E. Z. TAYLOR

MACHINERY FOR THE MANUFACTURE OF CONICAL TUBES OF PAPER OR THE LIKE.

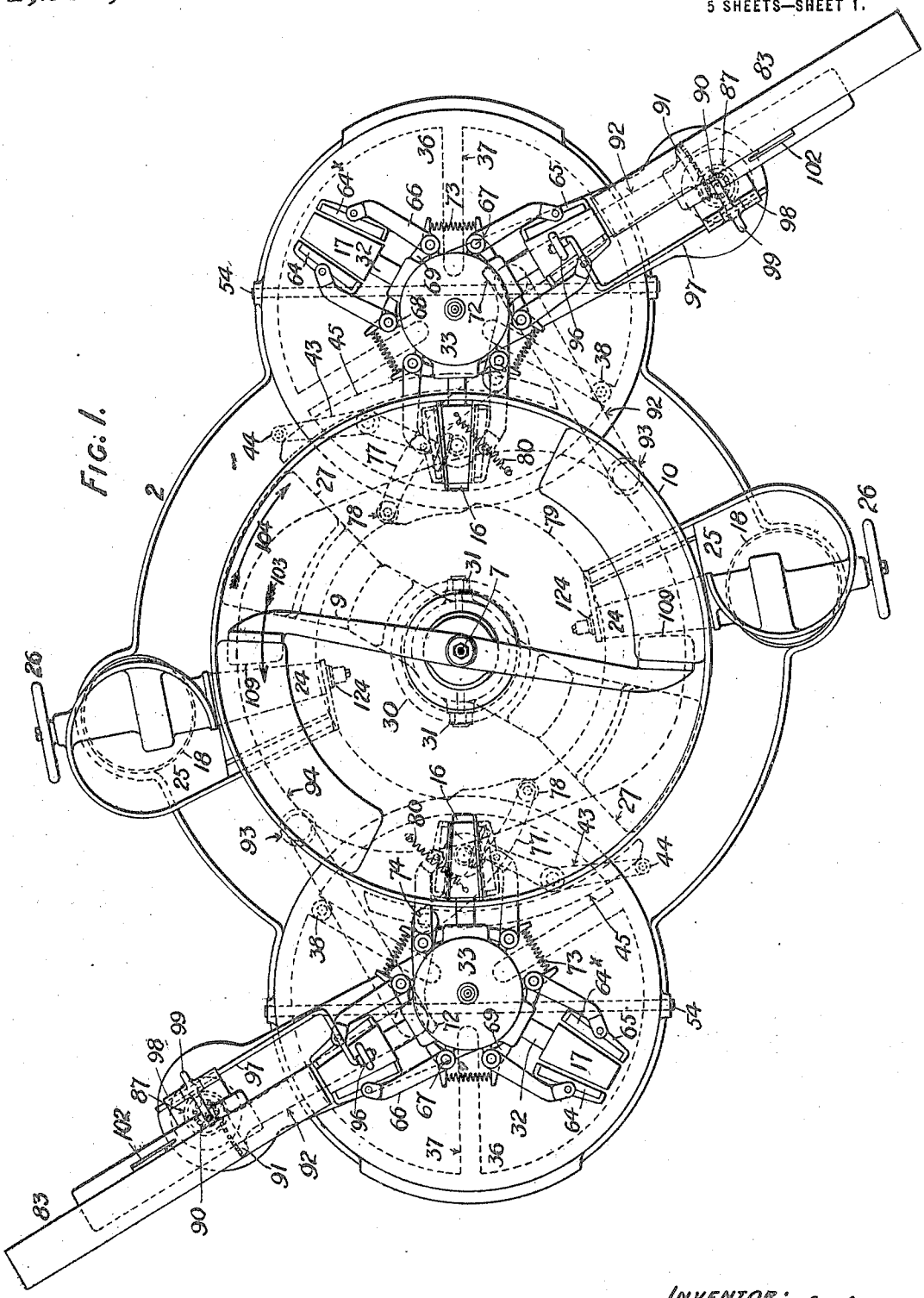
APPLICATION FILED DEC. 5, 1916.

1,283,966.

Patented Nov. 5, 1918.

5 SHEETS—SHEET 1.

FIG. 1.



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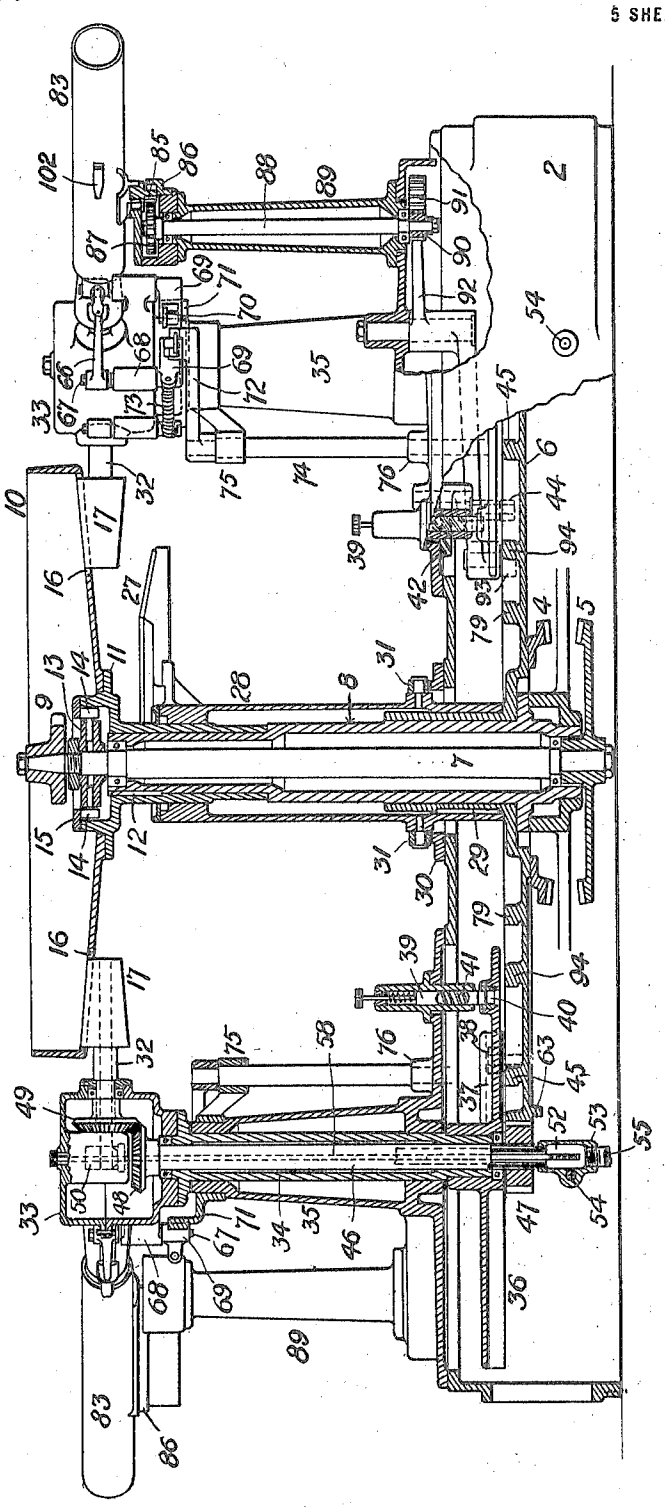
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5 SHEETS—SHEET 2.

FIG. 2.



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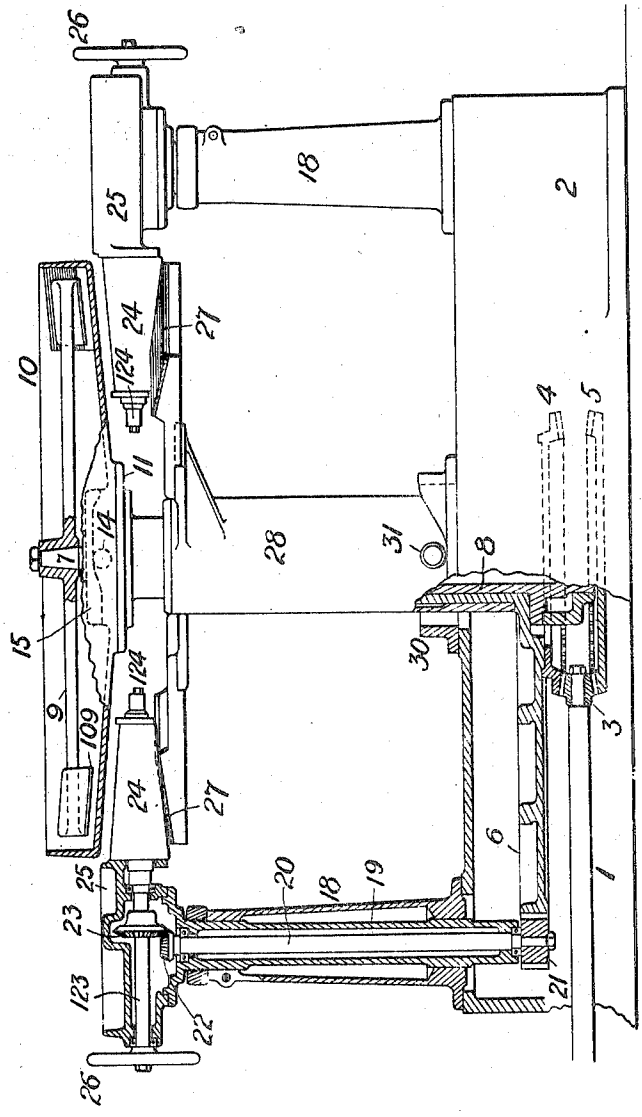
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5 SHEETS—SHEET 3.

FIG. 3.



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5 SHEETS—SHEET 4.

FIG. 4.

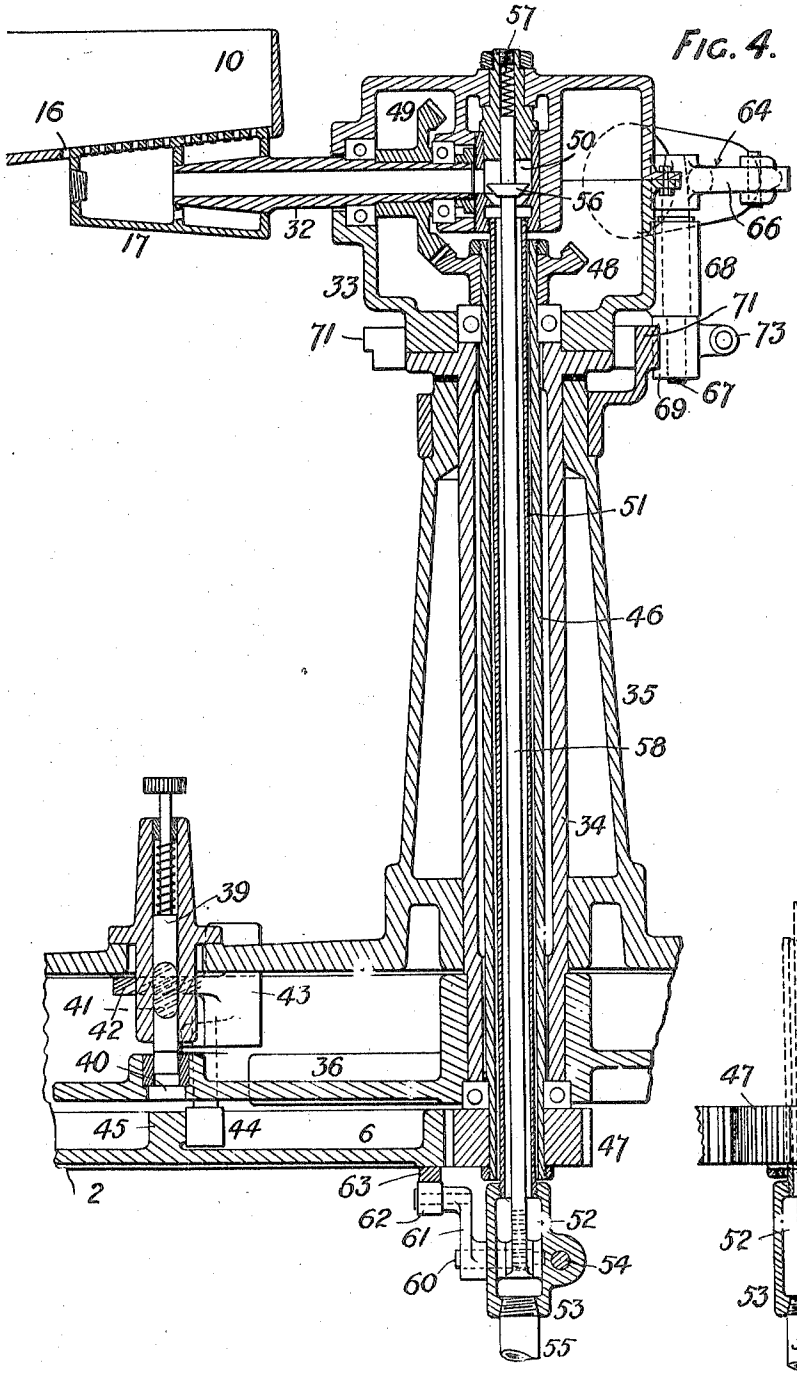
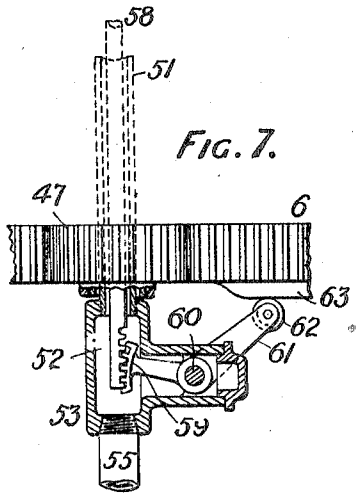


FIG. 7.



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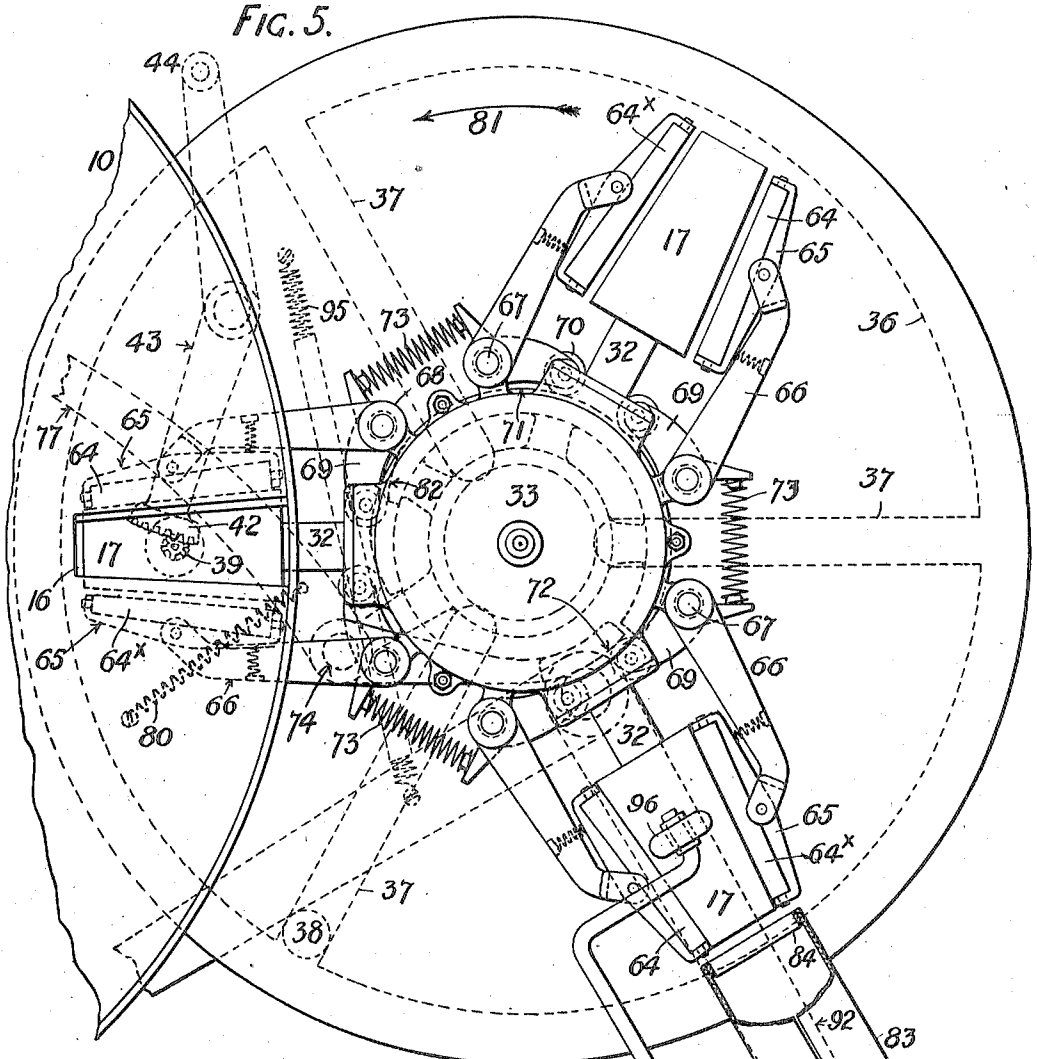
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5 SHEETS—SHEET 5.

FIG. 5.



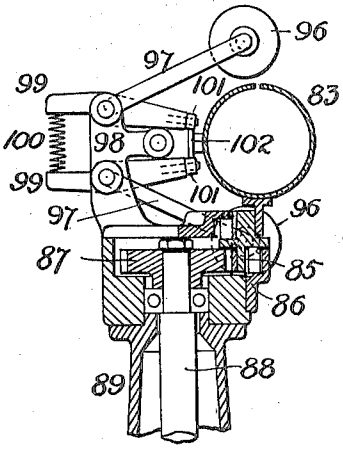


FIG. 6.

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UNITED STATES PATENT OFFICE.

ELMER ZEBLEY TAYLOR, OF NEWARK, NEW JERSEY, ASSIGNOR TO AMERICAN MONO SERVICE COMPANY, OF ATLANTIC CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINERY FOR THE MANUFACTURE OF CONICAL TUBES OF PAPER OR THE LIKE.

1,283,966. Specification of Letters Patent. Patented Nov. 5, 1918.

Application filed December 5, 1916. Serial No. 135,196.

To all whom it may concern:

Be it known that I, ELMER ZEBLEY TAYLOR, a citizen of the United States, residing at Verona avenue and Oraton street, Newark, New Jersey, United States of America, have invented Improvements in Machinery for the Manufacture of Conical Tubes of Paper or the like, of which the following is a specification.

The object of this invention is to provide an improved machine for the manufacture of conical tubes of paper or like material.

In the specification of United States Patent No. 1020165 dated March 12th, 1912, a machine is described in which the cut blanks are placed on a revolving platen or table, but in the present invention the pan in which the blanks are placed does not rotate, and such blanks are taken therefrom and operated on in an entirely different manner, as will be seen by the following description taken in connection with the accompanying drawings, in which:—

Figure 1 is a plan view of the machine;

Fig. 2 is partly a longitudinal section and partly a side elevation thereof.

Fig. 3 is partly a transverse section and partly an end elevation thereof.

Fig. 4 is a sectional view of the head carrying the rolling mechanism, and

Fig. 5 a plan view thereof;

Fig. 6 is a sectional view of the delivery arrangement, and

Fig. 7 a sectional view of suitable means for controlling the air suction.

For the sake of clearness various unessential details have been either only indicated or entirely omitted from these drawings, which illustrate what may be termed a double machine, there being two complete sets of pasting and rolling mechanisms mounted on a single base, but it will be readily understood that a single set only may be employed or that if desired and found advisable three or more of such sets may be mounted on a single base.

In carrying out the present invention a driving shaft 1 is mounted in base 2 and has motion imparted thereto in any desired manner. A bevel pinion 3 is mounted on shaft 1, and as shown in Fig. 3 transmits motion to two bevel wheels 4 and 5, which, being mounted one above and one below the driving shaft 1, rotate in opposite directions. The bevel wheel 4, mounted above the driving shaft, is rigidly connected to a horizontal gear wheel 6 which is employed as hereinafter described to drive the pasting and rolling cones or mandrels and also carries or has connected thereto or mounted thereon a number of cams by which various operations are effected.

The second bevel wheel 5, mounted below the driving shaft 1, is carried by the central vertical shaft 7 of the machine. This shaft rotates in bearings carried by a hollow column 8 mounted in any suitable manner on the base 2, and carries at its upper end a double armed pusher 9, to which it imparts a continuous horizontal rotary movement.

The pusher revolves in a pan 10 mounted on a holder 11 carried at the upper end of the central column 8, the bottom of such pan, upon which the blanks to be rolled are placed, being inclined downward toward the center at the same angle as it is desired to form the conical tubes.

A thin strip of metal 109 is secured to the under side of the pusher 9 and supports the rear end of the pile of blanks which are pushed around the pan by such pusher.

The holder 11 carrying pan 10 is capable of a slight up and down movement on the upper end of column 8, any tendency to rotation being prevented by the key 12. This up and down movement may be effected by any suitable means, as for example that shown in the drawings and consisting of a short sleeve 13 securely attached to the upper end of shaft 7 and having trunnions or bearings for a pair of rollers 14. Extending over these rollers 14 and secured to the holder 11 is a cam 15 whose projections and depressions by resting on the rollers 14 support the holder, so that as the latter cannot rotate the inclined surfaces of the cam will permit of the rollers passing thereunder, thus lifting the cam and consequently also the holder 11 and pan 10. Such pan has, in the case of the double machine illustrated, two slots 16 arranged diametrically opposite each other in its under surface, these slots being of sufficient width to allow of the widest blank for which the pan is to be used to pass freely therethrough, and of sufficient length (circumferentially of the pan 10) to permit the cones or mandrels 17 on which the rolling of the blanks takes place to enter

far enough for the upper surface of the mandrel to come in contact with the under surface of the lowermost blank in the pan.

As will be more fully hereinafter described, the mandrel 17 being perforated and connected with an air pump or the like, on thus coming in contact with the lowermost blank draws the latter downwardly, thus separating it from the next blank. As such mandrel is being continuously rotated it commences to roll up such blank and by so doing brings it to the position where the paste is applied, which is effected by the following means:—

The machine illustrated being a double one, two hollow standards 18 are mounted on the base 2 in suitable positions, and within these standards removable columns or sleeves 19 are supported in which are carried bearings for vertical shafts 20. The lower ends of shafts 20 carry pinions 21 gearing with the gear 6 hereinbefore referred to, and their upper ends carry bevel pinions 22 gearing with corresponding pinions 23 on horizontal spindles 123 to which paste cones 24 are also secured. The cone 24 rotates in a paste reservoir 25 carried by the upper end of the column 18, the spindle 123 of such cone running in suitable bearings in the paste reservoir and being provided with a hand wheel 26 by which the whole machine may be operated for trial, adjustment and the like purposes. At its inner end spindle 123 is provided with a slip clutch 124 which allows the machine to be rotated in a backward direction for adjustment without rotating the paste roller 24 in a backward direction.

During its rotation the paste cone 24 takes up paste from the reservoir 25, and this paste it transmits to a pasting plate 27 carried by a sleeve 28 which has a bearing at its lower end on the elongated hub of gear 6, and at its upper end on the holder 11 carrying pan 10. The sleeve 28 is caused to rotate by a key 29 slidably connecting it with the hub of gear 6, and is also capable of up and down movement through the intermediary of a cam 30 mounted on the base 2 of the machine, such cam 30 acting on rollers 31 carried in trunnions on such sleeve. It will thus be seen that as gear 6 revolves it will rotate sleeve 28 and with it the pasting plate 27, while the action of cam 30 will be to raise the sleeve and plate at proper intervals into contact with the under surface of paste cone 24, which will apply paste to the plate as the latter passes beneath it. In its lower position the pasting plate 27 is at the proper height for taking paste from the paste cone 24.

The pasting plate 27 is of similar shape to but preferably slightly smaller than the part of the blank to which paste is to be applied, and the surface of such plate is also preferably finely corrugated in circumferential lines, or etched in a sort of checker board pattern.

The mandrel 17 on which the blank is rolled is timed to bring the forward edge of the blank to the under side of the mandrel just as the pasting plate 27 (which is then in its raised position) arrives at the same point, so that the plate 27 commences to apply the paste to the blank. The surface speed of the mandrel and the speed of movement of the pasting plate are arranged to be as nearly as possible alike, so that the paste is evenly applied to the whole of the desired portion of the blank.

In the double machine shown it will of course be understood that each pasting plate 27 receives a supply of paste from each of the paste cones 24, and applies the paste to a blank on one of the mandrels of each set of rolling apparatus.

As is clearly shown in Fig. 5 each set of rolling apparatus comprises three mandrels 17 on which the blanks are to be rolled, but although three is suitable it is not desired to limit the use of the machine to this number. These mandrels are carried by hollow spindles 32 supported by a head or casing 33, to which an intermittent rotary movement is imparted by any suitable means, for instance that shown in the drawings, which is as follows:—

The head 33 is carried by the upper end of a sleeve 34 (see Fig. 4) supported by a column 35 mounted on the base 2 of the machine, and the lower end of such sleeve 34 carries a disk 36 having three radial slots 37 into each of which in turn a roller 38 carried by the gear 6 enters as the latter revolves. The roller 38 having entered one of the slots the continued movement of the gear 6 will cause the rotation of disk 36 until it is brought to such a position that the roller can leave the slot it entered.

This will bring the disk 36 and consequently the head 33 to the approximate position for the next mandrel 17 of the set to be ready for the reception of a blank, but it is important that the parts be stopped and held in the exact position required, and with this object the spring actuated locking pin 39 is employed. This pin is supported in the base of column 35 and its spring normally holds it in holes 40 formed for its reception in the disk 36. When however the disk is about to be rotated the pin is disengaged by means such as those shown, consisting in forming angular teeth 41 on one side of the pin, with which engage similar teeth on a sector 42 on the arm of a double armed lever 43, the other arm of which carries a roller 44 acted on by a cam 45 formed on or secured to gear wheel 6. As the first cam begins to act on the roller it lifts the pin 39 out of hole 40 and so releases the disk 36,

which can then make its intermittent movement (a third of a revolution in this case), and at or about the completion of this movement the roller passes off the cam permitting lever 43 to turn, thereby allowing the pin 39 to enter the next hole 40 in the disk 36, and so hold the latter and the head 33 in position.

During the operation of the machine all the mandrels 17 are continuously rotated. This may be effected in any desired manner, but that shown in the drawings is suitable and consists in the employment of a tube 46 passing through the sleeve 34, and carrying at its lower end a pinion 47 engaging with the gear wheel 6, while at its upper end a bevel wheel 48 is mounted, such bevel wheel engaging with a corresponding bevel wheel 49 mounted on the hollow spindle 32 of each of the mandrels.

The spindles 32 of the mandrels 17 are made hollow so that air may be drawn therethrough to create suction through perforations formed in the mandrels 17, for the purpose of holding the forward edges of the blanks on to such mandrels. In constructing the machine for the purpose of attaining this object the spindles 32 may as shown in Fig. 4 connect at their inner ends with a chamber 50 in head 33, communicating with each of the three mandrel spindles. This chamber 50 is connected by a tube 51 passing through the tube 46 just previously mentioned to a chamber 52 in a casting 53 carried on a rod 54 mounted in the base 2 of the machine, and which chamber 52 also communicates through tube 55 with a vacuum pump or the like.

In order that the suction may be cut off when not required, or when the rolled blank is to be released from the mandrel 17, a valve 56 is placed at the entrance to the chamber 50 in head 33, and is acted on by a spring 57 which tends to keep it closed. Such valve is mounted on a rod 58 passing through the tube 51 and having teeth at its lower end, where it passes into the chamber 52, such teeth being acted upon by a sector 59 (see Fig. 7) mounted on a spindle 60, to which is also connected a lever 61 carrying a cam roller 62 which at the proper times is actuated by a cam 63 on the gear wheel 6.

To assist in keeping the blank in contact with the mandrel 17 both during and after the pasting of such blank, one or more rollers is arranged to press on each side of the mandrel during the operation, such rollers being arranged and controlled in the following manner:—

Each roller 64, 64^x (or two or more rollers if it is found desirable to employ more than one on each side of the mandrel) is carried in a frame 65 pivotally carried in an arm 66 mounted on a spindle 67 passing through a boss 68 on the casing or head 33 of the rolling mechanism. On the other end of the spindle 67 is a lever 69 provided with a roller 70 which is held against a cam 71 or 72 by means of a spring 73, the action of the spring 73 being to cause the roller or rollers 64, 64^x always to bear against the mandrel 17, while the action of the cams 71, 72 is to cause such roller or rollers to lift therefrom at certain times. The cam 71 is a fixed cam and does not rotate, being supported by the upper end of stationary column 35. Cam 72 is movable and only comes into action at the completion of the rolling operation as hereafter described, its motion being obtained by mounting it as shown on a spindle 74 carried in bearings 75 (extending from the hub of cam 71) and 76 (in the base of column 35). The spindle 74 passes through the bearing 76 and has secured to its lower end a lever 77, on the other end of which is mounted a roller 78 pressed into engagement with a cam 79 on gear wheel 6 by means of a spring 80.

As will be seen in Fig. 5 the cam 71 keeps the rollers 64, 64^x away from the mandrels 17 until one of the latter approaches the position for taking a blank from the pan 10, the direction of movement of the set of rolling mechanism being that of arrow 81. The rear roller or rollers 64 of this particular mandrel will close down onto the latter as its cam roller 70 runs down the incline 82 (shown in dotted lines in Fig. 5) of cam 71, but the forward roller or rollers 64^x will be still kept away to prevent them from coming in contact with the pasted blank until the taking of the blank from pan 10 has been completed and the set of rolling mechanism begins its next movement, when the cam rollers 70 of the forward roller or rollers 64^x will permit the latter to immediately close down on the mandrel and remain down until the movement of the set of rolling mechanism to the position for delivery is almost completed. At about this time the cam 72 is brought into action and both rollers or sets of rollers 64, 64^x are caused to lift from the rolled blank, thus freeing such blank so that by the continued operation of the machine it may be removed from the mandrel.

This delivery is effected in the following manner:—A tube 83 is disposed so as to be opposite the end of the mandrel 17 when the latter is in the delivery position, and such tube 83 has a reciprocating movement imparted to it so that it passes over the mandrel while the latter is stationary. At its inner end such tube is split so as to form a spring, and a ring or catch or catches 84 is or are provided which owing to this spring action will pass over the rolled blank, but on the return movement of the tube will hook behind such rolled blank and pull it off the mandrel.

The reciprocating movement of the tube

83 may be obtained in any suitable manner, the arrangement shown in the drawings consisting in operating same by a toothed rack 85 adapted to reciprocate in a guide way 86, such rack engaging a pinion 87 on the upper end of a shaft 88 supported in a standard 89 mounted on the base of the column 35. On the lower end of shaft 88 is mounted a pinion 90 engaged by a sector 91 on one arm of a double armed lever 92, the other arm of which carries a roller 93 acting against a cam 94 on gear wheel 6, the roller 93 being held against the cam by means of a spring 95. It will be seen that as cam 94 rotates it will permit the spring 95 to draw the one arm of lever 92 inward, thus also operating the other arm of such lever the sector on which engages pinion 90. The rotation of the latter will in turn rotate pinion 87 which by its engagement with rack 85 will reciprocate the latter and also consequently the tube 83. As the latter passes along the rolled blank on the mandrel 17 it will spring slightly open, being made of the necessary diameter to insure this, and the catch 84 will at or about the completion of the inward movement of the tube pass down behind the edge of the rolled blank, so that on the outward movement such catch will pull the rolled blank off the mandrel and retain it in the tube. On the next operation the next blank will of course enter the one previously rolled and will be nested therein, pushing the previously rolled blank further along the tube, and this will be repeated again and again until a sufficient length of rolled blanks has been accumulated to be removed by hand.

As the pressure rollers 64 must be raised from the rolled blank before tube 83 begins to pass over mandrel 17, while it is desirable that such rolled blank should be held onto the mandrel as long as possible to prevent it from opening out again, means are preferably provided for holding the blank down until such tube is passing along the mandrel.

For this purpose a pair of disks 96, one above and the other below the mandrel 17, may be provided, such disks being mounted on bent rods 97 carried in bearings 98 at the top of the standard 89. A small lever 99 is secured to each of the rods 97 and one arm of each of these levers is acted on by a spring 100 in such a manner as to cause the disks 96 to normally bear on the rolled blank on mandrel 17 when the latter has been brought to the delivery position. The other arms of the levers 99 project toward the tube 83 and carry at their ends rollers 101 which lie in the path of a double cam plate 102 secured to such tube, these parts being so arranged that in the inward movement of tube 83 the cam 102 will operate to separate the rollers 101 and so lift both disks 96 away from the rolled blank immediately before the end of tube 83 reaches the position of such disks. As tube 83 moves outwardly again the disks will close toward each other and so be in position to hold the roll blank on the next mandrel 17 when the latter arrives at the delivery position.

The operation of the machine as a whole is as follows:—The machine shown being a double acting one, two piles of blanks must be placed in the pan 10, in position to be operated on, one by each arm of the pusher 9, which rotates in the direction of the arrow 103. A supply of paste or other adhesive is placed in each of the paste reservoirs 25, and the machine being started can continue running as the subsequent operations of feeding the blanks thereto, supplying the adhesive, and removing the rolled blanks can be attended to without stopping it.

The pushers 9 push the piles of blanks around in pan 10, and as the forward edge of each pile reaches the slot 16 the air suction through mandrel 17 (which mandrel at this time will be practically lying in the slot as the pan is in its lower position) will draw and hold the lowermost blank of the pile, and as the upper surface of the mandrel is traveling in the same direction and at the same speed as the pile such blank will be free to wrap itself around the mandrel, the movement imparted by the pusher preventing any liability of the blank being pulled away from the suction openings in mandrel 17. The edges of the slots in pan 10 are so shaped that only the blank actually acted on by the suction will be taken from the pile, the next blank being retained in the pan, even if it had a tendency to hang downwardly, by an upwardly inclined surface at the further edge of the slot.

After the blank has been drawn out for about one-fourth of a revolution of the mandrel it will pass under the first pressure roller or rollers 64 and this will assist the suction in keeping it on the mandrel and drawing it from the pan.

When the forward edge of the blank arrives at the under surface of the mandrel (the latter having turned about half a revolution) it will meet the forward edge of the pasting plate 27 which at this time is in its upper position. Such pasting plate is traveling in the direction of the arrow 104, that is to say in the opposite direction to the pusher 9, but in the same direction and at the same speed as the under surface of mandrel 17 carrying the blank. The latter and the pasting plate will therefore remain in contact during the continuance of the movement, and consequently the paste will be applied evenly to the desired portion of the blank, such plate being as before stated of the same shape but slightly smaller than the portion of the blank to be pasted.

As the mandrel completes about three-

fourths of a revolution it carries the pasted forward edge of the blank past the second pressure roller or rollers 64^x, the latter being at this time held away from the mandrel so that paste is not applied thereto by the blank.

At the completion of a whole revolution the pasted forward edge of the blank will be brought into contact with the second lap of such blank, which will be caused to adhere thereto, this being materially assisted by the two sets of pressure rollers 64, 64^x, the second of which is brought into operation after the pasted inner layer of the blank has passed it.

One or more complete revolutions may be made after the whole of the blank has been rolled on the mandrel, so as to set the adhesive and obviate as far as possible any chance of the blank unrolling itself as a result of the springiness of the material of which it is composed.

In the meantime the pan 10 will have been raised to its upper position, so that when roller 38 on gear 6 enters one of the slots 37 in disk 36, to bring the next mandrel 17 to position for receiving a blank, the mandrel carrying the rolled blank will be free to turn to the delivery position, passing between the disks 96 which are then in the position to exert pressure on the rolled blank and which do so until the delivery tube 83 has nearly reached them. The pressure rollers 64, 64^x must as hereinbefore stated have been lifted from the rolled blank before the delivery tube begins to pass over the mandrel.

As the delivery tube reaches the inner edge of the rolled body its catch 84 passes down behind such inner edge, so that on the return or outward movement the rolled blank will be drawn off the mandrel; the latter will then be ready to be turned to its next position bringing the following mandrel with a rolled blank ready for delivery opposite to the tube 83.

A machine constructed as above described can be readily changed to enable different sized tubes to be rolled. If such tubes are to be of the same diameter at their larger end it will not be necessary to change the pan 10, which however, must be replaced by another of different size if tubes of larger or smaller diameter at their larger ends are to be rolled.

It will be readily understood that the invention is not limited to the precise details shown, as these may be largely modified in many ways without departing from the spirit of the invention.

What I claim, and desire to secure by Letters Patent, is:—

1. In a machine for the purpose specified the combination of a non-rotating pan to receive the pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over a slot formed in the bottom thereof, and a mandrel located under the bottom of said pan and provided with suitable means for causing it to grip the forward edge of the lowermost blank through the slot in the pan substantially as described.

2. In a machine for the purpose specified the combination of a non-rotating pan to receive the pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over a slot formed in the bottom thereof, a mandrel disposed below the pan and extending parallel with the slot therein, perforations being formed in such mandrel through which air is drawn to create suction by which the mandrel grips the forward edge of the lowermost blank in the pan, through the slot in the latter, substantially as described.

3. In a machine for the purpose specified the combination of a non-rotating pan to receive the pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over a slot formed in the bottom thereof, and a mandrel located under the bottom of said pan and provided with suitable means for causing it to grip the forward edge of the lowermost blank through the slot in the pan, and means for rotating the mandrel in such a direction that its upper peripheral surface will travel in the same direction as that in which the pile of blanks is being pushed, substantially as described.

4. In a machine for the purpose specified the combination of a non-rotating pan to receive the pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over a slot formed in the bottom thereof, and a mandrel located under the bottom of said pan and provided with suitable means for causing it to grip the forward edge of the lowermost blank through the slot in the pan, means for rotating the mandrel, and means for imparting an intermittent movement to the head or casing in which the spindle of such mandrel is mounted, substantially as described.

5. In a machine for the purpose specified the combination of a non-rotating pan to receive the pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over a slot formed in the bottom thereof, and a mandrel located under the bottom of said pan and provided with suitable means for causing it to grip the forward edge of the lowermost blank through the slot in the pan, means for rotating the mandrel, and means for imparting an intermittent movement to the head or casing in which the spindle of such mandrel is mounted, means being also provided for bringing such head or casing to a stop and for locking it in its proper position after its intermittent movement, substantially as described.

6. In a machine for the purpose specified the combination of a non-rotating pan to receive the pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over a slot formed in the bottom thereof, means for raising and lowering the pan, a plurality of mandrels located under the bottom of said pan and each provided with suitable means for causing it to grip the forward edge of the lowermost blank through the slot in the pan, such mandrels being provided with spindles mounted in the casing, a single column or standard supporting all such mandrels, means for rotating all such mandrels, and means for imparting an intermittent movement to the head or casing in which the spindles of such mandrels are mounted, substantially as described.

7. In a machine for the purpose specified the combination of a non-rotating pan to receive the pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over a slot formed in the bottom thereof, means for raising and lowering the pan, a plurality of mandrels located under the bottom of said pan and each provided with suitable means for causing it to grip the forward edge of the lowermost blank through the slot in the pan, a single column or standard supporting all such mandrels, means for rotating all such mandrels, and means for imparting an intermittent movement to the head or casing in which the spindles of such mandrels are mounted, means being also provided for bringing such head or casing to a stop and for locking them in their proper positions after their intermittent movement, substantially as described.

8. In a machine for the purpose specified the combination of a non-rotating pan to receive the pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over a slot formed in the bottom thereof, means for raising and lowering the pan, a plurality of mandrels located under the bottom of said pan and each formed with perforations through which air is drawn to create suction by which the mandrel grips the forward edge of the lowermost blank in the pan, through the slot in the latter, a single column or standard supporting an axis common to all such mandrels, each of which latter is supported on a hollow spindle connected to a central head carried by such column or standard, and through which spindles an air pump is connected to the mandrels, means for rotating all such mandrels, and means for imparting an intermittent movement to the head or casing in which the spindles of such mandrels are mounted, substantially as described.

9. In a machine for the purpose specified the combination of a non-rotating pan to receive the pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over a slot formed in the bottom thereof, means for raising and lowering the pan, a plurality of mandrels located under the bottom of said pan and each formed with perforations through which air is drawn to create suction by which the mandrel grips the forward edge of the lowermost blank in the pan, through the slot in the latter, a single column or standard supporting an axis common to all such mandrels, each of which latter is supported on a hollow spindle connected to a central head carried by such column or standard, and through which spindles an air pump is connected to the mandrels, a valve mounted in such central head to open and close the air suction through the mandrels at the required times, means for operating such valve, means for rotating the mandrels, and means for imparting an intermittent movement to the head or casing in which the spindles of all of such mandrels are mounted, substantially as described.

10. In a machine for the purpose specified the combination of a non-rotating pan to receive the pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over a slot formed in the bottom thereof, and a mandrel located under the bottom of said pan and provided with suitable means for causing it to grip the forward edge of the lowermost blank through the slot in the pan, in combination with pressure rollers adapted to bear on the blank being rolled, and means for allowing such rollers to come into contact with such blank and for lifting them therefrom at the required times, substantially as described.

11. In a machine for the purpose specified the combination of a non-rotating pan to receive the pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over a slot formed in the bottom thereof, and a mandrel located under the bottom of said pan and provided with suitable means for causing it to grip the forward edge of the lowermost blank through the slot in the pan, and a pasting plate adapted to apply adhesive to the blank being rolled on the mandrel, substantially as described.

12. In a machine for the purpose specified the combination of a non-rotating pan to receive the pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over a slot formed in the bottom thereof, and a mandrel located under the bottom of said pan and provided with suitable means for causing it to grip the forward edge of the lowermost blank through the slot in the pan, and a pasting plate adapted to apply adhesive to the blank being rolled on the mandrel, and means for rotating such past-

ing plate in the same direction as the under surface of the mandrel, substantially as described.

13. In a machine for the purpose specified the combination of a non-rotating pan to receive the pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over a slot formed in the bottom thereof, a mandrel located under the bottom of said pan and provided with suitable means for causing it to grip the forward edge of the lowermost blank through the slot in the pan, and a pasting plate adapted to apply adhesive to the blank being rolled on the mandrel, and means for rotating such pasting plate in the same direction as the under surface of the mandrel, and means for raising and lowering such pasting plate at the required times, substantially as described.

14. In a machine for the purpose specified the combination of a non-rotating pan which is formed with a slot in the bottom thereof, said pan being adapted to receive a pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over said slot, a mandrel provided with means for causing it to grip the forward edge of the lowermost blank through the slot in the pan, means for pasting the blank being rolled, and means for removing the rolled blank from the mandrel.

15. In a machine for the purpose specified the combination of a non-rotating pan formed with a slot in the bottom thereof, said pan being adapted to receive a pile of cut blanks, a rotating pusher to push said pile of blanks around the pan and over said slot, a mandrel provided with suitable means for causing it to grip the forward edge of the lowermost blank through the slot in the pan, a pasting plate adapted to apply adhesive to the blank as the mandrel rotates, means of shifting the rolled blank to a position where delivery can be effected, and means of assembling the rolled blanks in a tube.

16. In a machine for the purpose specified the combination of a non-rotating pan formed with a slot in the bottom thereof, such pan being adapted to receive a pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over said slot, a mandrel provided with suitable means for causing it to grip the forward edge of the lowermost blank through the slot in the pan, means for pasting the blank being rolled, means for delivery of the rolled blank, and means for confining the delivered rolled blanks one inside the other.

17. In a machine for the purpose specified the combination of a non-rotating pan formed with a slot in the bottom thereof, such pan being adapted to receive a pile of cut blanks, a rotating pusher to push the pile of blanks around the pan and over said slot, a mandrel provided with suitable means for causing it to grip the forward edge of the lowermost blank through the slot in the pan, means for pasting the blank being rolled, a delivery tube adapted to be reciprocated by suitable means, pressure disks adapted to press on the rolled blank during the beginning of the delivery operation, and means for releasing such pressure at the proper time.

In testimony whereof I affix my signature in presence of two witnesses.

ELMER ZEBLEY TAYLOR.

Witnesses:
EDWARD R. DONNELLY,
CHAS. W. JENKS.