

No. 863,208.

PATENTED AUG. 13, 1907.

F. C. OSBORN.
CUT-OFF MECHANISM FOR PAPER TUBE MACHINES.

APPLICATION FILED JULY 31, 1905.

4 SHEETS—SHEET 1.

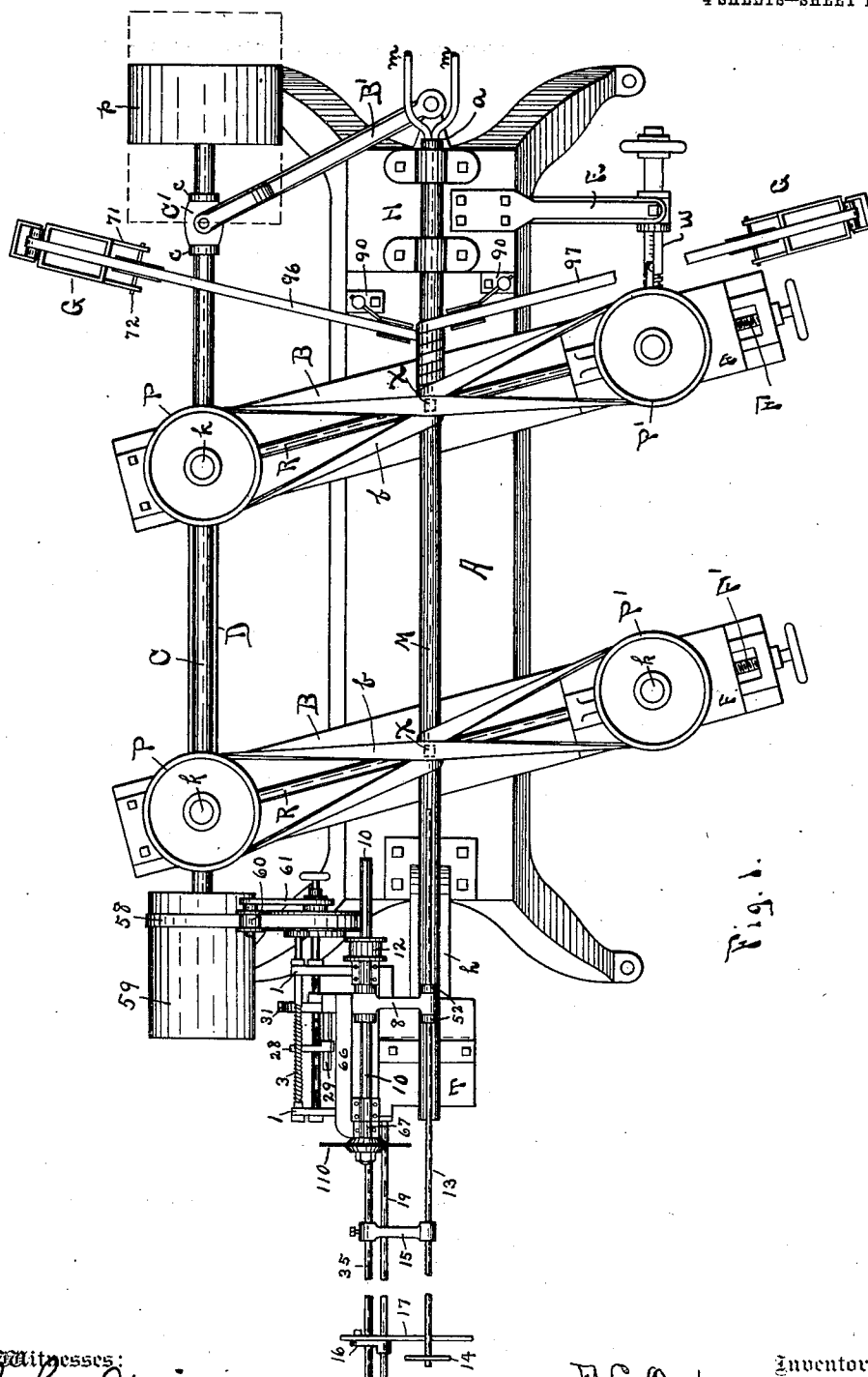


Fig. 1.

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Edward N. Bagelsen.

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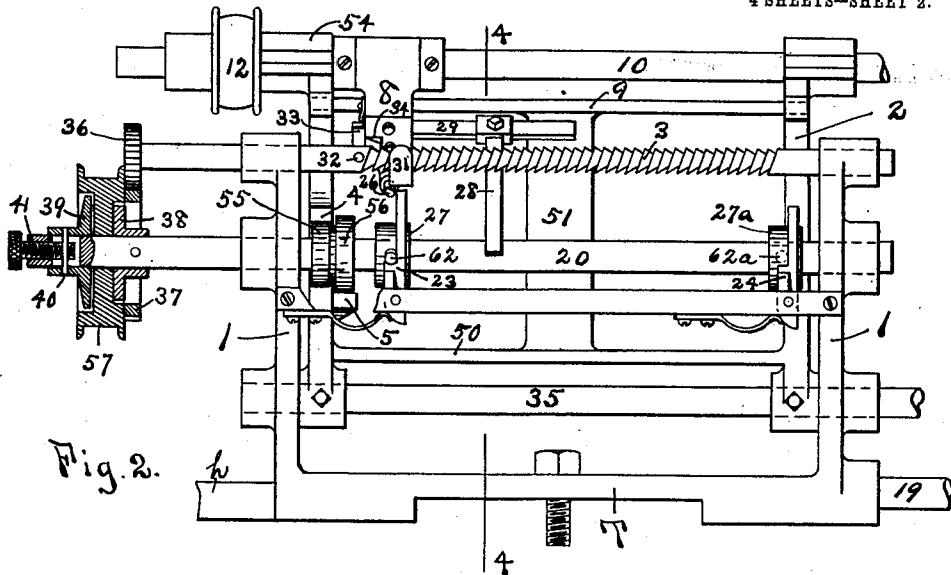


Fig. 2.

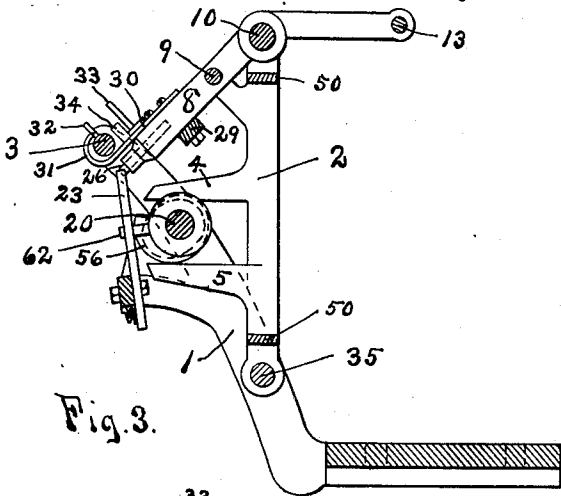


Fig. 3.

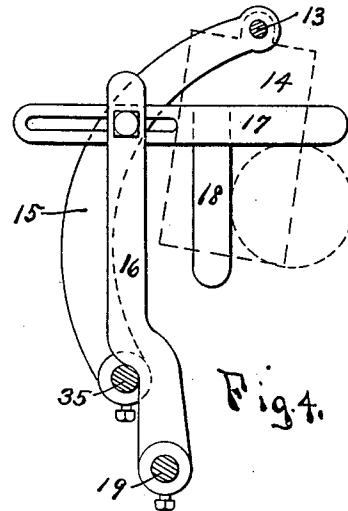


Fig. 4.

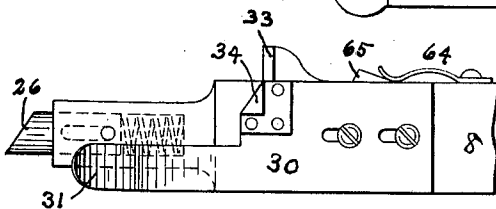
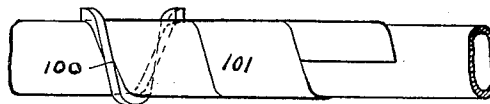


Fig. 5.

Fig. 19.



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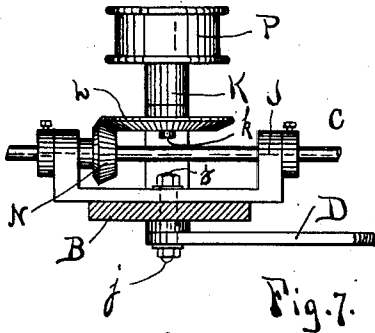


Fig. 7.

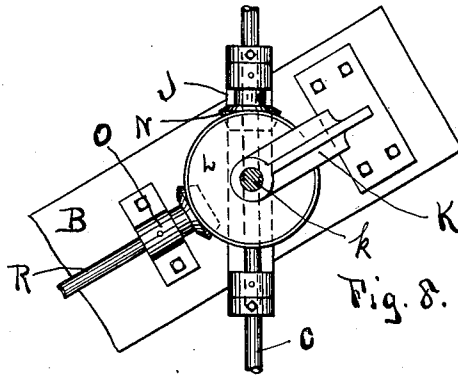


Fig. 8.

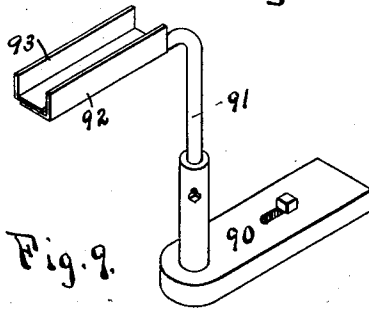


Fig. 9.

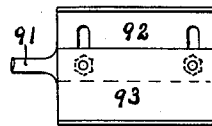


Fig. 10.

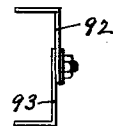


Fig. 11.

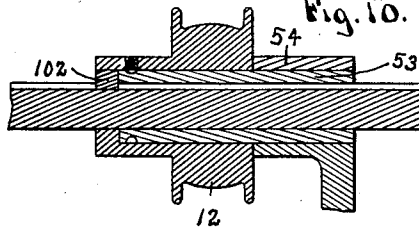


Fig. 18.

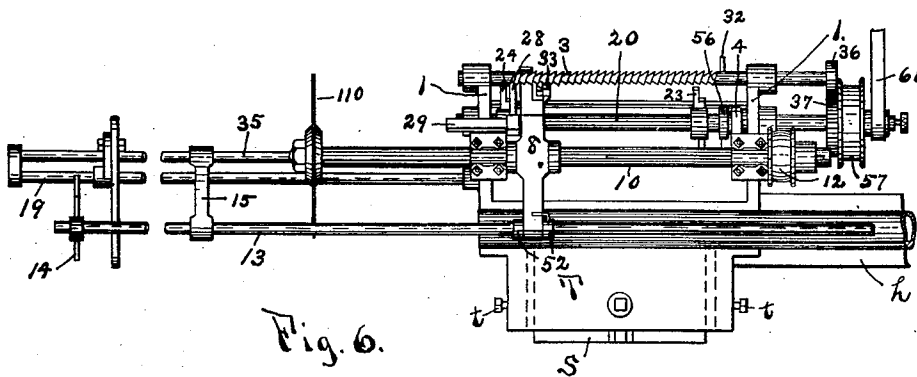


Fig. 6.

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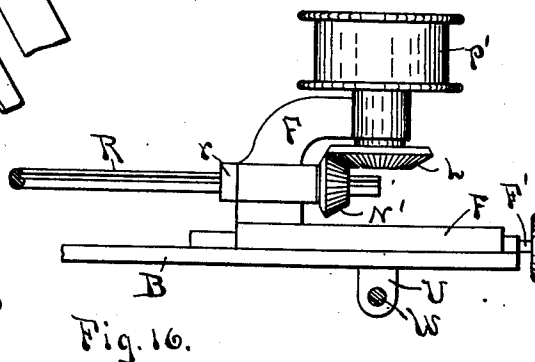
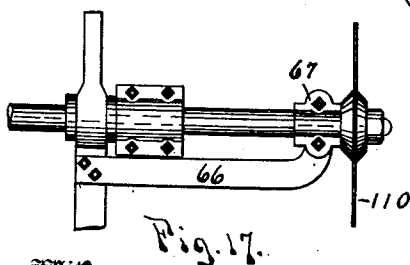
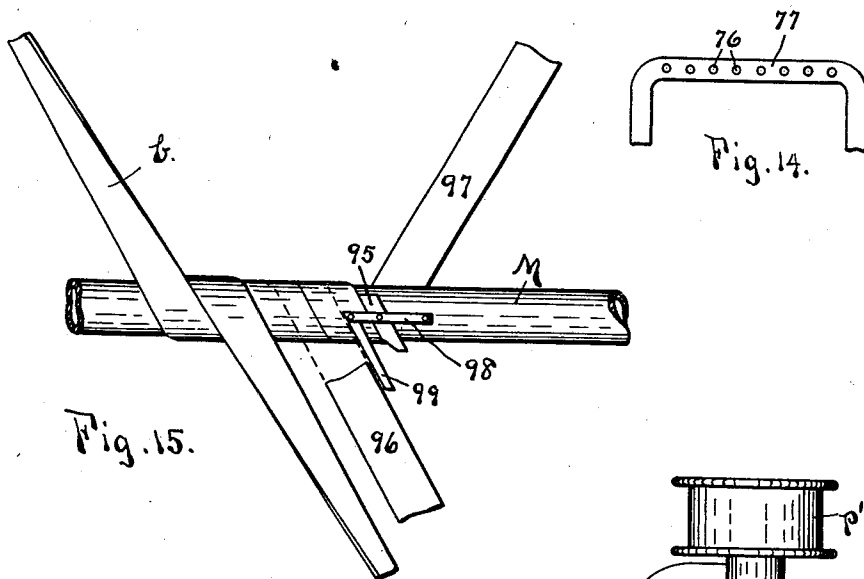
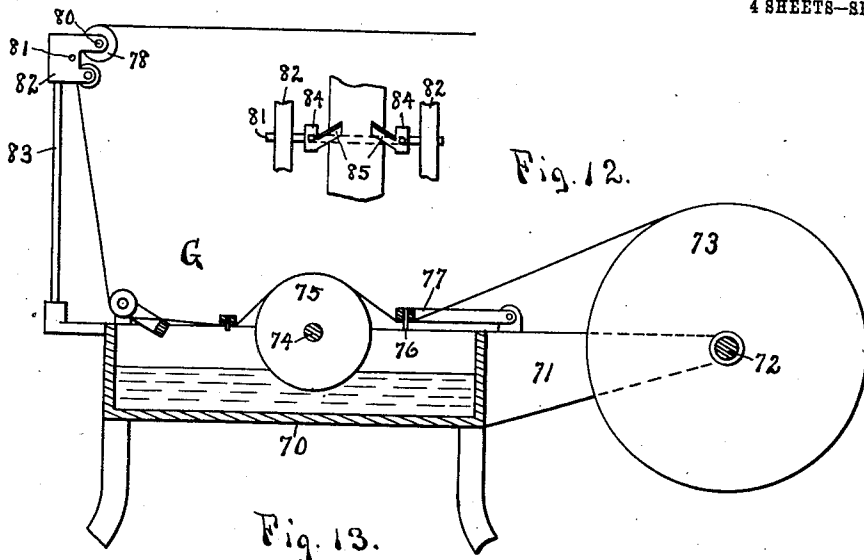
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APPLICATION FILED JULY 31, 1905.

4 SHEETS—SHEET 4.



Witnesses:
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UNITED STATES PATENT OFFICE.

FRANCIS C. OSBORN, OF DETROIT, MICHIGAN.

CUT-OFF MECHANISM FOR PAPER-TUBE MACHINES.

No. 863,208.

Specification of Letters Patent.

Patented Aug. 13, 1907.

Application filed July 31, 1905. Serial No. 271,879.

To all whom it may concern:

Be it known that I, FRANCIS C. OSBORN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Cut-Off Mechanism for Paper-Tube Machines, of which the following is a specification.

My invention relates to that type of machines by which continuous strips or bands of paper or other similar material are carried spirally around a mandrel, cemented together, formed into continuous tubes, and finally cut off into predetermined lengths. The objects of my improvements are—to provide a machine of this class that can be quickly and easily adjusted for paper of varying widths and for tubes of different diameters; to provide means whereby the tubes are made of two or more layers, the inner surface of the inner layer being evenly coated with paraffin and the inner surface of the other layers being coated with glue or other cement; to provide means whereby the paraffin and glue will be evenly spread on the strips of material; to provide guides for the paper that are easily adjustable; to provide means to accurately and cleanly cut the tube into lengths and to provide means to quickly dry the cement between the layers of the material. I attain these objects by the construction illustrated in the accompanying drawings, in which

Figure 1 is a general plan of the machine. Fig. 2 is an elevation of the cut off mechanism. Figs. 3, 4 and 5 are details of the cut off mechanism, Fig. 4 being a cross section on the line 4—4 of Fig. 2. Fig. 6 is a plan of the cut off mechanism on a somewhat smaller scale. Figs. 7, 8 and 16 are details of the belt carrying mechanism for winding the tubes. Figs. 9, 10 and 11 are details of paper guides. Figs. 12, 13 and 14 are details of the paper coating mechanism. Figs. 15 and 19 are views of guides for the paper strips that are adapted to be secured on the forming mandrel. Fig. 17 is a view of an auxiliary bearing for the saw shaft. Fig. 18 is a cross section through the driving pulley of the saw.

Similar reference characters refer to like parts throughout the several views.

The base or bed A of the machine is similar to a lathe bed and is supported by legs as shown in Fig. 1. On this bed are pivoted the swinging bed pieces B, and the swinging arm B'. The pivots of the bed pieces B and arm B' are in line with each other. To one end of each of the flat bed pieces is secured a slidable support F for the pulley P', the distance between this pulley and the pulley P being varied by the screw F'. At the other end of the bed piece is the journal bracket J of the shaft C, which bracket is pivoted on the screw j. Outside of the bracket J is the upright bearing K of the stud shaft k of the pulley P. On the lower end of the shaft k is the gear L which meshes with the pinion N on the shaft C. Inside of the bracket J is the bearing O of the

shaft R which shaft extends across and is splined in a sleeve r, carrying a pinion N' which meshes with a second gear L on a second shaft k which carries the pulley P' at its upper end. One of these bed pieces B is provided for each two thicknesses of material used to make the tube.

At the head end of the base A is a small bracket a, to which is pivoted the swinging arm B' which is in turn pivoted to the bearing C' on the shaft C. This bearing is held from longitudinal movement on the shaft by the collars c. A link D is pivoted to all the swinging bed pieces B by the pins j, and as the distance between the pins j is the same as that between the pins X of the swinging bed pieces, the several bed pieces will always remain parallel to each other. The angle between the bed pieces and the base is determined by the graduated screw W supported by the bracket E secured to the base A, which screw engages in the nut U which is pivoted at one end of the first bed piece B in line with the screws X and j, and equi-distant from X with j. As will be seen in Fig. 1, the screw W is graduated so the angle between the bed pieces B and the mandrel can be accurately determined.

The machine is driven from an over-head countershaft of any desired construction on which countershaft is secured a wide driving pulley which pulley is connected by means of a driving belt with the pulley p. The belts b pass around the mandrel M as shown in Fig. 1 and should be about as wide as the material wound. The hollow mandrel is securely fixed in the head H of the machine. For the purpose of heating the mandrel so that the paraffin will penetrate the material of the strip and flow into the joint between the spirals and also dry the cement, I provide a steam pipe bent upon itself extending the length of the mandrel and having ends m projecting from one end of the mandrel, which pipe ends may be connected to any steam source.

The means for coating the paper strip with paraffin or glue is designated by G, and consists of the tank supported on suitable legs, and having secured to it the arms carrying the pin upon which is mounted the roll of paper 73. Journaled on the pin 74 is the roller 75 which dips into the liquid paraffin or cement and carries it up against the lower face of the paper strip. This strip is guided between the pins in the holes 76 in the arm 77 pivoted to the sides of the arms 71. The guide roll 78 is supported on the pin 80 secured in the frame 82 at the upper end of the rod 83. On the pin 81 are secured the collars 84 having fingers 85 which press against the coated side of the paper strip. Usually the coating material collects on the outer edges of the strip but by means of the fingers 85 it is spread evenly toward the center. It will be noticed that by reason of the roll 78 the coated strip will pass to the tube making machine with the coated side up, thus not only avoiding any

tendency of the coating to form drops as it does when the strip is fed to the machine with the coated side down, but also permitting the coating to level itself on the flat surface.

- 5 To the base are secured the paper guides as shown in Fig. 1, each consisting of the base 90 to which is secured the arm 91 carrying the fixed part 92 of the guide and the slidable part 93, secured to the part 92 by bolts.

- An auxiliary guide for the paper strips is shown in 10 Fig. 15 and consists of the spirally arranged guide 95 secured to the mandrel M against which the inner strip of paper 97 will run, and over this guide 95, to position the strip 96, is secured an arm 98 which bears the guide 99 against which the outer strip 96 will run. With certain 15 grades of paper, the guides shown in Fig. 19 is found to be of great value. Instead of the short piece 95 as in Fig. 15, the part 100 is made to pass around the mandrel. The paper is wound upon the spiral sheet of brass 101, which extends until just before the place where the 20 first belt *b* embraces the mandrel. The mandrel M being of less diameter at this point, the tube will slip around it more easily. The arm 98 and guide 99 are used as before. The part 101 serves a similar purpose to part 100 in that it acts as a shoulder to force the paper 25 along the mandrel and acts on the inner strip after it has left the part 100 and after the outer strip has been wound upon it.

- Secured to the end of the base is an arm *h* which carries the means for cutting the tube into predetermined 30 lengths. The outer end of arm *h* is broadened to form a plate S to which is adjustably secured the table T. The table is slidable on the plate and adjustable side-wise by the small set screws *t* shown in Fig. 6. At- 35 tached to the table T are two arms 1, between which is pivoted the frame 2, secured to the shaft 35, which projects toward the rear end of the machine. (Figs. 6 and 4). This frame is braced by the cross pieces 50 and the vertical piece 51. In the upper part of this frame is 40 journaled the arbor 10 for the saw 110 for cutting off the tubes. This arbor is slidable longitudinally in its journals and the position of the saw while cutting is controlled by the following means.

- The tube as it comes from the mandrel abuts against the plate 14 on the end of the slidable rod 13 as shown 45 in the dotted lines in Fig. 4. This rod is supported by and is slidable in the upper end of the arm 15 which is carried by the revoluble rod 35 and by the arm 8 carried on the saw arbor. Adjustable collars 52 on the rod 13 position the plate 14 with reference to the saw. The 50 saw arbor is driven by a belt from an over-head pulley to the flanged pulley 12 on the sleeve 53 journaled in the bearing 54 of the frame 2. (Fig. 18). A feather 102 in the arbor keyseat forms the driving connection between the arbor and the pulley. To the frame 2 are 55 attached arms 4 and 5 which engage cams 55 and 56 respectively on the shaft 20. (Fig. 3). When therefore the shaft 20 is revolved the frame with the saw will be swung toward and away from the tube. In the outer ends of the arms 1 is journaled the constantly running 60 screw 3 which is intended to return the saw 110 to its initial position, which screw is constantly driven by means of the pinion 36 which meshes with the gear 37 (Fig. 2) secured to the pulley 57, loosely mounted on the end of the shaft 20. This pulley is driven by a belt 58 65 on pulley 59 on the shaft C as shown in Fig. 1. The

belt is tightened by the pulley 60 on the arm 61, loosely mounted on the outer end of the shaft 20. Secured to the shaft 20 is a disk 38 and loose on the outer end of the shaft is a second disk 39 having a pin 40 which passes through a slot near the end of the shaft. A screw 41 in 70 the end of the shaft contacting with this pin regulates the pressure between the disks and the pulley and the frictional stress on the shaft. Secured to the shaft 20 are two collars 27 and 27^a, each having a pin 62—62^a projecting therefrom, the pins being so positioned as to 75 project from opposite sides of the shaft so that the dogs 23 and 24 will alternately stop the shaft 20 when the frame 2 and with it the saw 110 is in the withdrawn and in the operative positions respectively under the action of the cams. 80

The arm 8 is pivoted on the saw arbor and positioned by two small collars. To prevent it from revolving with the arbor it slides on a rod 9 secured to the swing- 85 ing frame 2. To this arm is attached a short bar 29 (Fig. 2) having a finger 28, which, when the arbor and with it the arm 8 has reached its outward position con- tacts with the dog 24, moving it away from the pin 62^a and releases the shaft 20, which in turning swings the frame and saw back from the tube by the action of the 90 cams. The dogs 23 and 24 return to position under the influence of the springs shown in Fig. 2.

On the arm 8 is a slidable plate 30 having a tooth 34 that engages the threads of the screw 3. This plate also has an upturned lug 33 and has its end bent to form the 95 hook 31. The plate is held in its upper and lower posi- tions by the spring 64 acting on the lug 65. In the end of the arm 8 is a pin 26 that is spring pressed outward and is intended to engage the dog 23 and trip the same as the saw begins to move with the tube.

The operation of the sawing mechanism is as follows:— 100 When the saw is in the position shown in Fig. 1, the arbor is free to slide under the pressure of the tube against the plate 14. The pin 26 in the arm 8 is to the left of the dog 23 (Fig. 2) and the tooth 34 is free from the screw. Upon the tube pressing against the plate 14, the rod 13, 105 the saw, the arbor and arm 8 are moved outward, the pin 26 moves dog 23 with it and pin 62 is released, per- mitting shaft 20 to turn part of a revolution which through the action of the cams on the arms 4 and 5 swings the frame 2 and with it the arbor and saw toward the 110 tube, sufficient for the saw to cut through the walls of the tube. In so doing the hook 31 is brought in contact with the threads of the screw 3 causing the plate 30 to be pulled out, the spring 64 acting on lug 65 after passing the center to free the hook from the threads. The saw, 115 arbor, arm 8, bar 29 and finger 28 move with the tube, cutting through the tube as it turns under the pull of the belts *b*, until the finger 28 contacts with the dog 24, moving it to the right, (Fig. 2) which releases the pin 62^a and permits the shaft 20 to turn the remainder of the 120 revolution or until the other pin 62 engages the dog 23. In this part of the revolution the cams swing the frame 2 back from the tube, bringing the tooth 34 into engage- ment with the screw 3, thus causing the arm 8, the arbor and the saw to be carried to the position shown in Fig. 2. 125 When the pin 26 has passed the dog 23, which it can do owing to the beveled end, the pin 32 on the screw shaft 3 will contact with the lug 33 and force the tooth 34 out of engagement with the screw. The saw will then re- main in its withdrawn position until sufficient length 130

of tube is formed to again push the plate 14 and the rod 13 outward. The amount of travel to the right and left is regulated by the position of finger 28 on the bar 29.

To prevent the tube being pulled back by the saw when the frame 2 is withdrawn, I secure the arm 16 to the rigid rod 19 carried by the table T. To this arm is secured the bar 17 with finger 18 which projects against the tube and prevents it moving to the left with the saw (Fig. 4). To stiffen the saw arbor I secure a bar 66 to the arm 8 (Fig. 17) and provide a bearing 67. This construction is omitted from the other figures as it is not absolutely necessary for ordinary tubes.

Having now explained my improvements, what I claim as my invention and desire to secure by Letters Patent is,—

1. In a tube machine, the combination of a bed, a mandrel secured thereto, a fixed frame secured to the bed, a swinging frame pivoted in said fixed frame, and a cutting tool carried in the swinging frame and longitudinally movable in the same.

2. In a tube machine, the combination of a bed, a mandrel secured to said bed, arms secured to said bed, a swinging frame pivoted between said arms, a longitudinally movable cutting tool carried by the swinging frame, and means whereby the tube may move the cutting tool longitudinally.

3. In a tube making machine, the combination of fixed arms, a shaft revolubly mounted in said arms, an eccentric on said shaft, a screw revolubly mounted in said arms, a swinging frame carried by said arms, said frame having means to engage the eccentric, a saw arbor journaled and slidable in said frame, and means carried by the arbor in intermittent engagement with the screw whereby said arbor may be moved longitudinally in the frame when permitted by the eccentric.

4. In a tube making machine, the combination of fixed arms, a screw revolubly mounted in said arms, a swinging frame carried by said arms, a saw arbor journaled and slidable in said frame, and means carried by the arbor for engaging said screw to cause said arbor to be moved longitudinally in said frame.

5. In a tube machine, the combination of a rigid frame having fixed arms, a shaft revolubly mounted in said arms, cams on the shaft, a constantly running screw journaled in said arms, a swinging frame mounted in said arms having means to engage the cams, a saw arbor journaled and slidable in the frame, means connected to the arbor and in the path of the tube whereby the tube may move the arbor in one direction, and an arm connected to the arbor having means to engage the screw whereby the arbor may be moved in the opposite direction.

6. In a tube machine, the combination of a rigid frame, a shaft having intermittent motion journaled in the frame, cams on said shaft, stops carried by said shaft at an angle to each other, pivoted dogs carried by the frame normally in the paths of the stops, a constantly running screw journaled in the frame, a swinging frame pivoted in the rigid frame, a slidable arbor journaled in the swinging frame, and an arm on the arbor having means to contact with the dogs to release the shaft.

7. In a tube machine, the combination of a fixed frame, a swinging frame pivoted in said fixed frame, a shaft having intermittent motion journaled in the fixed frame, cams on the shaft, arms secured to the swinging frame whereby the movement of the cams will move the swinging frame toward and from the tube, a saw arbor slidably mounted on the swinging frame, and adjustable means mounted on the frame for governing the movement thereof.

8. In a tube machine, the combination of rigid arms, a shaft journaled in said arms, a pulley frictionally connected with said shaft, a screw journaled in the arms and positively connected to said pulley, stops secured to said

shaft at an angle to each other, dogs pivoted to said arms and normally held in the paths of the stops, a swinging frame pivoted between the arms, a slidable arbor journaled in said frame and movable in one direction by the screw, and an arm slidable with said arbor for acting on the dogs alternately and so releasing the shaft so it may revolve the angular distance between the stops.

9. In a tube forming machine, the combination of a rigid frame, a frictionally driven shaft journaled in said frame, cams on said shaft, stops on said shaft at an angle to each other, dogs pivoted to said frame each normally in the path of a stop, a swinging frame having means to engage the cams, a slidable arbor journaled in the swinging frame, an arm carried by the arbor to operate the dogs to release the stops so the shaft may turn through the angular distance to the next stop, whereby the arbor carrying frame will be swung back and forth by the cams, and a constantly driven screw for moving the arbor in one direction when the frame has reached the end of its movement.

10. In a tube machine, the combination of a fixed frame, a horizontal rod in said frame, a swinging frame secured to said rod, a saw arbor slidable in the swinging frame, a second rod slidable with said arbor, and a plate secured to the end of said second rod.

11. In a tube machine, the combination of a fixed frame, a revolving screw carried by said frame, a revoluble rod in said frame, a swinging frame secured to said rod, a saw arbor slidable in the swinging frame, an arm journaled on said arbor, means secured to one end of the arm to contact with said screw, an adjustable rod carried by the other end of the arm, and a plate at one end of the adjustable rod in the path of the tube whereby the saw arbor may be moved in one direction, said arbor being moved in the other direction by the screw.

12. In a tube machine, the combination of a fixed frame, a horizontal rod secured in said frame, a swinging frame pivoted in said fixed frame, a cutting-off saw carried by the swinging frame, means to move the saw to and from the tube, and means carried by the horizontal rod to prevent the cut off portion of the tube from moving back with the saw.

13. In a tube machine, the combination of a shaft, a disk secured to said shaft, a second disk loose on said shaft, a constantly running pulley on said shaft between the disks whereby said shaft may be intermittently driven, a gear secured to the pulley, a constantly running screw driven by said gear, and a slidable saw arbor movable in one direction by said screw.

14. In a cutting off machine, the combination of a bed, means mounted thereon to support the article to be cut off, arms secured to said bed, a swinging frame connected to said arms, a saw arbor mounted for longitudinal movement in said frame, means for moving the saw arbor longitudinally in one direction, and independent means for returning the arbor.

15. In a cutting off machine, the combination of a fixed frame, a screw revolubly mounted thereon, a swinging frame carried by the fixed frame, a cutting tool carried by the swinging frame, means to engage the screw to move the tool in one direction, and independent means whereby the article to be cut off may move the tool in the opposite direction.

16. In a cutting off mechanism for paper tube machines, the combination of a frame, a saw arbor mounted therein, a saw on said arbor, and means for moving the saw to operative position, permitting the arbor to slide longitudinally under the action of the tube, swinging the saw back to normal position and then moving the arbor longitudinally to the starting point.

In testimony whereof I have signed my name to this application in the presence of two subscribing witnesses.

Witnesses:

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GEO. WILSON.

FRANCIS C. OSBORN.