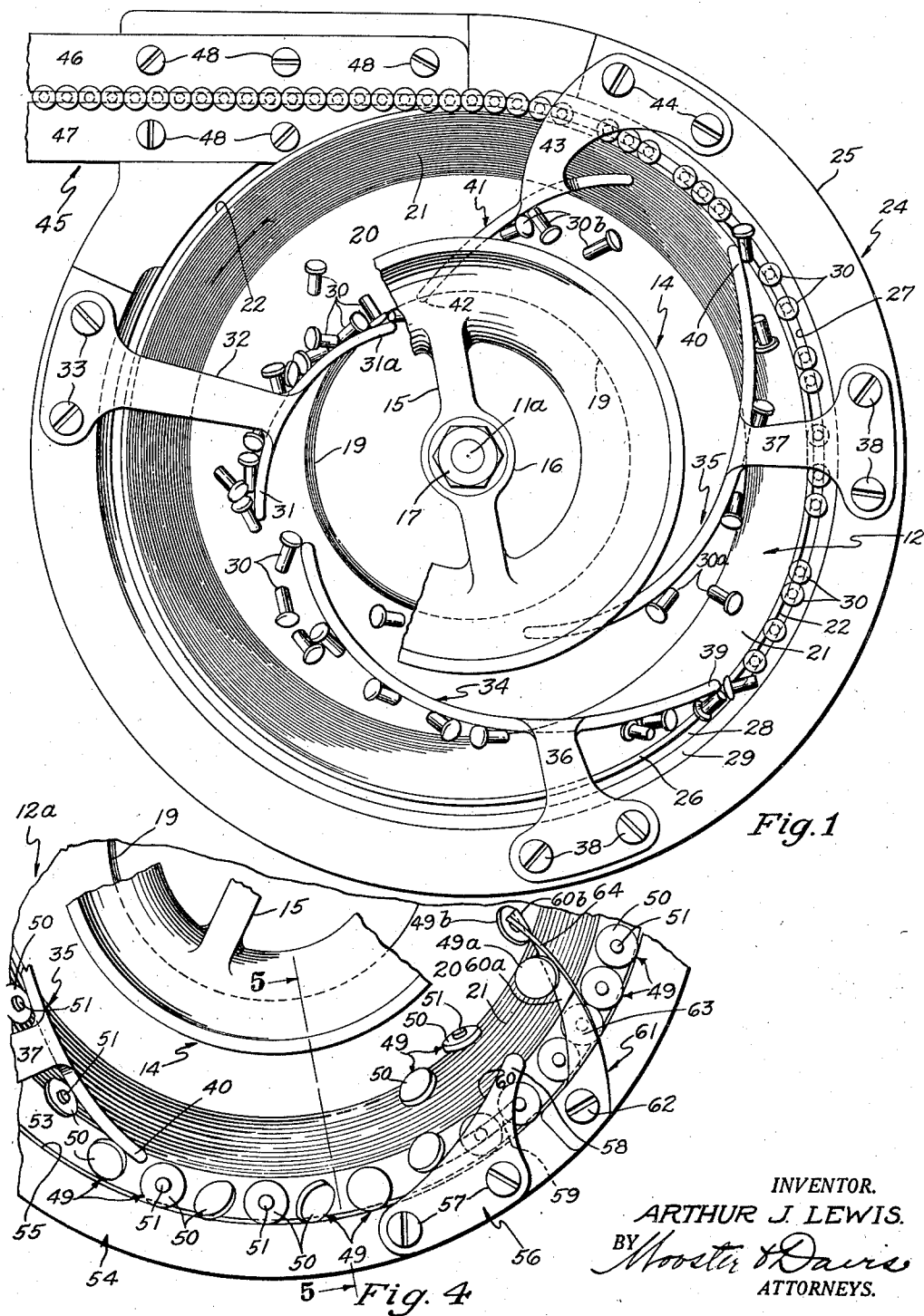


Fig. 1

Fig. 4

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2 Sheets-Sheet 2

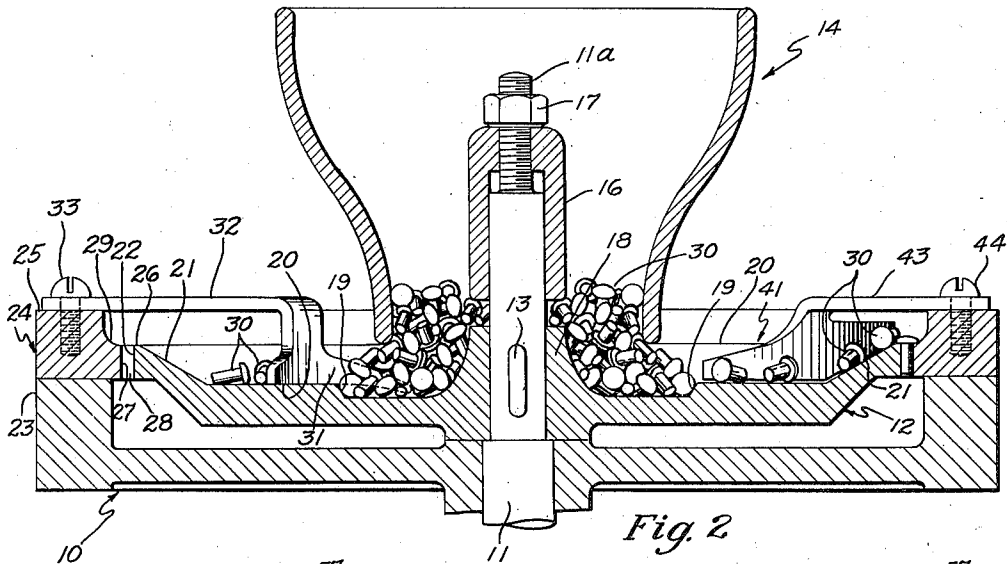


Fig. 2

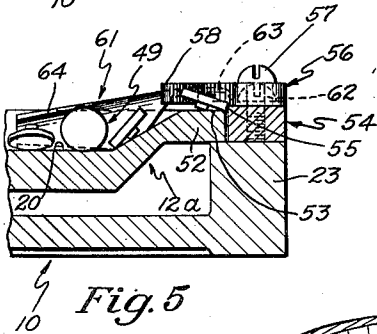


Fig. 5

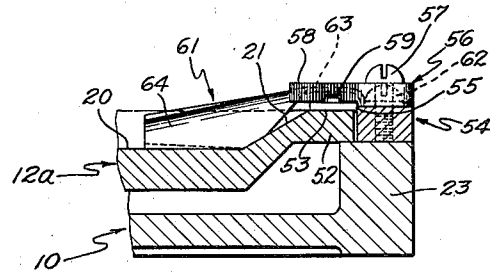
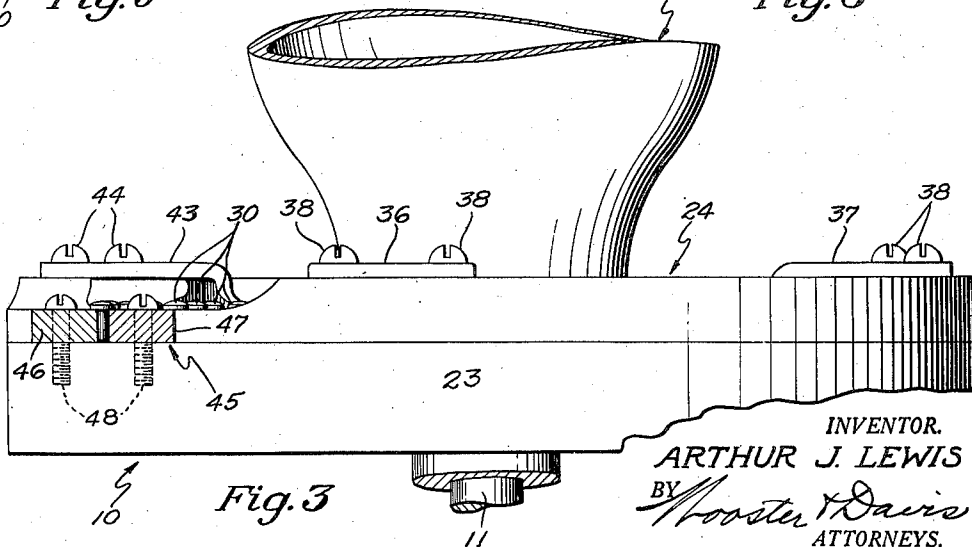


Fig. 6



UNITED STATES PATENT OFFICE

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HOPPER FEED

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21 Claims. (Cl. 221—130)

This invention relates to new and useful improvements in hopper feeds.

An object of the invention is to provide a hopper feed in which there is no tumbling action of the parts being fed whereby if they are finished as for example by being coated with lacquer, they will not become scratched or worn during the feeding operation.

An additional object is to provide a feed wherein as the articles are taken from the hopper they enter onto a disc and move from a position thereof of smaller diameter to a position of relatively larger diameter and are thus separated from one another.

Another object is to provide a hopper feed wherein articles are taken from a hopper and fed onto a disc on which they are directed to a raceway, means being provided for directing the surplus articles back to the mass at the lower end of the hopper.

A further object is to provide in an apparatus as indicated, means for rearranging articles not in correct position to enter the raceway so that when they are next fed to the raceway they are more apt to be in the right position to enter it.

Other objects and advantages will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawings wherein satisfactory embodiments of the invention are shown. However, it will be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawings:

Fig. 1 is a top plan view showing the hopper feed constructed according to the present invention with a portion of the container broken away;

Fig. 2 is a vertical sectional view through the apparatus of Fig. 1;

Fig. 3 is an elevational view with parts broken away and showing the same apparatus;

Fig. 4 is a top plan view showing a modified construction;

Fig. 5 is a detail sectional view taken substantially along the line 5—5 of Fig. 4 and showing the action when the articles being fed are not correctly positioned to enter the raceway; and

Fig. 6 is a view similar to Fig. 5 but illustrating the passage of a correctly positioned article through a gauge means employed.

Referring in detail to the drawings, and at

first particularly to the form of the invention shown in Figs. 1, 2 and 3, at 10 is generally indicated a substantially circular frame or support through which extends a driven shaft 11 having an upper reduced threaded end portion 11a. Within and of somewhat less diameter than the support 10 is a plate or disc generally designated 12. By means of a key 13 or otherwise, disc 12 is secured to the shaft 11 to turn therewith. An open ended hopper 14 is arranged above the disc 12 and includes a spider 15 having a hub portion 16 disposed over the upper end portion of a shaft 11 and clamped to such shaft as by means of a nut 17 threaded onto the shaft portion 11a. Shaft 11 is turnable in the frame 10 and it will therefore be clear that the disc 12 and hopper 14 are rotated together but relative to the frame.

Disc 12 includes an upwardly extending central thickened portion 18 entering the lower open end of the hopper 14, and outwardly of such portion the disc is provided with the annular shoulder 19 beyond which the disc has a flat surface portion 20 bounded by an inclined surface portion 21 extending substantially to the outer edge or periphery 22 of the disc. Beyond the outer edge of the disc 12 the frame 10 includes a vertical wall portion 23 on the upper edge of which is disposed a ring like part 24 the upper surface 25 of which is above the upper surface of the edge portion 26 of the disc 12 while the inner edge portion 27 is spaced from the peripheral edge 22 of the disc thereby providing a raceway 28. Part 24 may be secured to member 10 by any suitable means and at its inner side includes an upper surface portion 29 flush with the surface portion 26 of the disc, and these surface portions together are to be engaged by the undersides of the heads of headed articles when the shanks of such articles are in the raceway 28.

Hopper 14 receives the articles to be fed, and in Figs. 1, 2 and 3 such articles are disclosed as rivets 30, and particularly by reference to Fig. 2 it will be noted that the shoulder 19 of disc 12 holds back the mass of articles to be fed and prevents them from moving freely out of the lower end of the hopper onto the disc. As the disc and hopper revolve together there is no tumbling action of the articles while in the hopper and it will, therefore, be apparent that the apparatus may be used for the feeding of finished articles and that during such feeding the surfaces of the articles will not be scratched or worn.

Disposed over the flat surface portion 20 and

extending across the shoulder 19 of the disc 12 is a member or guide 31 supported as by an arm 32 secured to the part 24 by screws 33 or the like. Member 31 is stationary with respect to the disc 12, and since such member extends across the shoulder 19 it will be apparent that as the disc and hopper are rotated some of the articles 30 will be taken from the mass at the lower end of the hopper by the inner end portion 31a of member 31 and fed or guided outwardly onto the disc 12 as clearly shown in Fig. 1.

Beyond the member 31 there are located stationary guide members 34 and 35 also disposed over the disc 12 and extending across the flat surface portion 20 of such disc and up the inclined portion 21 thereof and terminating approximately at the raceway 28. Members 34 and 35 are supported by arms 36 and 37 respectively and the outer ends of such arms are secured to the ring-like part 24 as by screws 38. The arrangement of member 34 is such that on the rivets 30 being carried beyond the outer end of member 31 they are carried over against the member 34, and as the disc continues to rotate the rivets are guided upwardly by the member 34 to the edge of the raceway 28. On reaching the raceway those rivets which are correctly positioned are received by it since their shanks enter the slot while their heads are supported by the surface portions 26 and 29 of the disc and part 24 respectively.

The rivets which are not correctly positioned on leaving the upper or outer end 39 of the member 34 slide down the inclined portion 21 of the disc as at 30a and as they are carried along by the latter they are brought against the member 35 and are again guided upwardly toward the raceway 28. Those articles which are correctly positioned on leaving the upper end 40 of the member 35 enter the raceway if they are presented to an unoccupied portion of it, and the articles which do not enter the raceway, on leaving the outer end portion 40 of member 35 again slide down the inclined portion 21 of the disc toward the center or flat portion 20 thereof. Several such articles are shown at 30b.

Those articles 30b which do not enter the raceway after the second attempt on being carried along by the disc come into engagement with a stationary guide member 41 disposed over the disc and extending down the inclined portion 21 and across the flat portion 20, and having an end portion 42 crossing the shoulder 19. It will, therefore, be apparent that the articles which are carried against the member 40 are guided by it back across the shoulder 19 and into the mass of articles being held back by such shoulder. Member 41 is stationary being supported by an arm 43 the outer end portion of which is secured to the ring-like part 24 in any suitable manner as by the screws 44.

The articles which enter the raceway are carried along as the disc 12 is revolved and are delivered to a chute 45 forming a continuation of raceway 28 which may be the feed chute to a machine which is to use the article or a discharge chute from the hopper feed. As shown, chute 45 is formed by bar-like members 46 and 47 secured by screws 48 and spaced apart a distance to receive the shanks of the articles but to have the heads of such articles rest on their upper surfaces at their adjacent edges. Obviously, any other form of chute may be used

with the hopper feed of the present invention. It will be understood that the articles in the raceway are not gripped and are therefore not positively carried along by the revolving disc 12 and that when the chute 45 is full the disc 12 may continue to revolve without binding the articles one against the other and that the apparatus will continue to feed articles up to the raceway 28 even though the latter be full so that additional articles may not enter it.

Figs. 4, 5 and 6 illustrate a slightly modified construction particularly adapted for feeding a somewhat different shape of article such, for example, as the snap fastener parts 49 each including a head 50 flat on one side and on its other side provided with a short stud 51. The structure shown for feeding these articles is for the most part the same as that of Figs. 1, 2 and 3 and includes the base or frame 10, a disc 12a corresponding with the disc 12 except that disc 12a at its outer edge is provided with a horizontal portion 52 having a flat upper surface 53 comprising a raceway. Also, the modified apparatus includes the hopper 14 mounted to be revolved with disc 12a as will be understood.

On the upper edge of the outer vertical wall portion 23 of frame 10 of Figs. 4, 5 and 6 is a ring-like part 54 secured in any suitable manner and of a thickness somewhat greater than that of the edge portion 52 of disc 12a whereby such part 54 extends above the surface or raceway 53 providing a shoulder or stop 55 to prevent articles moving outwardly off the raceway. Particularly by reference to Figs. 5 and 6 it will be noted that the outer edge portion 52 of the disc 12a extends over the upper edge of the wall portion 23 of the base or frame and has its outer periphery relatively close to the inner edge of the part 54.

In the modified construction the articles 49 are taken from the lower end of the hopper 14 and guided outwardly across the disc 12a to the raceway 53 in the manner already described in connection with Fig. 1. It is desired that the articles be fed from the raceway all in the same position and disposed on the flat sides of their heads 50 with their studs 51 directed upwardly. To insure that only correctly positioned articles will be carried along the raceway a gauge means 56 is secured to the part 54 as by screws 57 and includes an arm-like portion 58 extending across the raceway and provided in its under side with a groove 59 of a width to permit of the passage therethrough of the studs 51 of articles 49.

Gauge 56 is so located that correctly positioned articles on the raceway may be carried along under the gauge since the studs of such articles may pass through the groove 59 of the gauge. However, articles which are not correctly positioned will be carried against the curved front edge 60 of the gauge and forced off the raceway onto the inclined portion 21 of the disc down which they will slide. The articles which are rejected by the gauge are for the most part those which are disposed with their stud 50 downwardly and beyond the gauge there is provided a means for rearranging such articles or for turning them over so that they would be disposed on the flat sides of their heads after they pass the gauge, and will therefore be more apt to be properly arranged when next presented to the gauge.

The means for rearranging the article comprises an arm 61 secured to the ring-like part 54 as by screw 62 and having its portion 63 which

crosses the raceway 53 bulged or bent upwardly so as not to interfere with the movement of the correctly positioned articles being carried along the raceway. Inwardly of the raceway the portion 64 of the arm 61 extends downwardly along the inclined portion 21 of the disc and then partway across its flat surface 20.

This portion 64 of the arm is twisted into a somewhat spiral-like form so that in the length of the arm its lower edge passes from a position at the forward side of its upper edge as shown at 60a in Fig. 4 to a position at the rear side of such upper edge, as shown at 60b. That is, the portion 64 of the arm is constructed somewhat like the mold board of a plow.

Therefore, as the articles 49 are carried against such arm portion with their studs 51 lowermost their heads move over the lower portion of the arm as shown by the article 49a in Fig. 4 and as the disc carries the articles along they are gradually carried up through and beyond a vertical position as in the case of the article 49b of Fig. 4 and fall over onto their flat backs. From this it will be seen that by means of the arm 61 articles which are rejected by the gauge 56 because of being incorrectly arranged will be rearranged by such arm 61 and therefore are more likely to be properly arranged when next carried to the gauge.

From the foregoing it will be clear that with the means of the present invention the articles being fed are not tumbled upon one another in the hopper, and that owing to the shoulder or wall 19 the articles are prevented from moving freely out of the hopper onto the revolving disc at the underside of the hopper. Further, the arrangement is such that as the articles are taken from the hopper they enter onto a relatively wide disc and so are separated out or from one another. In each instance the articles which are presented to the raceway and do not enter it because of being improperly arranged are returned to the mass at the center of the disc to be again taken from such mass and offered to the raceway. Also, the articles are not fed positively along the raceway and thus if the latter becomes full there will be no wedging or binding action to interfere with the continuous operation of the mechanism. It will also be seen that as the articles are fed outwardly from a surface of smaller diameter to one of larger diameter they are automatically separated or spaced from each other giving them a greater opportunity to rearrange themselves and not interfere with each other.

Having thus set forth the nature of my invention, what I claim is:

1. In a hopper feed, an upright shaft, an open ended hopper secured to the shaft, a plate secured to the shaft below the hopper and of greater diameter than the lower end thereof, an annular wall on the plate about the lower end of the hopper to hold back a mass of articles from moving out of the hopper onto the plate, means forming a raceway at the outer edge of the plate to hold the articles in a certain definite position, and a stationary means extending over the plate and positioned to take articles from such mass as the plate and hopper revolve with the shaft and feed such articles out over the plate to the raceway.

2. In a hopper feed, an upright shaft, an open ended hopper secured to the shaft, a plate secured to the shaft below the hopper and of greater diameter than the lower end thereof, an

annular wall on the plate about the lower end of the hopper to hold back a mass of articles from moving out of the hopper onto the plate, a raceway at the outer edge of the plate arranged to hold a plurality of the articles in the same definite position, and means extending over the plate and positioned to take articles from such mass as the plate and hopper revolve with the shaft and feed such articles out over the plate to the raceway.

3. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, a shoulder on the disc about the lower end of the hopper to keep back a mass of articles and prevent them moving freely out of the hopper onto the disc, a raceway outwardly of the shoulder arranged to hold a plurality of the articles in the same definite position, and means over the disc and extending across said shoulder to cause articles from said mass to move out over the disc and shoulder to the raceway as the latter and hopper are revolved.

4. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, a shoulder on the disc about the lower end of the hopper to keep back a mass of articles and prevent them moving freely out of the hopper onto the disc, means over the disc and extending across said shoulder to cause articles from said mass to move out over the disc as the latter and hopper are revolved, a raceway at the outer edge of said disc, and other means extending over the disc to cause said articles to move across the disc to said raceway as the disc revolves.

5. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, a shoulder on the disc about the lower end of the hopper to keep back a mass of articles and prevent them moving freely out of the hopper onto the disc, means over the disc and extending across said shoulder to cause articles from said mass to move out over the disc as the latter and hopper are revolved, a raceway at the outer edge of said disc, other means extending over the disc to cause said articles to move across the disc to said raceway as the disc revolves, and means extending across the disc to cause the articles which do not enter the raceway to move back across the disc and over said shoulder to said mass.

6. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, a shoulder on the disc about the lower end of the hopper to keep back a mass of articles and prevent them moving freely out of the hopper onto the disc, stationary means over the disc and extending across said shoulder to cause articles from said mass to move out over the disc as the latter and hopper are revolved, a raceway at the outer edge of said disc, other stationary means extending over the disc to cause said articles to move across the disc to said raceway as the disc revolves, and means to return to the mass articles which are fed to but do not enter said raceway.

7. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, a shoulder on the disc about the lower end of the hopper to keep back a mass of articles and prevent them moving freely out of the hopper onto the disc, said disc including a flat surface portion beyond

said shoulder and an inclined portion beyond said flat surface, means over the disc and extending across said shoulder to cause articles from said mass to move out onto the flat portion of the disc, a raceway at the outer edge of the inclined portion of the disc, other means extending over the disc to cause said articles to move up the inclined portion of the disc to the raceway, and said other means terminating at the raceway whereby articles slide down the inclined portion of the disc on leaving said means and not entering the raceway.

8. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, said disc including a flat surface portion and an inclined portion beyond said flat surface, means over the disc to cause articles from said mass to move out onto the flat portion of the disc, a raceway at the outer edge of the inclined portion of the disc, other means extending over the disc to cause said articles to move up the inclined portion of the disc to the raceway, said other means terminating at the raceway whereby articles slide down the inclined portion of the disc on leaving said means and not entering the raceway, and a means beyond said other means and positioned to direct back to said mass the articles which move down said inclined portion of the disc.

9. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, a shoulder on the disc about the lower end of the hopper to keep back a mass of articles and prevent them moving freely out of the hopper onto the disc, means over the disc and extending across said shoulder to cause articles from said mass to move out over the disc as the latter and hopper are revolved, a raceway at the outer edge of said disc, other means extending over the disc to cause said articles to move across the disc to said raceway as the disc revolves, and a chute positioned to receive articles from said raceway.

10. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, means over the disc to cause articles from said mass to move out over the disc as the latter and hopper are revolved, a ring-like part about said disc and having its inner edge spaced from the outer edge of the disc whereby a raceway is formed, and other means extending over the disc to cause said articles to move across the disc to said raceway as the disc revolves.

11. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, a shoulder on the disc about the lower end of the hopper to keep back a mass of articles and prevent them moving freely out of the hopper onto the disc, a ring-like part about said disc and having its inner edge spaced from the outer edge of the disc whereby a raceway is formed, stationary means over the disc to cause articles to move across the disc from said mass to the raceway as the disc revolves, and said ring-like part having a surface portion flush with the upper surface of the edge of the disc whereby as the shanks of headed parts enter said raceway the heads of said parts rest on the flush upper surface portions of the disc and ring-like part.

12. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, a shoulder on the disc

about the lower end of the hopper to keep back a mass of articles and prevent them moving freely out of the hopper onto the disc, means over the disc and extending across said shoulder to cause articles from said mass to move out over the disc as the latter and hopper are revolved, a frame including a portion spaced from the edges of said disc and therewith defining a slot comprising a raceway to receive the shanks of headed articles, and other means secured to said frame and extending over said disc to cause articles to move across the disc to said raceway as the disc is revolved.

13. In a hopper feed, a frame, a shaft extending vertically through said frame, an open ended hopper secured to the shaft above the frame, a disc secured to the shaft between the hopper and frame and of greater diameter than the lower end of the hopper, an annular wall on the disc about the lower end of the hopper to hold back a mass of articles from moving freely out of the hopper onto the disc, a raceway at the outer edge of the disc arranged to hold a plurality of the articles in the same definite relation, and means supported by the frame and extending over the disc and operative to take articles from the mass held by said wall and guide them to said raceway.

14. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, a shoulder on the disc about the lower end of the hopper to keep back a mass of articles and prevent them moving freely out of the hopper onto the disc, a raceway at the outer edge of said disc arranged to hold a plurality of the articles in the same definite relation, and means over said disc to cause articles from said mass to move across the disc to the raceway as the disc is revolved.

15. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, a shoulder on the disc about the lower end of the hopper to keep back a mass of articles and prevent them moving freely out of the hopper onto the disc, a raceway at the outer edge of said disc, means over said disc to cause articles from said mass to move across the disc to the raceway as the disc is revolved, and means to move from the raceway incorrectly positioned articles.

16. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, a shoulder on the disc about the lower end of the hopper to keep back a mass of articles and prevent them moving freely out of the hopper onto the disc, a raceway at the outer edge of said disc, means over said disc to cause articles from said mass to move across the disc to the raceway as the disc is revolved, other means to direct back from the raceway for later presentation thereto incorrectly positioned articles, and means to thereafter rearrange said articles whereby they are more apt to be correctly positioned on next being fed to the raceway.

17. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, a shoulder on the disc about the lower end of the hopper to keep back a mass of articles and prevent them moving freely out of the hopper onto the disc, said disc having a flat outer edge portion comprising a raceway, and means over said disc to cause articles from said mass to move across the disc to the raceway as the disc is revolved.

18. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, a shoulder on the disc about the lower end of the hopper to keep back a mass of articles and prevent them moving freely out of the hopper onto the disc, said disc having a flat outer edge portion comprising a raceway, means over said disc to cause articles from said mass to move across the disc to the raceway as the disc is revolved, and a frame including a portion extending above the surface of the raceway to prevent articles moving outwardly of the raceway.

19. In a hopper feed, a hopper open at its lower end, a disc below the hopper, means to revolve the disc and hopper together, a discharge chute for articles located outwardly from the hopper, a raceway for articles leading to said chute, said disc having an annular inclined wall adjacent the inner side of the raceway, and means for guiding articles outwardly from the hopper and up the inclined wall to the raceway.

20. In a hopper feed, a disc mounted to rotate about an upright axis, a hopper over the disc mounted to rotate therewith and having

an open lower end discharging on to the disc, means about the lower end of the hopper and spaced therefrom to retard movement of articles outwardly from the hopper, a raceway at the outer edge of the disc arranged to hold a plurality of articles in the same definite predetermined arrangement, means over the disc to feed articles from the hopper over the surface of the disc toward the raceway and arrange them in proper position to enter the raceway, and means above the disc to carry the articles not so arranged back toward the hopper.

21. In a hopper feed, an open ended hopper, a disc below the hopper, means to revolve the disc and hopper together, means about the lower end of the hopper and spaced therefrom to retard movement of articles outwardly over the disc, a raceway outwardly of said means arranged to hold a plurality of the articles in the same definite position, and means over the disc and extending outwardly of said means to cause articles from below the hopper to move outwardly over the disc and past said retarding means to the raceway as the disc and hopper are revolved.

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