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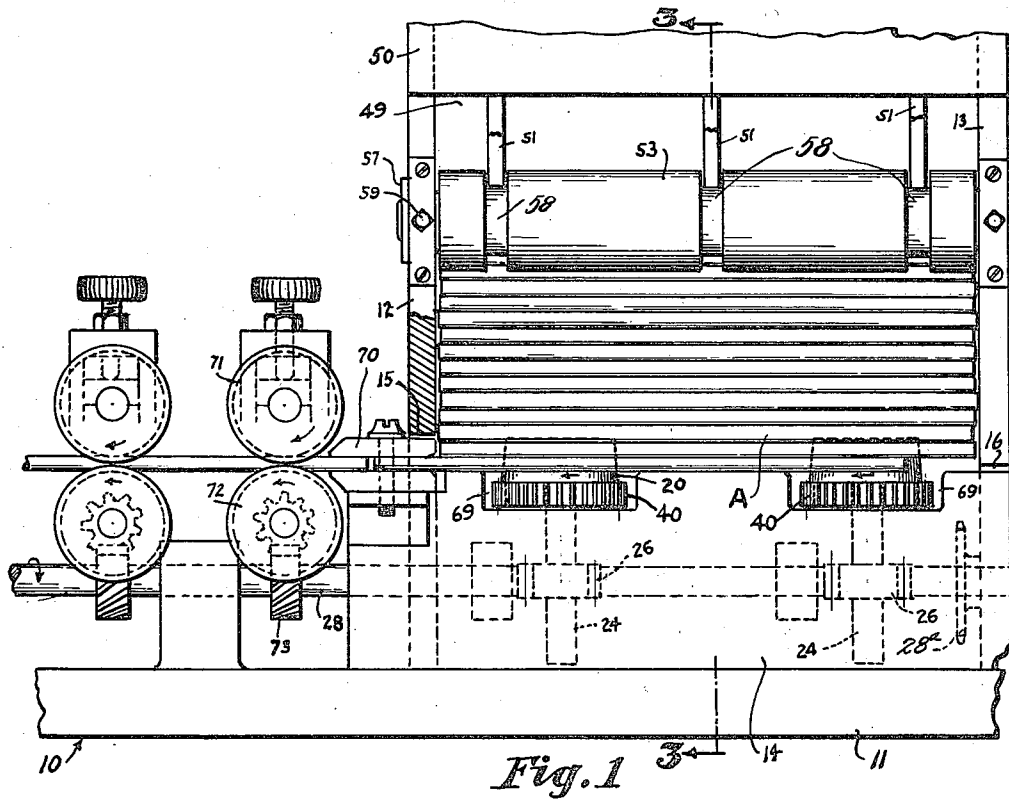
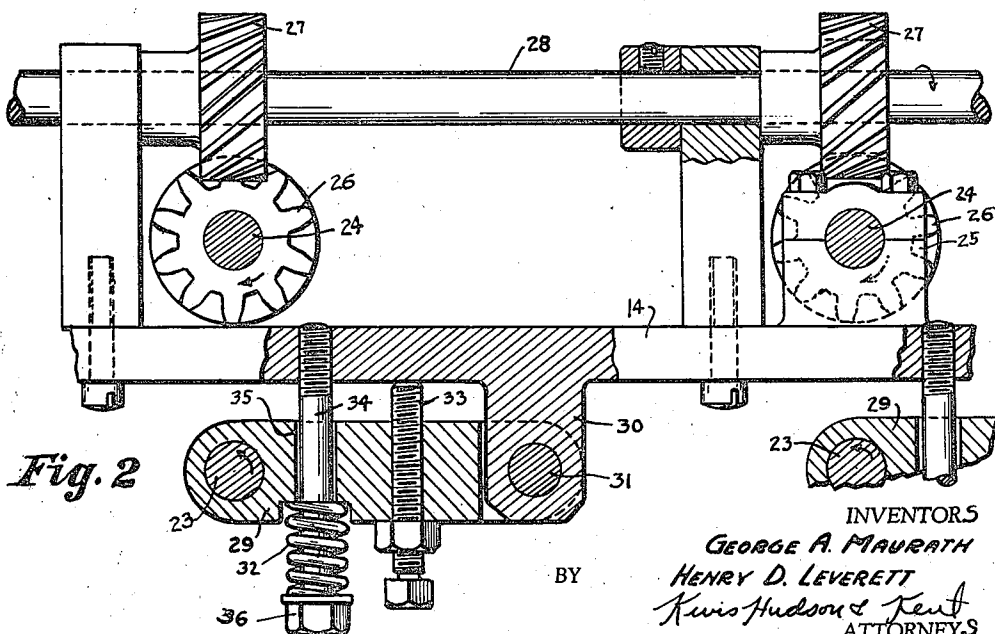
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2,167,049

ARTICLE FEEDING APPARATUS

Filed May 17, 1938

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

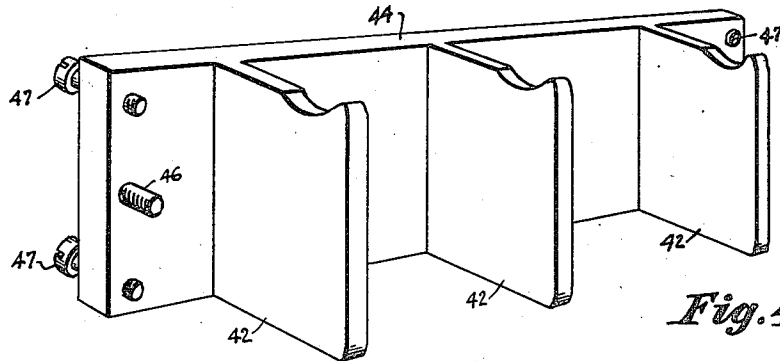


Fig. 4

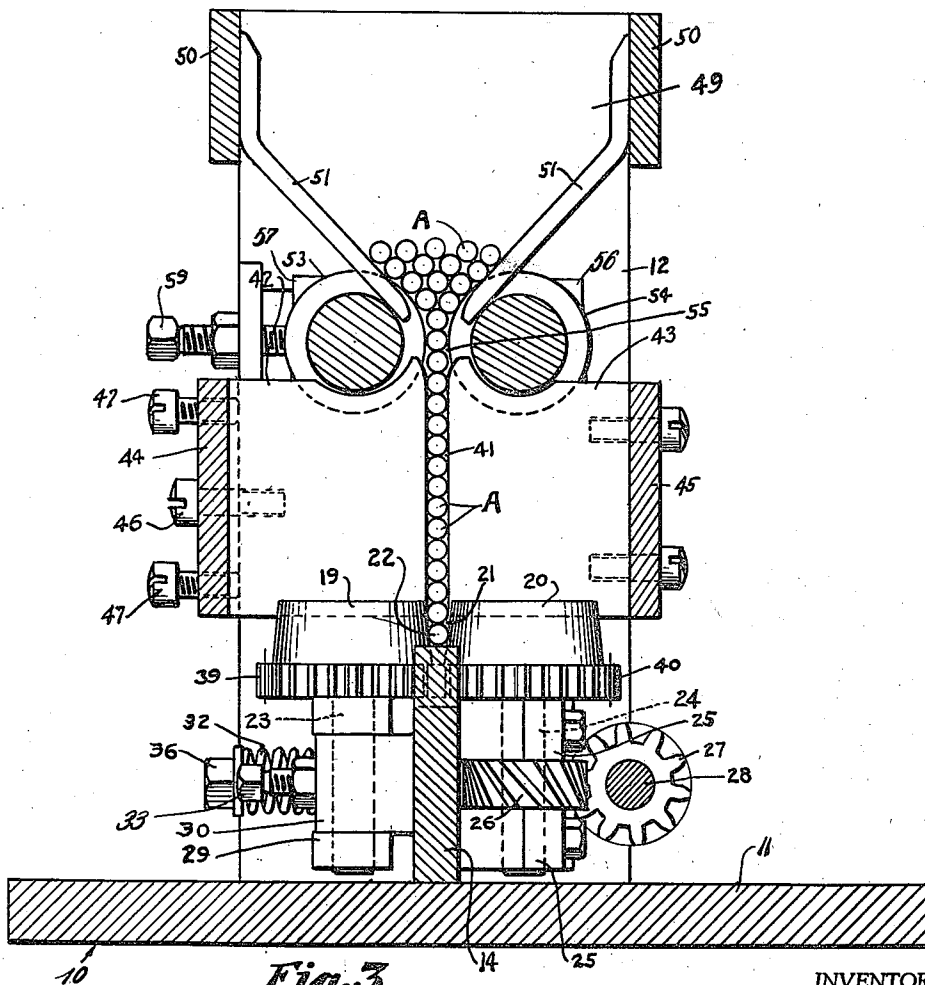


Fig. 3

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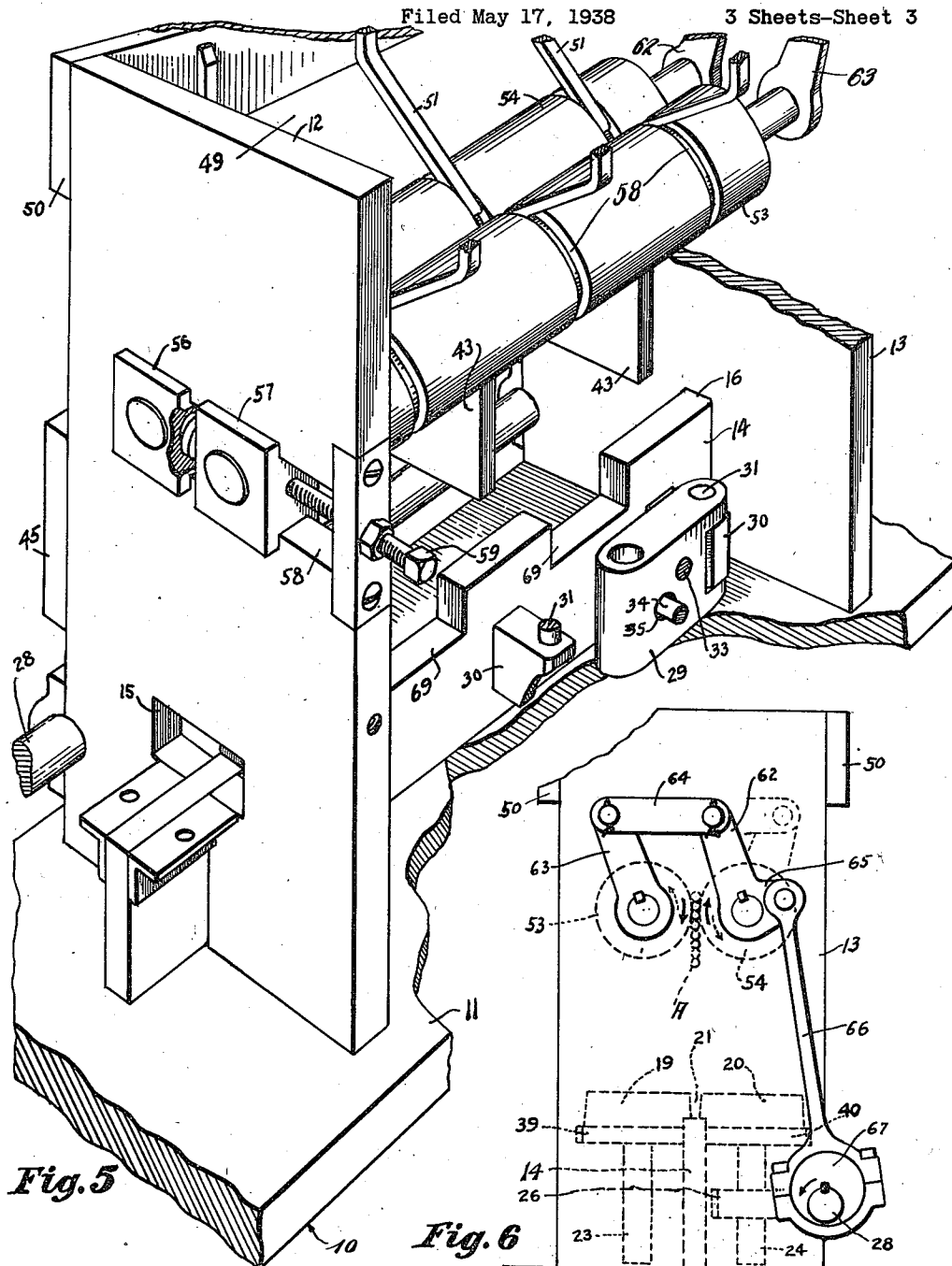


Fig. 5

Fig. 6

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UNITED STATES PATENT OFFICE

2,167,049

ARTICLE FEEDING APPARATUS

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11 Claims. (Cl. 198—43)

This invention relates to article feeding apparatus and more particularly to apparatus of this kind, which is of simple and compact construction and capable of efficient and reliable operation at both low and high speeds.

An object of our invention is to provide novel feeding apparatus of this character, embodying a pair of cooperating feed rolls to which the articles to be fed are supplied and which have a space of tapering width therebetween for gripping the individual articles in succession.

Another object of our invention is to provide improved article feeding apparatus having a chute adapted to contain a series of articles to be fed and a pair of cooperating tapered feed rolls having a space therebetween to receive articles from said chute and adapted to cause gripping of the lowermost article of the series.

A further object of our invention is to provide article feeding apparatus, of the type referred to, in which means is provided for causing relative lateral adjustment of at least one of the rolls for varying the width of the space therebetween.

Still another object of our invention is to provide article feeding apparatus in which a pair of cooperating feed rolls have a downwardly converging article receiving space therebetween for gripping the lowermost article and in which means is provided for limiting the extent of movement of such lowermost article into the converging space.

Another object of our invention is to provide article feeding apparatus having a pair of cooperating feed rolls and a hopper for supplying articles thereto, and in which a pair of oscillating rollers define the discharge opening at the bottom of the hopper and facilitate the passage of articles therefrom.

Other objects and advantages of our invention will be apparent from the following description when taken in conjunction with the accompanying sheets of drawings, in which—

Fig. 1 is a side elevation with the parts broken away showing one embodiment of our article feeding apparatus.

Fig. 2 is a partial plan view with parts in section showing the means for mounting and driving the feed rolls.

Fig. 3 is a vertical sectional view taken through the apparatus as indicated by line 3—3 of Fig. 1.

Fig. 4 is a perspective view showing one of the chute forming members in detached relation.

Fig. 5 is a perspective view with parts broken away and with the feed rolls removed, illustrating the construction and arrangement of certain parts of the apparatus, and

Fig. 6 is an end view of the machine with parts broken away, showing the means for driving the oscillating rollers of the hopper.

More detailed reference will now be made to

the accompanying drawings in which we show what we now regard to be a preferred form of our article feeding apparatus. Before proceeding with the detailed description it should be understood, however, that the drawings are mainly illustrative and that the invention may be embodied in various other forms of apparatus capable of feeding articles of different size and shape.

In the embodiment of the invention herein illustrated we show feeding apparatus having a frame 10 which may include an elongated substantially horizontal base plate 11 having a pair of longitudinally spaced upright end plate members 12 and 13 mounted thereon, and a longitudinally extending upright web member 14. The latter member is relatively low in height as compared with the end members 12 and 13 and may project through openings 15 and 16 of the latter located substantially on the longitudinal mid plane of the apparatus.

An important part of our feeding apparatus consists in the provision of a pair of cooperating feed rolls 19 and 20 having a downwardly converging article receiving space 21 therebetween to which the articles A can be supplied, preferably in a series, so as to cause gripping of the lowermost article 22 of the series. This downwardly converging article receiving space 21 may be obtained by mounting cylindrical feed rolls on relatively inclined shafts or axes or, as illustrated in this instance, may be provided by constructing the rolls 19 and 20 with a taper and mounting the rolls to rotate on laterally spaced substantially parallel upright shafts 23 and 24. The angle of taper of the rolls 19 and 20 may be varied or selected to obtain the best operating condition and to suit the characteristics of the articles to be fed.

When the articles to be fed are relatively long, thin articles such as the rods or wires A illustrated in this instance, we may provide longitudinally spaced pairs of the feed rolls 19 and 20, as shown in Fig. 1 of the drawings. The pairs of rolls are of similar construction and are mounted in a similar manner on the upright web or plate member 14.

As best shown in Figs. 2 and 3 of the drawings, the shaft 24 for the roll 20 is journaled in vertically spaced bearings 25 which are mounted against one side of the upright web 14. A gear 26 mounted on this shaft is disposed between the spaced bearings 25 and meshes with a gear 27 of a longitudinally extending drive shaft 28. The shaft 23 for the roll 19 is carried by a laterally swinging arm or lever 29 so as to provide for relative lateral adjustment of the roll 19 and variation in the width of the downwardly converging space 21. The arm 29 may have a forked end which is pivotally connected to a projection 30 of the web 14 by means of the hinge pin 31. The po-

sition of adjustment of the roll 19 relative to the roll 20 may be determined and maintained by adjusting means comprising a compression spring 32 acting on the arm 29 and a set screw 33 carried by such arm and engageable with the web 14. The spring 32 may be mounted on a stud 34 which is carried by the web 14 and extends through an opening 35 of the arm. The inner end of the spring bears against the outer side of the arm 29 and a nut or head 36 on the stud provides an abutment for the outer end of the spring.

The shaft 28 may be driven, as by means of the sprocket 28a, from an electric motor or any other suitable source of power and, through the gears 26 and 27, will cause rotation of the feed roll 20. The apparatus may be operated with the roll 19 acting as an idler or back-up roll for the driven roll 20, but we prefer to also drive the roll 19 so that relative rotation between the rolls cannot take place. For this purpose we provide the rolls with annular gears 39 and 40 which mesh with each other and cause the roll 19 to be driven from the roll 20. These gears are formed with teeth of sufficient length or depth to remain in mesh with each other, even though the roll 19 is adjusted laterally away from the roll 20 by means of the set screw 33.

The articles A are preferably supplied in a series to the converging space between the feed rolls and for this purpose we provide a downwardly extending guideway or chute 41 which leads to this space. This chute may be formed as a substantially vertical slot defined by the inner edges of a pair of aligned arms 42 and 43 which are carried by longitudinally extending plate members 44 and 45. These plate members may be bolted or otherwise secured to the upright end members 12 and 13 of the frame 10. It is desirable to provide for adjustment of the width of the chute 41 so that articles of different widths can be accommodated, and to this end we mount the plate member 44 on studs 46 and provide the same with set screws 47, so that this member and the arm 42 thereof can be adjusted relative to the plate member 45.

When the articles A are relatively long, as in this instance, we form the plate members 44 and 45 with several of the arms 42 and 43, spaced longitudinally therealong, so as to form a guideway or chute extending for a substantial distance in the direction of the longitudinal axis of the apparatus, and in which such relatively long articles may lie in a series with their axes substantially parallel to each other and extending in the direction of the longitudinal axis of the machine.

A supply of the articles to be fed may be maintained at the upper end of the chute 41 by a suitable hopper 49. The bottom of this hopper may be formed, in part, by longitudinal side plates 50 which are secured to the end plates 12 and 13 and, in part, by downwardly and laterally inclined bars 51 which are carried by such side plates. The bars 51 may be provided in suitable number to support the supply of articles, for example, they may correspond in number and location with the longitudinally spaced arms 42 and 43 which define the chute 41.

To facilitate passage of the articles from the bottom of the hopper to the upper end of the chute 41, we provide a pair of rollers 53 and 54 which form a partial bottom for the hopper and define therebetween a discharge opening 55 leading from the hopper to the upper end of the chute. These rollers are mounted in suitable

bearings such as the bearing blocks 56 and 57 carried by the end plates 12 and 13 of the machine and are adapted to be oscillated about their axes to cause agitation of the articles and thereby facilitate the passage of the articles from the bottom of the hopper into the upper end of the chute. These rollers may be formed with longitudinally spaced grooves 58 therein, into which the downwardly and laterally inclined bars 51 of the hopper extend, as shown in Figs. 3 and 5. With the rollers arranged in this manner it will be seen that they form a partial bottom for the hopper and engage and support the articles located immediately above the upper end of the chute 41. By oscillating these rollers the articles at this point can be agitated and thereby caused to arrange themselves in regular order and to pass through the discharge opening 55 into the upper end of the chute without sticking or jamming.

To permit of variation in the width of the discharge opening 55 so as to accommodate articles of different size, we provide for lateral shifting of the bearing blocks 57 of the roll 53. This may be accomplished by constructing the end plates 12 and 13 with lateral slots 58 therein which accommodate the bearing blocks 57. These bearing blocks may be shifted in such slots, and locked in the desired position of adjustment therein, by means of suitable adjusting screws 59.

The rollers 53 and 54 of the hopper may be oscillated by any suitable means and, for this purpose, we may provide levers 62 and 63 which are keyed to the respective rollers and may be connected by a link 64. The lever 62 may be a bell crank lever and may have its angular extending arm 65 connected with the upper end of a connecting rod 66. The lower end of this connecting rod may be mounted on an eccentric 67 which is driven by the shaft 28.

From the arrangement of apparatus above described it will be seen that when a supply of articles is placed in the hopper 49 and the apparatus set in operation by rotation of the shaft 28, the rollers 53 and 54 will be oscillated to cause articles to be supplied to the chute 41. The feed rolls 19 and 20 will also be driven and as the lowermost article of the series is applied to the downwardly converging space 21 from the chute it will be gripped by the rolls and will be fed thereby longitudinally of its axis and thus ejected from between the rolls. As each article of the series becomes the lowermost article it will, in turn, be gripped by the rolls, and as it is ejected therefrom it will push the preceding articles ahead of it.

To prevent the lowermost article 22 from moving too far downwardly into the converging space 21 between the feed rolls we may use the top portion or upper edge of the web 14 as a rest or stop to be engaged by such lowermost article. If desired, notches 69 may be formed in the top of the web 14 to accommodate the pairs of feed rolls 19 and 20, leaving a portion of the web upstanding to form such a stop or rest for the lowermost article of the series. The opening 15 of the end plate 12 of the machine may have a suitable guide, such as a guide 70, mounted therein to receive the articles from the feed rolls and direct the same to an article advancing means which conveys the articles to the point of use. This article advancing means may comprise pairs of cooperating grooved rollers 71 and 72 which are located at spaced points outwardly of the guide 70 and receive the articles therefrom. The rollers

72 of such pairs of rollers may be driven from the shaft 28 by suitable gearing 73.

From the foregoing description and the accompanying drawings it will now be readily seen that we have provided a novel and efficient article feeding apparatus, which is of relatively simple construction, but which can be operated at any desired rate of speed to cause smooth and uninterrupted feeding of articles. While our apparatus operates very efficiently in the handling of elongated articles, such as rods or wires, the principle of the invention can be embodied in different machines for handling articles of various shapes and sizes.

Although we have illustrated and described the feeding apparatus of our invention in a somewhat detailed manner, it should be understood that we do not wish to be limited to the precise details of construction and arrangement of parts herein disclosed, but regard our invention as including such changes and modifications as do not involve a departure from the spirit of the invention and the scope of the appended claims.

Having thus described our invention, we claim:

1. In article feeding apparatus, means providing a chute adapted to contain a series of articles to be fed, a pair of feed rolls adapted to receive articles therebetween from said chute, at least one of said rolls being tapered to cause the lowermost article of the series to be gripped therebetween, and means for driving said rolls for delivering the articles therefrom in succession.

2. In article feeding apparatus, a hopper adapted to contain a quantity of articles to be fed, means providing a chute of substantially single-article width adapted to receive articles in succession from the hopper and to contain a series of the articles to be fed, a pair of feed rolls having therebetween a space adapted to receive articles from said chute and which tapers in width to cause gripping of the lowermost article by the rolls, and driving means connected with at least one of said rolls.

3. In article feeding apparatus, means providing a chute adapted to contain a series of articles to be fed, a pair of feed rolls having therebetween a space adapted to receive articles from said chute and which converges to cause gripping of the lowermost article by the rolls, driving means connected with at least one of said rolls, and means for limiting the extent of movement of the lowermost article into the converging space.

4. In article feeding apparatus, means providing a chute adapted to contain a series of articles to be fed, a pair of feed rolls, means mounting said rolls to receive articles from said chute therebetween and providing for relative movement between the rolls to adjust the same for gripping of the lowermost article, driving means having connection with at least one of the rolls, and means for limiting the extent of downward movement of articles between the rolls.

5. In an article feeder, means providing a chute of substantially single-article width adapted to contain a series of articles to be fed, a pair of feed rolls adjacent the lower end of said chute, said rolls being tapered and providing a converging space therebetween adapted to receive articles from said chute and to grip the lowermost article, and means having driving connection with at least one of said rolls.

6. In an article feeding device, a pair of feed rolls having an article receiving space there-

between, means for driving said rolls to discharge articles laterally in succession therefrom, means defining a chute leading to said space and adapted to contain a series of the articles to be fed, a hopper having a pair of spaced rollers defining a discharge opening connecting with the upper end of said chute, and means for oscillating said rollers to facilitate the passage of articles from the hopper to the chute.

7. In a device for feeding rod-like articles, a pair of feed rolls having an article receiving space therebetween, means for driving said rolls to discharge articles laterally in succession therefrom, means defining a chute leading to said space and adapted to contain a series of the articles to be fed, a pair of spaced elongated rollers adjacent the upper end of said chute, a hopper adapted to contain a supply of the articles and having a bottom formed in part by said spaced rollers, and means for oscillating said rollers to facilitate passage of articles to the chute.

8. In a device for feeding rod-like articles, a pair of feed rolls having an article receiving space therebetween, means for driving said rolls to discharge articles laterally in succession therefrom, means defining a chute leading to said space and adapted to contain a series of the articles to be fed, a pair of spaced elongated rollers adjacent the upper end of said chute, a hopper adapted to contain a supply of the articles and having a bottom formed in part by said spaced rollers, means for oscillating said rollers to facilitate passage of articles to the chute, and means for relatively adjusting said rollers to vary the width of the space therebetween.

9. In a device for feeding rod-like articles, a pair of feed rolls having an article receiving space therebetween, means for driving said rolls to discharge articles laterally in succession therefrom, means defining a chute leading to said space and adapted to contain a series of the articles to be fed, a pair of spaced elongated rollers adjacent the upper end of said chute, said rollers having spaced circumferentially extending grooves therein, a hopper adapted to contain a supply of the articles and having portions thereof extending into the grooves of said rollers, and means for oscillating said rollers.

10. An article feeding apparatus comprising a frame having a longitudinal upright member with a recess in the top thereof, a pair of feed rolls having peripheral portions thereof extending into said recess, means mounting said rolls with said peripheral portions defining a downwardly converging space, means for directing articles in succession into said space to be gripped by said rolls, and means for driving the rolls to discharge articles laterally along the top of said member.

11. An article feeding apparatus comprising a frame having an upright web with a recess in the top thereof, a pair of feed rolls having peripheral portions thereof extending into said recess and defining a downwardly converging space, means mounting said rolls on said web including a swinging arm carrying one of the rolls and providing for relative adjustment between the rolls, means providing a chute leading to said space and adapted to contain a series of the articles to be fed, and means for driving said rolls to discharge articles laterally along the top of said web.

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