Oct. 7, 1930. C. E. DELLENBARGER 1,777,661

FEEDING DEVICE

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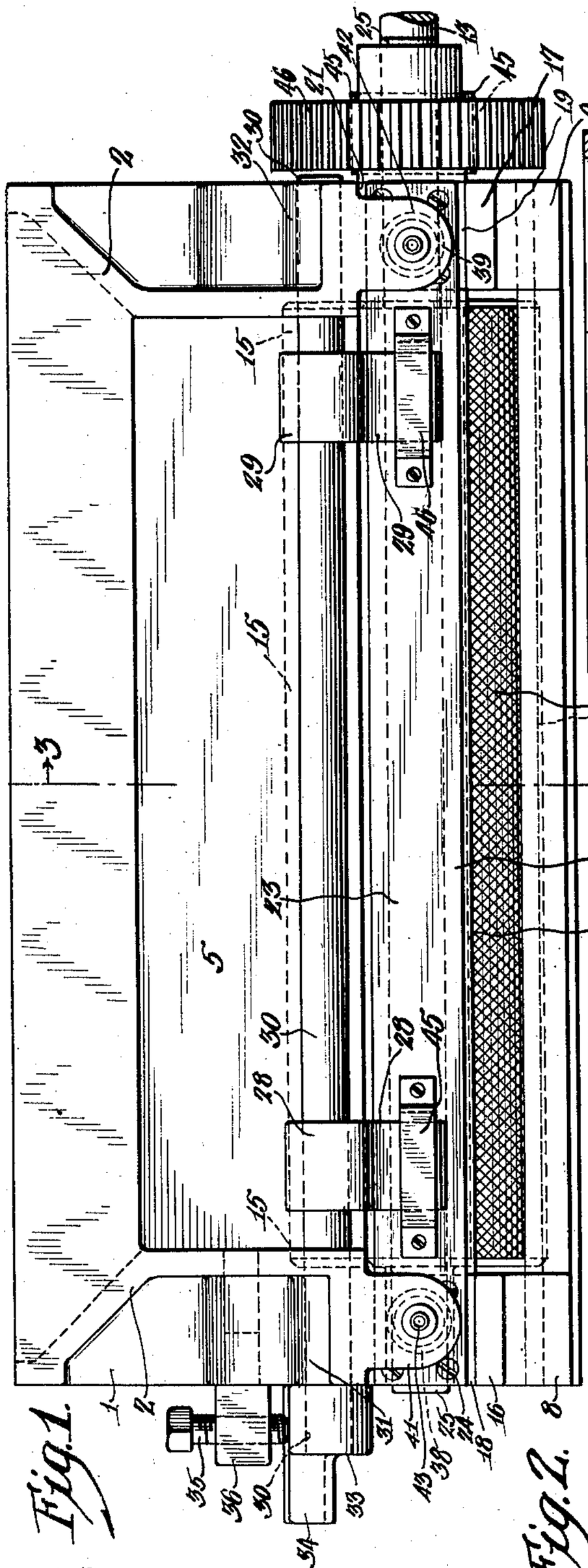

Fig. 1.

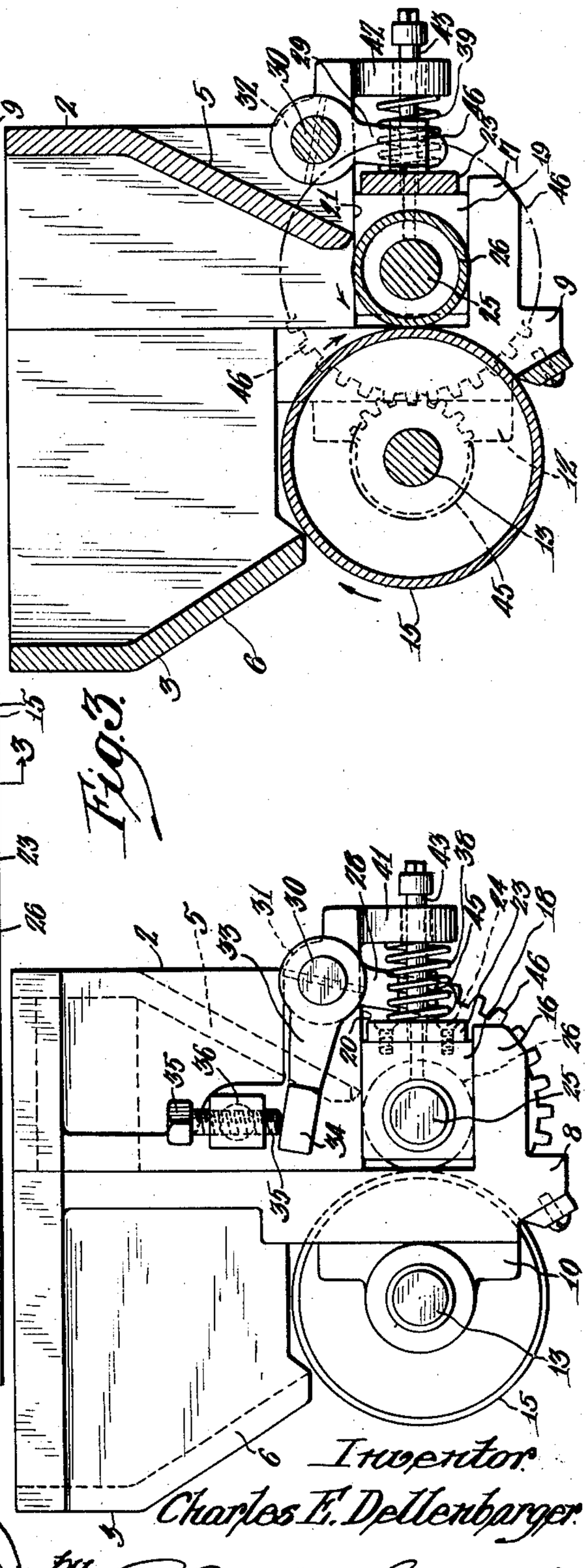

Fig. 2.

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Fig. 4.

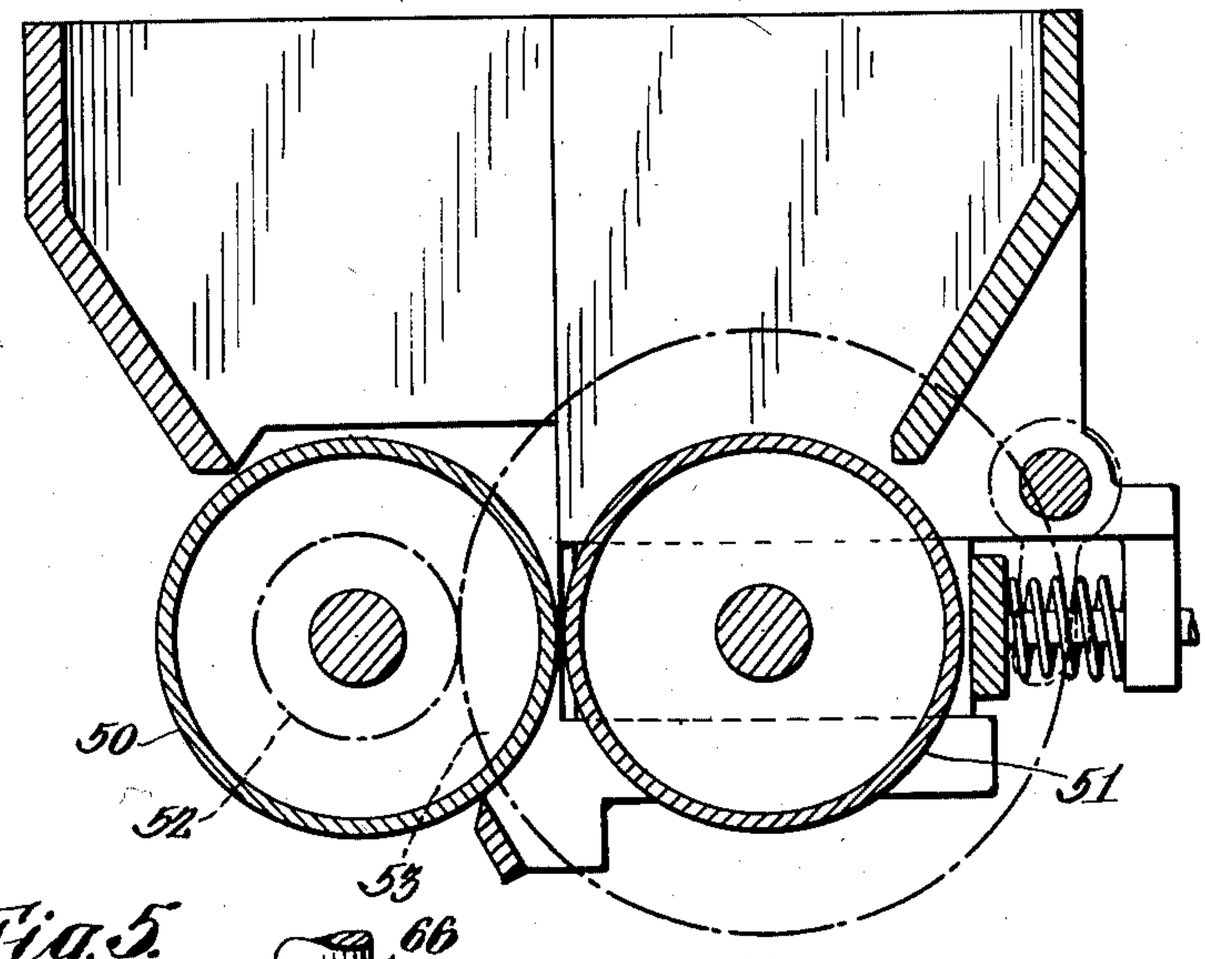


Fig. 5.

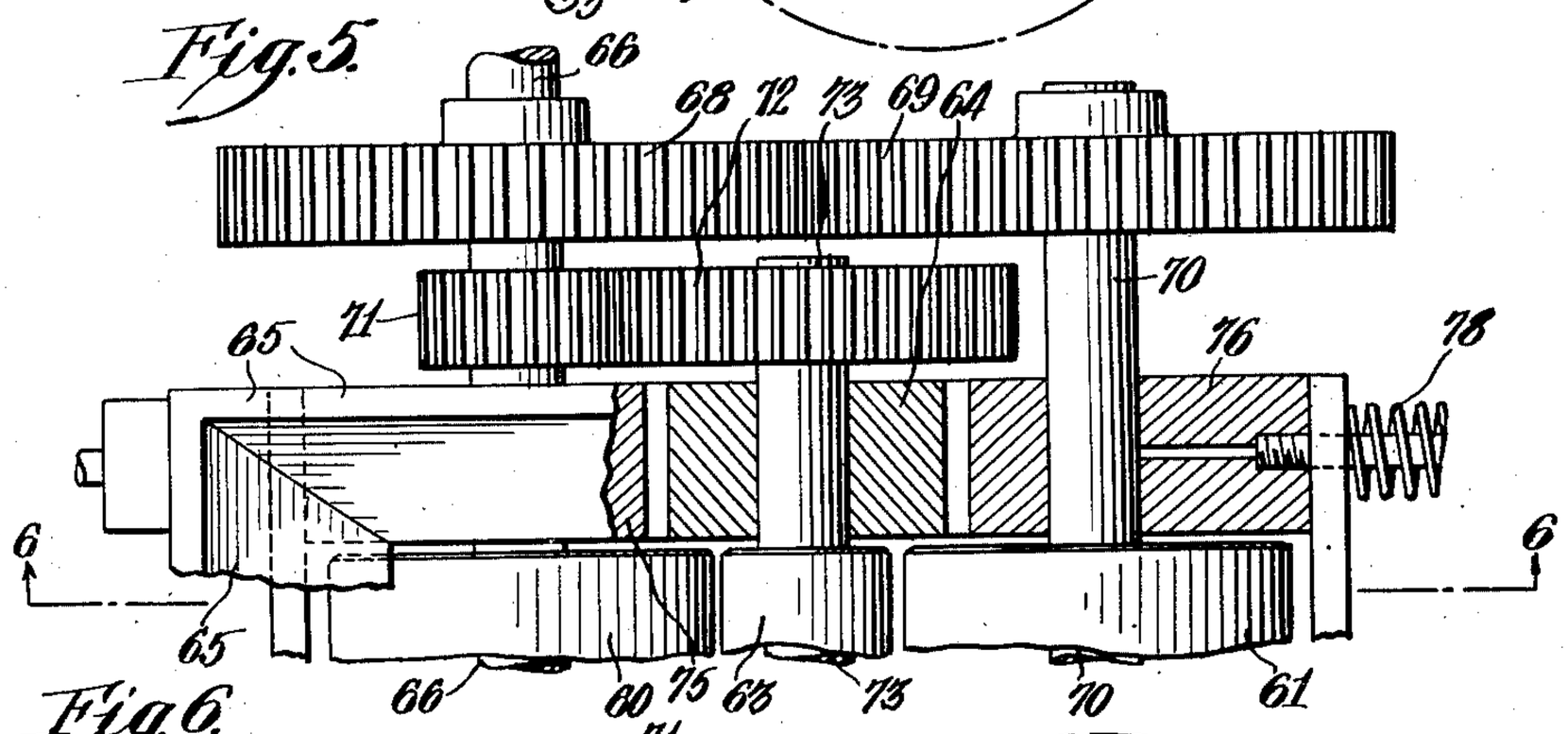
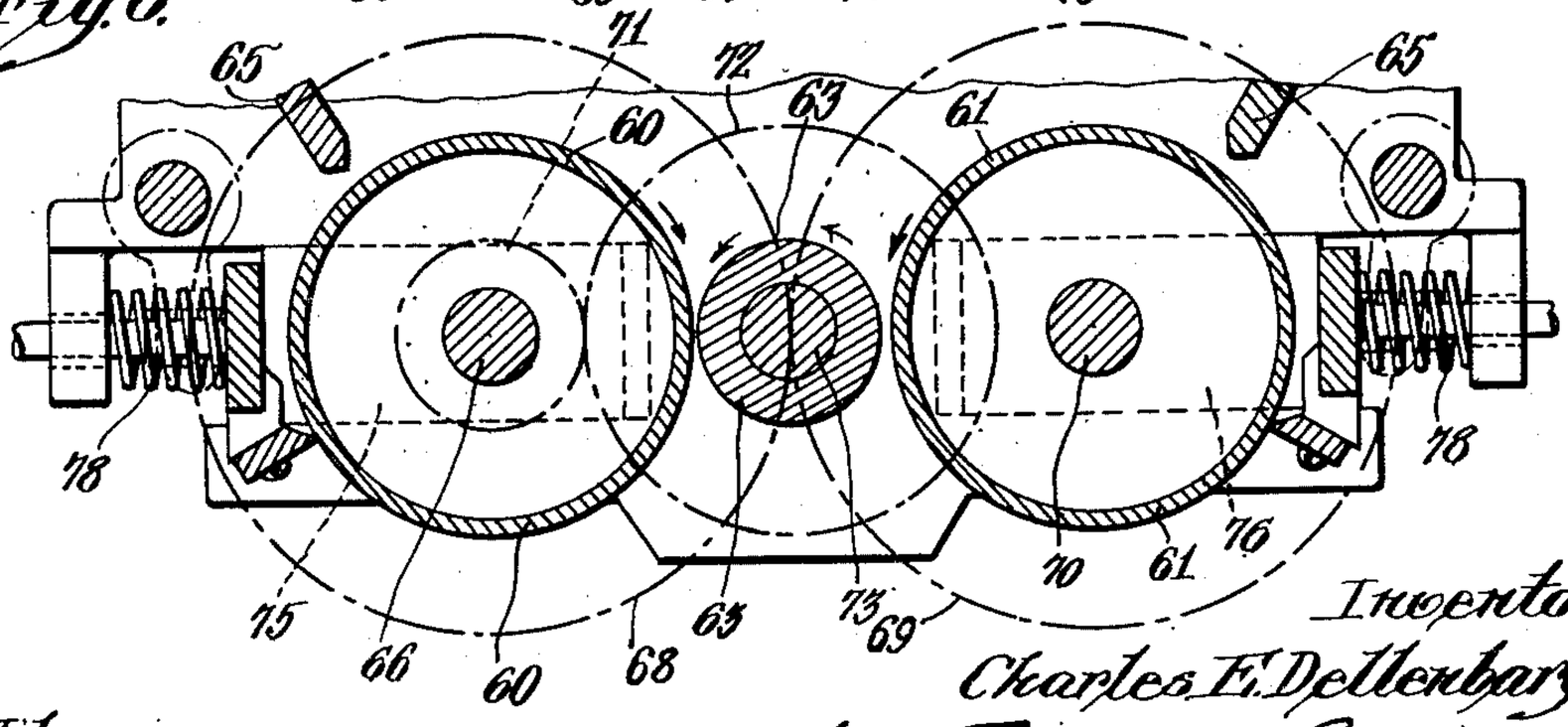


Fig. 6.



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Patented Oct. 7, 1930 1,777,661

UNITED STATES PATENT OFFICE

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FEEDING DEVICE

Application filed January 4, 1928. Serial No. 244,538.

My invention relates to improvements in a feeding device and particularly relates to a feeding device for feeding powdered sugar, kaolin, flour and similar material used in the manufacture of candy, porcelain and various other industries.

The object of my invention is to provide a feeding device which will feed a uniform quantity of material, and which may be readily adjusted for feeding any desired quantity of material; a further object is to provide a device which will not clog due to foreign substances or caked lumps of the material being fed through the same; and a still further object is to provide various novel features of construction and arrangement of the parts, which will be more fully hereinafter described and claimed.

In carrying out my invention I employ two or more rolls or disks which are rotated at different surface speeds. Said rolls are adjustable relatively to each other for varying the feeding space between the rolls and said rolls are also yieldably mounted to permit them to separate, thus preventing the clogging of the device.

Referring to the accompanying drawings, Fig. 1 is a front elevation of my improved feeding device; Fig. 2 is an end elevation of Fig. 1; Fig. 3 is a vertical transverse section on line 3—3, Fig. 1; Fig. 4 is a view similar to Fig. 3, showing a different arrangement of the rolls and gearing for operating the same; Fig. 5 is a partial plan view of a still different form of feeding mechanism; and Fig. 6 is a vertical sectional view on line 6—6, Fig. 5.

In the accompanying drawings, in which like reference characters refer to like parts, 1 represents a hopper, preferably made in two sections 2 and 3 secured together at their opposite ends to form a body portion having the front and rear walls 5 and 6 inclined to form a restricted discharge opening at the bottom portion of the hopper, where the feed and gage rolls are positioned.

Depending extension brackets 8 and 9 are formed upon opposite ends of section 3 of the hopper, and have rigidly secured thereto bearings 10 and 12 in which is mounted a shaft 13 carrying the feed roll 15, having its surface knurled or corrugated, as shown in Fig. 1. The brackets 8 and 9 are provided with horizontal bearing arms 16 and 17 which form the lower guide members for the movable bearings 18 and 19, positioned between said arms and the facing surfaces 20 and 21, formed upon the under side of the section 2 of the hopper. Said bearings 18 and 19 are connected by a cross-bar 23, rigidly secured to said bearing by screws 24. A shaft 25 is rotatably mounted in said bearings 18 and 19 and forms part of the gage roll 26.

The feed roll 15 and the gage roll 26 are positioned immediately below the discharge opening of the hopper 1 and regulate the rate of discharge of material from the hopper. The gage roll 26 is adjustable relatively to the roll 15 by lever arms 28 and 29, rigidly secured to a shaft 30, which is loosely mounted in bearings 31 and 32, formed in the ends of sections 2 of the hopper. Upon one end of the shaft 30 is secured a stop arm 33, the free end of which is engaged by a stop, in the form of a screw 35 mounted in a block 36 secured in the end of section 2. An extension 34 upon the stop arm 33 forms a handle for moving said arm when it is desired to separate the rolls 15 and 26 temporarily.

The gage roll 26 is forced toward the roll 15 by springs 38 and 39 positioned between the cross bar 23 and the depending lugs 41 and 42 formed upon the section 2 of the hopper. Said springs are held in place by tubes 43 which pass freely through enlarged openings in the lugs 41 and 42, and are also utilized for supplying lubricant to the bearings 18 and 19.

The cross bar 23 has secured thereon keepers 45 and 46 in which the free ends of the lever arms 28 and 29 are embraced and adapted to limit the movement of the gage roll 26 towards the roll 15 when the stop arm 33 takes against the stop screw 35. By adjusting the stop 35 the normal space between the rolls 15 and 26 may be regulated to suit the quantity of material which is to be fed between the rolls. The springs 38 and 39 are

adapted to yield and permit the rolls 15 and 26 to separate and allow any foreign substances to pass between them without clogging the feeding operation, and said springs will also permit the rolls to be separated by depressing the handle 34 to remove any large obstructions.

The shaft 13 carrying the feed roll 15 is rotated by any suitable driving means and said shaft has secured thereon a gear wheel 45 which meshes with a larger gear wheel 46 secured upon the shaft 25 for rotating the gage roll 26, thus rotating the latter at a lower speed of revolution than the roll 15. The gage roll 26 is also made smaller in circumference than the feed roll 15, thus obtaining a relatively lower surface speed on the gage roll than on the feed roll, which speed is further reduced by the difference in ratio between the gear wheels 45 and 46. In the preferred form of the device as shown in Figs. 1 to 3, the roll 15 is about twice the diameter of the gage roll 26 and by the reduction of the speed of revolution of the gear wheel 46 relatively to the driving gear 45 a great difference in the surface speeds of the rolls 15 and 26 is obtained, without resorting to the use of compound gearing for driving the gage roll.

In operation the rolls 15 and 26 are rotated in opposite directions as indicated by the arrows, so that the feeding action of the upper surfaces of the rolls will carry the material between the rolls and the roll having the slower surface speed will cause a retarding action upon the flow of material carried through the space between the rolls, thus insuring a uniform feeding of the material between the rolls. The springs 38 and 39 will permit the roll 26 to be forced away from the roll 15 by the presence of any large lumps of material, or other obstructions, which may then pass between the rolls without clogging the feeding device.

Fig. 4 illustrates another form of my invention having the feed roll 50 and the gage roll 51 of about the same diameter, and the gears 52 and 53 have a large difference in ratio, thus showing that the same difference between the surface speeds of the rolls 50 and 51 may be obtained by the gearing as that obtained in the form of the invention shown in Figs. 1 to 3, having a large feed roll and a smaller gage roll and gearing with a smaller difference in ratio.

Figs. 5 and 6 illustrate a still different form of my invention in which two large feed rolls 60 and 61 are employed for feeding the material toward a smaller gage roll 63, mounted in a fixed bearing 64, secured upon the frame of the hopper 65. A drive shaft 66 rotates the roll 60 in the direction of the arrow, Fig. 6. Secured upon said shaft 66 is a gear wheel 68 which meshes with a gear wheel 69, secured on the shaft 70. The feed roll 61 is secured upon said shaft 70 and is rotated by the latter in the direction indicated. A gear wheel 71, also secured on the shaft 66, meshes with a larger gear wheel 72 secured on the shaft 73 and rotates the gage roll 63 in the direction of the arrow, Fig. 6. The shafts 66 and 70 are mounted in bearings 75 and 76, which are movably mounted in the frame of the hopper 65 and adjustable relatively to the gage roll 63. Said bearings 75 and 76 are yieldingly held in position by springs 78 to allow lumps of material, or foreign substances, to pass between the same and the gage roll 63.

By the form of feeding device shown in Figs. 5 and 6 a larger feeding capacity is obtained by means of the three rolls, in which the center roll 63 is smaller and acts as a gage roll for both of the outer rolls 75 and 76. The fact that the gage roll 63 is given a direction of surface movement opposed to that of the roll 61, having a greater surface speed, does not destroy the function of the co-operative motion of the rolls in producing uniform and efficient feeding of the material, or in eliminating foreign substances or lumps of material. When the surface movement of the rolls is opposed as indicated by the arrows Fig. 6, due to the rolls 61 and 63 rotating in the same direction, it is only necessary to adjust the roll 61 at a slightly greater distance from the roll 63, thus forming a wider opening between the rolls 61 and 63 than between the rolls 60 and 63 where the surface direction of the rolls is towards the outlet opening.

Various other changes in the construction and arrangements of the parts may be made without departing from my invention.

I claim:—

1. A feeding device comprising a hopper, a feed roll mounted adjacent to the discharge opening of said hopper, a gage roll mounted adjacent to the feed roll, fixed bearings upon the hopper in which one of said rolls is mounted, movable bearings upon said hopper in which the other one of said rolls is movably mounted relatively to the other roll, a spring tending to press said rolls toward each other, a cross-bar having said movable bearings secured at opposite ends thereof, a shaft rotatably mounted upon the hopper, arms secured upon said shaft having their ends pivotally associated with the cross-bar, a stop arm secured to said shaft, a stop upon the hopper against which the stop arm takes for regulating the distance the rolls may be moved toward each other, and means for rotating the rolls at different relative speeds.

2. A feeding device comprising a hopper, feed rolls rotatably mounted adjacent to the outlet of the hopper, a gage roll rotatably mounted upon the hopper, said gage roll positioned between said feed rolls whereby the surface of the gage roll will co-act with

the surface of said feed rolls for retarding the flow of materials in two columns between said rolls, and means for rotating the feed rolls at a greater surface speed than the gage roll.

In testimony whereof I affix my signature.

CHARLES E. DELLENBARGER.