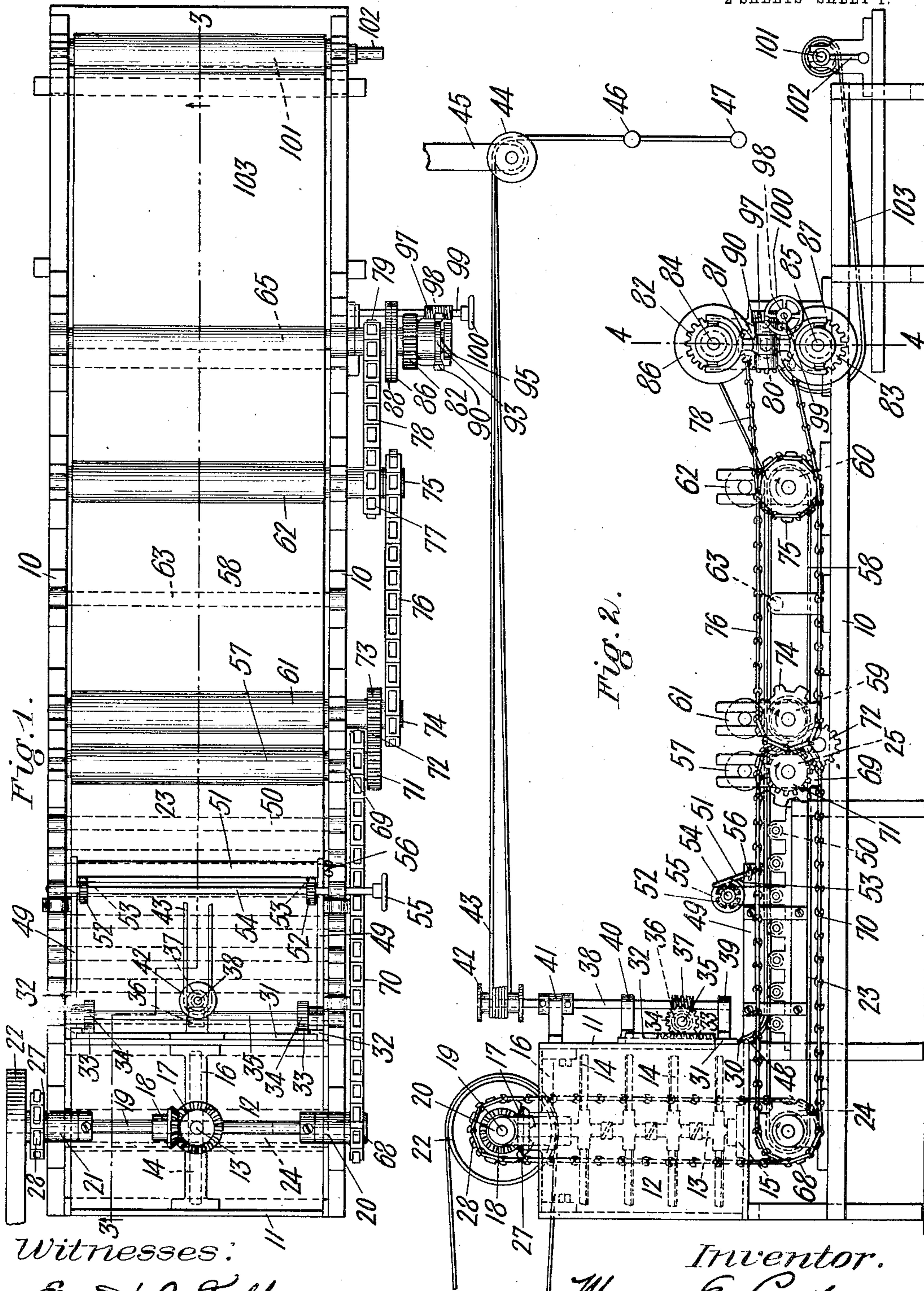


M. E. CURTIS.  
MACHINE FOR MAKING TUBES.  
APPLICATION FILED MAY 3, 1907.

912,292.

Patented Feb. 16, 1909

2 SHEETS—SHEET 1.



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William C. Glass

Inventor.  
Morse E. Curtis  
by his attorney Charles S. Fordney.

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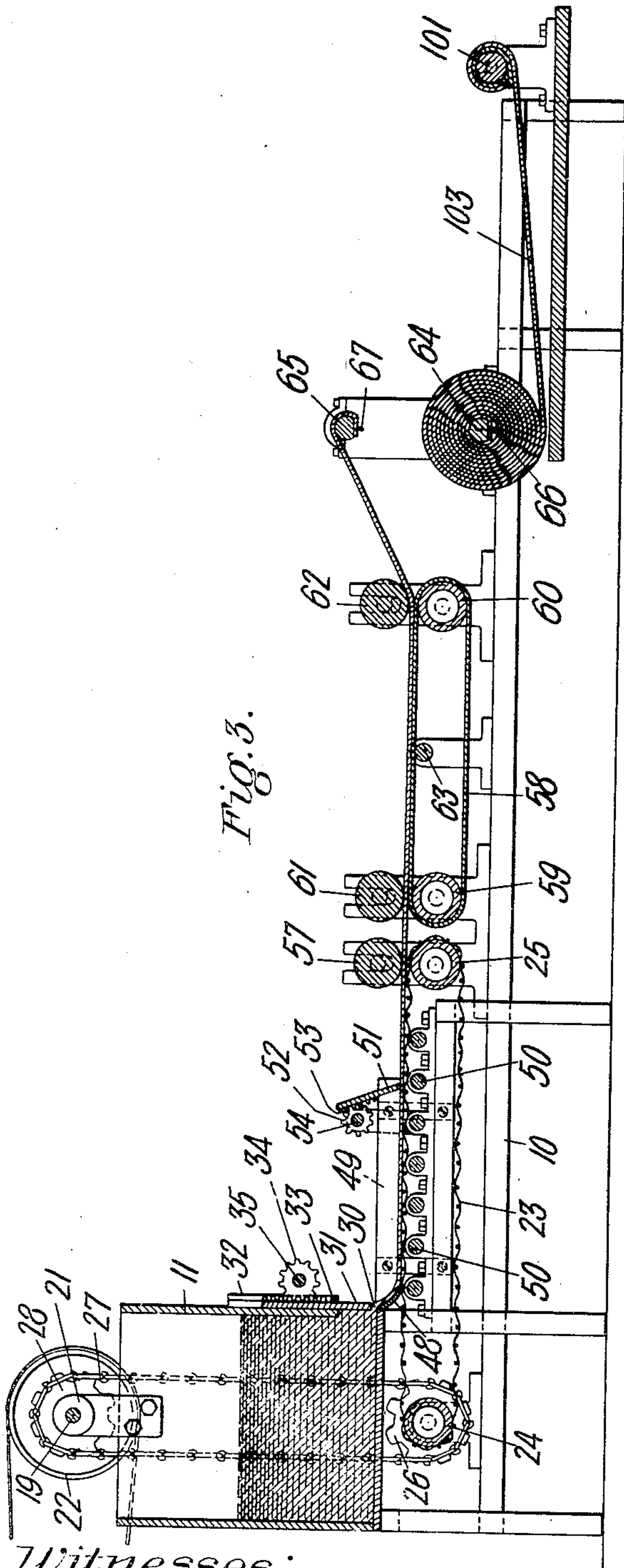


Fig. 3.

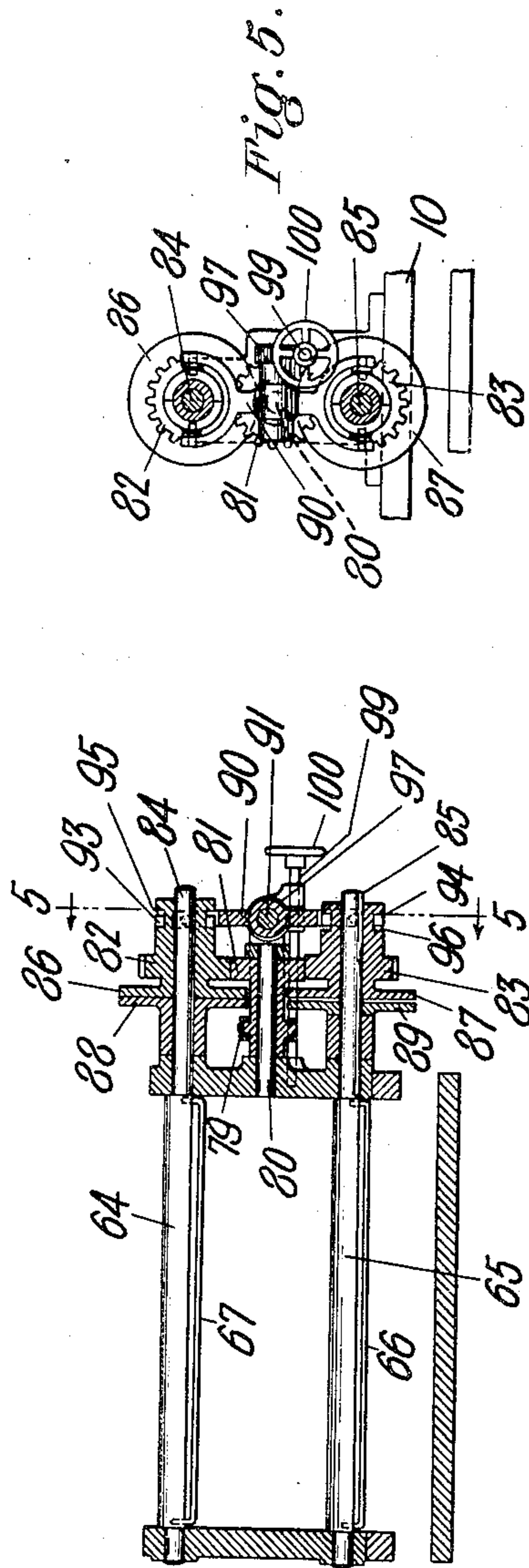


Fig. 4.

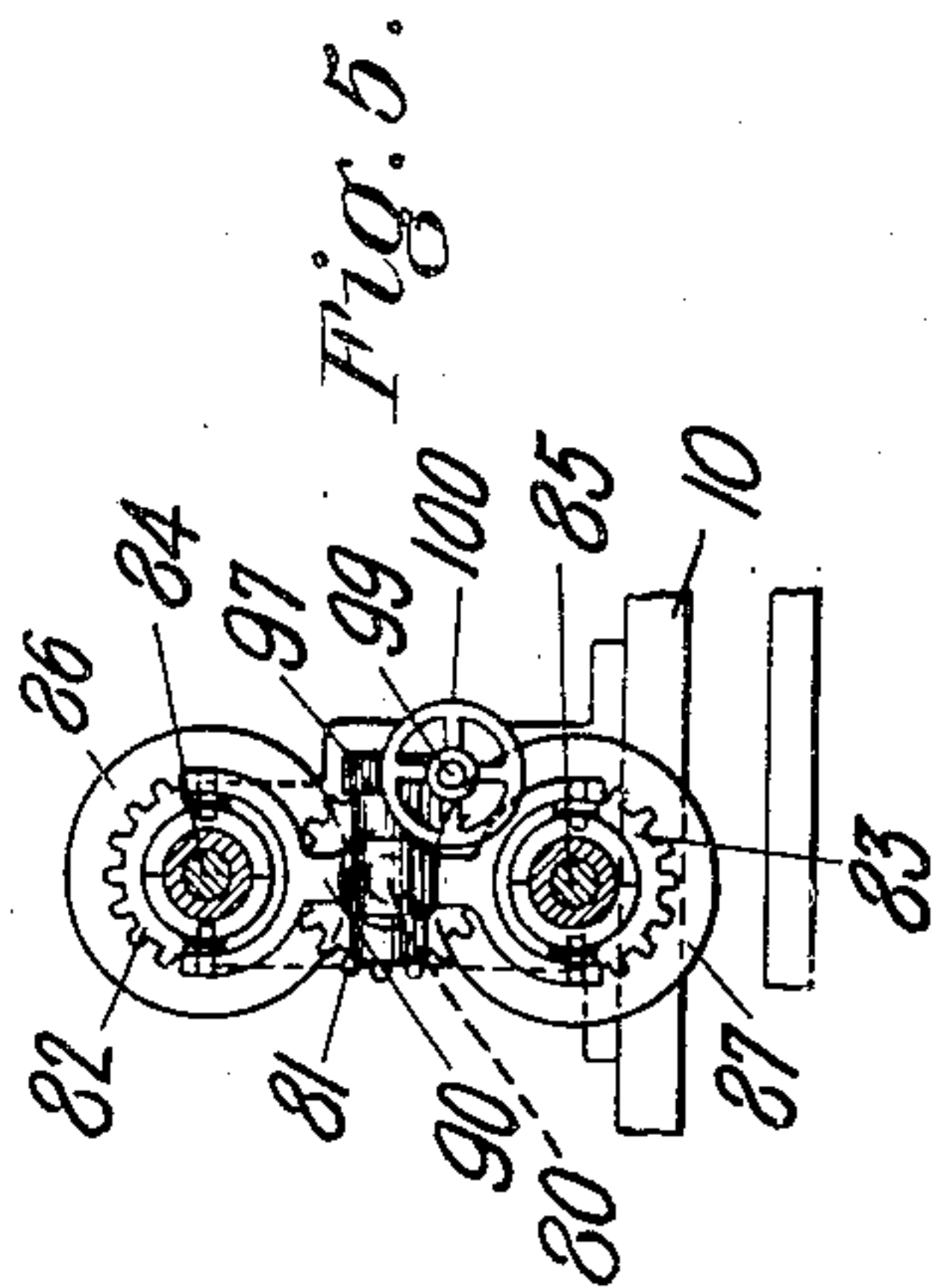


Fig. 5.

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# UNITED STATES PATENT OFFICE.

MORRIS E. CURTIS, OF EVERETT, MASSACHUSETTS.

## MACHINE FOR MAKING TUBES.

No. 912,292.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed May 3, 1907. Serial No. 371,729.

*To all whom it may concern:*

Be it known that I, MORRIS E. CURTIS, a citizen of the United States, residing at Everett, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Machines for Making Tubes, of which the following is a specification.

This invention relates to improvements in machines and processes for forming tubes from fibrous material, and the object is to cheapen the cost of production of tubes such as are used for coverings for steam pipes and the like and to that end I provide a machine by means of which the plastic material is formed into a sheet and while in its plastic state said sheet is wound into the form of a tube so that the layers adhere to each other without the necessity of coating the sheet with adhesive material and furthermore by reason of the construction of said machine I am enabled to substitute for the wool fiber commonly used as the base of the material a much cheaper material such as cow's hair or the like.

The invention consists in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims thereof.

Referring to the drawings: Figure 1 is a plan of my improved machine for making tubes. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional elevation taken on line 3—3 of Fig. 1. Fig. 4 is a sectional elevation taken on line 4—4 of Fig. 2, looking toward the right. Fig. 5 is a sectional elevation taken on line 5—5 of Fig. 4, looking toward the left.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 10 is a frame on which is supported a receptacle 11 which is adapted to contain plastic material such, for instance, as a mixture of old paper, hair, infusorial earth and water. Any other suitable materials may be used, if desired. An agitator 12 located within the receptacle 11 comprises a vertical shaft 13 on which are mounted a number of propeller blades 14. The shaft 13 is journaled at its lower end in a bearing 15 and at its upper end in a bracket 16, there being a bevel gear 17 fast to the upper end of said shaft, said gear meshing into a bevel gear 18 fast to a horizontal shaft 19. The shaft 19 is journaled in bearings 20 and 21 mounted on the receptacle 11.

A pulley 22 fast to the shaft 19 may be connected to any suitable source of power. As the pulley 22 is rotated, the agitator 12 is rotated thereby thoroughly mixing the plastic material contained in the receptacle 11. A conveyer belt 23 which is preferably formed of wire netting connects two drums 24 and 25, said drums being journaled in suitable bearings on the frame 10. A sprocket wheel 26 fast to the shaft of the drum 24 is connected by a chain 27 to a sprocket wheel 28 fast to the shaft 19. The receptacle 11 is provided preferably at the bottom thereof with an outlet orifice 30, the size of which may be varied by means of a gate 31 which is adapted to slide in ways 32, 32.

Two racks 33, 33 fast to the gate 31 mesh into pinions 34, 34 fast to a shaft 35, said shaft being journaled in suitable bearings on the receptacle 11. A worm gear 36 fast to the shaft 35 meshes into a worm 37, said worm being fast to a vertical shaft 38. The shaft 38 is journaled in bearings 39, 40 and 41, the bearing 39 being fast to the gate 31, and the bearings 40 and 41 being fast to the receptacle 11. A drum 42 fast to the shaft 38 is surrounded by a rope 43 by means of which said shaft may be rotated and the gate 31 raised or lowered as may be desired. The ends of the rope 43 pass over sheaves 44 journaled on a suitable support 45, the ends of said rope terminating in balls 46 and 47 which are conveniently arranged so that the operator can by pulling one end or the other of the rope vary the size of the outlet orifice 30. The plastic material as it flows out through the outlet orifice 30 is guided by a guide 48 onto the conveyer belt 23 and is retained on the sides thereof by the guides 49, 49. As the plastic material flows onto the belt 23 in the form of a sheet said belt is adapted to move said sheet toward the right, the excess water running through the meshes of said belt.

A series of supporting rolls 50 journaled in suitable bearings on the frame 10 are adapted to carry the weight of the belt and the sheet of plastic material thereon and prevent said belt from sagging. A gate 51 which is slidably mounted in suitable ways formed in the guides 49, 49 is adapted to be moved up and down therein by pinions 52, 52 which mesh into racks 53, 53 fast to the gate 51. The pinions 52, 52 are fast to a shaft 54 journaled in suitable bearings on



the frame 10, there being a hand wheel 55 by means of which the shaft 54 may be rotated to raise or lower the gate 51, there being a thumb-screw 56 suitably arranged 5 to sustain the gate 51 in position when properly adjusted. As the sheet of plastic material passes beneath the gate 51, said gate is adapted to level said sheet and gage it to proper thickness. A roll 57 which is 10 preferably a heavy metal roll is arranged above the roll 25 in such a manner as to compress the sheet as it passes between said rolls. A second conveyer belt 58 connects two drums 59 and 60, said drums 15 being journaled in suitable bearings on the frame 10, the belt 58 being formed of any suitable material such, for instance, as felt.

Two rolls 61 and 62 arranged above the drums 59 and 60, respectively, are adapted 20 to compress the sheet as it passes beneath them, said rolls being preferably heavy metal rolls. A roll 63 journaled in suitable bearings on the frame 10 is adapted to prevent the belt 58 from sagging. Two winding rolls 64 and 65 are journaled in suitable 25 bearings on the frame 10, there being two rods 66 and 67 fast to the rolls 65 and 64, respectively, in such a manner that the sheet may be inserted in either one or the 30 other of the spaces between said rolls and said rods. Two sprocket wheels 68 and 69 fast to the shafts of the drums 24 and 25, respectively, are connected by a chain 70. A gear 71 fast to the shaft of the drum 25 35 meshes into an intermediate gear 72, said intermediate gear meshing into a gear 73 fast to the shaft of the drum 59. Two sprocket wheels 74 and 75 fast to the shafts of the drums 59 and 60, respectively, are 40 connected by a chain 76. A second sprocket wheel 77 fast to the shaft of the drum 60 is connected by a chain 78 to a sprocket wheel 79, said sprocket wheel being journaled on a stud 80. A spur gear 81 is connected by 45 an integral sleeve to the sprocket wheel 79.

The gear 81 meshes into gears 82 and 83 which are loosely mounted on the shafts 84 and 85, respectively, said shafts forming continuations of the rolls 64 and 65, respectively. 50 Two friction disks 86 and 87 are formed integral with the gears 82 and 83, respectively. Two friction disks 88 and 89 are fast to the shafts 84 and 85, respectively. A lever 90 pivoted at 91 to the frame 10 is pivotally 55 connected at its upper and lower ends, respectively, with collars 93 and 94 which are located in annular grooves 95 and 96, respectively, formed in the hubs of the gears 82 and 83. A worm gear 97 fast to the 60 pivotal pin 91 meshes into a worm 98, said worm being fast to a shaft 99 journaled in suitable bearings. A hand wheel 100 is fast to the shaft 99 so that the operator by rotating said hand wheel can throw the friction 65 disk 86 into contact with the friction disk 88

as shown in Fig. 4 or can throw the friction disk 87 into contact with the friction disk 89 and simultaneously throw the disk 86 out of contact with the disk 88. It will be understood that when the disk 86 is in contact with 70 the disk 88, the roll 64 is rotated by frictional contact and similarly when the disk 87 is in contact with the disk 89, the shaft 65 is rotated by frictional contact. A mandrel 101 is journaled in suitable bearings on the 75 frame 10, there being a crank 102 connected therewith by means of which said mandrel may be rotated.

The general operation of the machine hereinbefore specifically described is as follows: 80 The plastic material located within the receptacle 11 is kept thoroughly mixed by the rotation of the agitator 12 and said material flows outwardly through the outlet orifice 30 onto the belt 23, surplus water runs out 85 through the meshes of the belt 23 and as the sheet of material passes beneath the rolls 57, 61 and 62, successively, it is compressed. The operator slips the end of the sheet between the roll 64 and rod 67 as shown in Fig. 90 3 and by means of the hand wheel 100 throws the disk 86 into contact with the disk 88. It will be understood that as the disk 86 rotates it will slip against the disk 88 and rotate the 95 roll 64 in such a manner as to exert but a gentle pull on the sheet which is being wound thereon. While the sheet of material is winding onto the roll 65 the operator unwinds from the roll 64 the sheet of material 100 103 which has been previously wound thereon. He first winds onto the mandrel 101 a short piece of asbestos paper and then winds the sheet 103 thereon to the required thickness, it being understood that said sheet is 105 still moist and that as it is being wound onto the mandrel 101 it adheres to itself. When the tube has reached its proper thickness the operator with a knife severs the sheet 103, lifts the mandrel 101 from the slotted bearings or jaws in which it rests removes the 110 tube in its complete tubular form from the mandrel 101, and forms a second tube and so on repeating the process. Each tube is then dried in a suitable drying room either before or after removal from the mandrel 101 as 115 may be desired. In the meantime, the sheet of material has been winding onto the roll 65 so that by the time that the material on the roll 64 has been exhausted the roll 65 is filled with material. The operator then severs the 120 sheet of material and starts it winding from the rolls 60 and 62 onto the roll 64 and he then unwinds the sheet from the roll 65 onto the mandrel 101.

Having thus described my invention what 125 I claim and desire by Letters Patent to secure is:

1. In a machine of the character described, a receptacle for plastic material, said receptacle provided with an outlet orifice, a 130



conveyer belt adapted to convey plastic material away from said outlet orifice in the form of a sheet, two rolls upon which said sheet may be wound, and mechanism adapted to rotate said rolls alternately.

2. In a machine of the character described, a receptacle for plastic material, said receptacle provided with an outlet orifice, a conveyer belt adapted to convey plastic material away from said outlet orifice in the form of a sheet, two rolls on which said sheet may be wound, mechanism adapted to rotate said rolls alternately, and a mandrel upon which said sheet may be wound, while in its plastic state to form a tube.

3. In a machine of the character described, a receptacle for plastic material, said receptacle provided with an outlet orifice, a conveyer belt adapted to convey plastic material away from said outlet orifice in the form of a sheet, two rolls on which said sheet may be wound, and frictional driving means adapted to rotate said rolls alternately.

4. In a machine of the character described, a receptacle for plastic material, said receptacle provided with an outlet orifice, a conveyer belt adapted to convey plastic material away from said outlet orifice in the form of a sheet, two rolls on which said sheet may be wound, frictional driving means adapted to rotate said rolls alternately, and a mandrel upon which said sheet may be wound while in its plastic state to form a tube.

5. In a machine of the character described, a receptacle for plastic material, said receptacle provided with an outlet orifice at or near its bottom, means to adjust the size of said outlet orifice, an agitator located in said receptacle, a conveyer belt adapted to convey plastic material away from said outlet orifice in the form of a sheet, and a mandrel upon which said sheet may be wound while in its plastic state to form a tube.

6. In a machine of the character described, a receptacle for plastic material, said receptacle provided at or near its bottom with an outlet orifice, a gate adapted to vary the size of said outlet orifice, a conveyer belt adapted to convey plastic material away from said outlet orifice in the form of a sheet, a plurality of rolls adapted to com-

press said sheet, two winding rolls on which said sheet may be wound, and frictional driving means adapted to rotate said rolls alternately.

7. In a machine of the character described, a receptacle for plastic material said receptacle provided at or near its bottom with an outlet orifice, a conveyer belt adapted to convey plastic material away from said outlet orifice in the form of a sheet, a second belt adapted to convey said sheet away from said first belt, two winding rolls on which said sheet may be wound, frictional driving means adapted to rotate said rolls alternately, and mechanism operatively connecting said belts and said winding rolls.

8. In a machine of the character described, a receptacle for plastic material, said receptacle provided at or near its bottom with an outlet orifice, a gate adapted to vary the size of said outlet orifice, mechanism for regulating the height of said gate, an agitator located within said receptacle, a conveyer belt adapted to convey plastic material away from said outlet orifice in the form of a sheet, a second belt adapted to convey said sheet away from said first belt, two winding rolls on which said sheet may be wound, means to rotate said rolls alternately, and mechanism operatively connecting said agitator, said first belt, said second belt, and said rolls.

9. In a machine of the character described, a receptacle provided with an outlet orifice, a conveyer belt adapted to convey plastic material away from said outlet orifice in the form of a sheet, a plurality of rolls adapted to compress said sheet, two winding rolls on which said sheet may be wound, and means adapted to rotate said rolls alternately.

10. In a machine of the character described, a receptacle for plastic material provided with an outlet orifice, a gate adapted to regulate the size of said orifice, and self-locking means adapted to move said gate.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

MORRIS E. CURTIS.

Witnesses:

LOUIS A. JONES,  
ANNIE J. DAILEY.