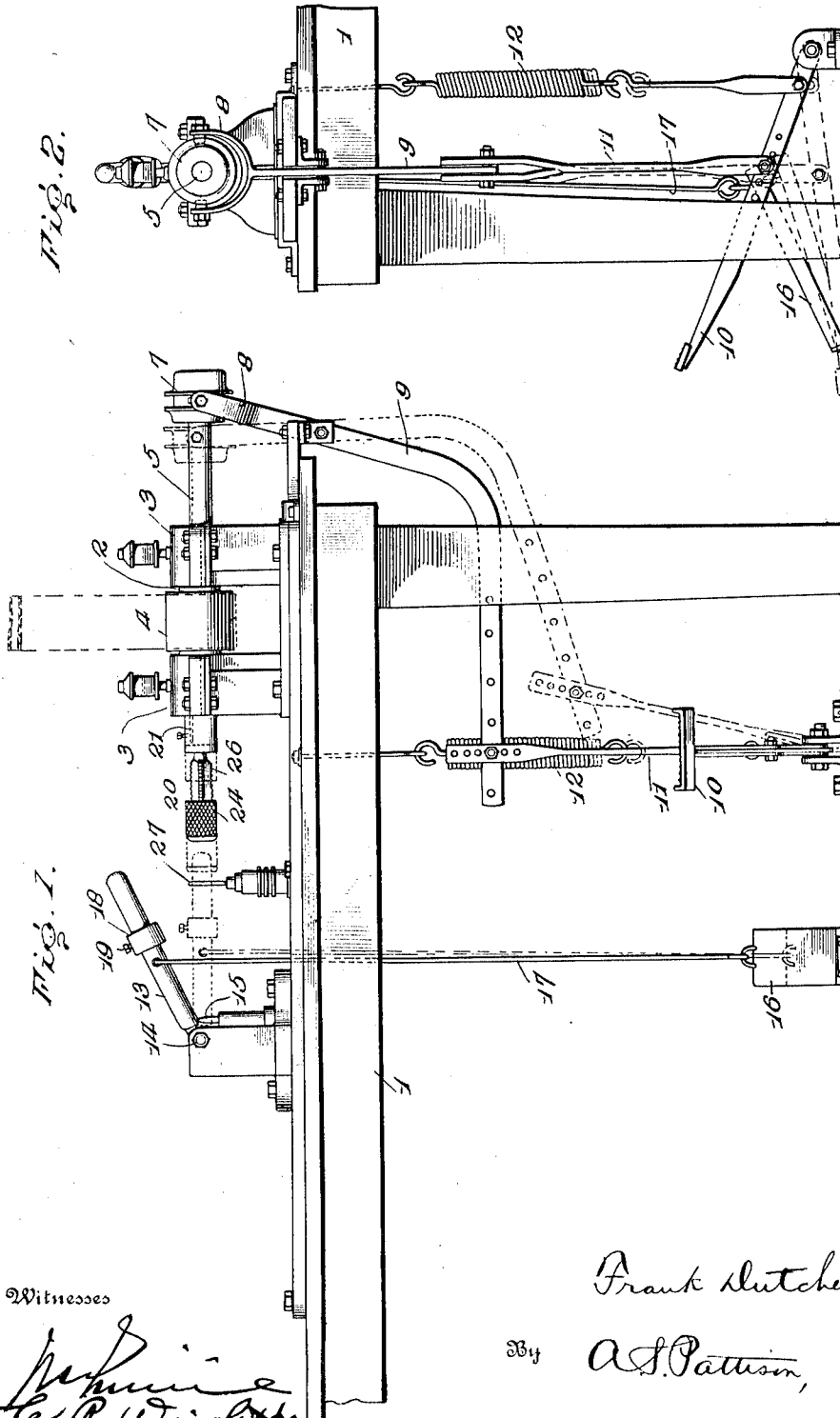


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MACHINE FOR CLOSING THE ENDS OF PAPER TUBES.
APPLICATION FILED DEC. 5, 1907.

1,012,530.

Patented Dec. 19, 1911.

2 SHEETS-SHEET 1.



Witnesses

John C. R. Wright

By

Frank Dutcher,
A. S. Patterson,

Inventor

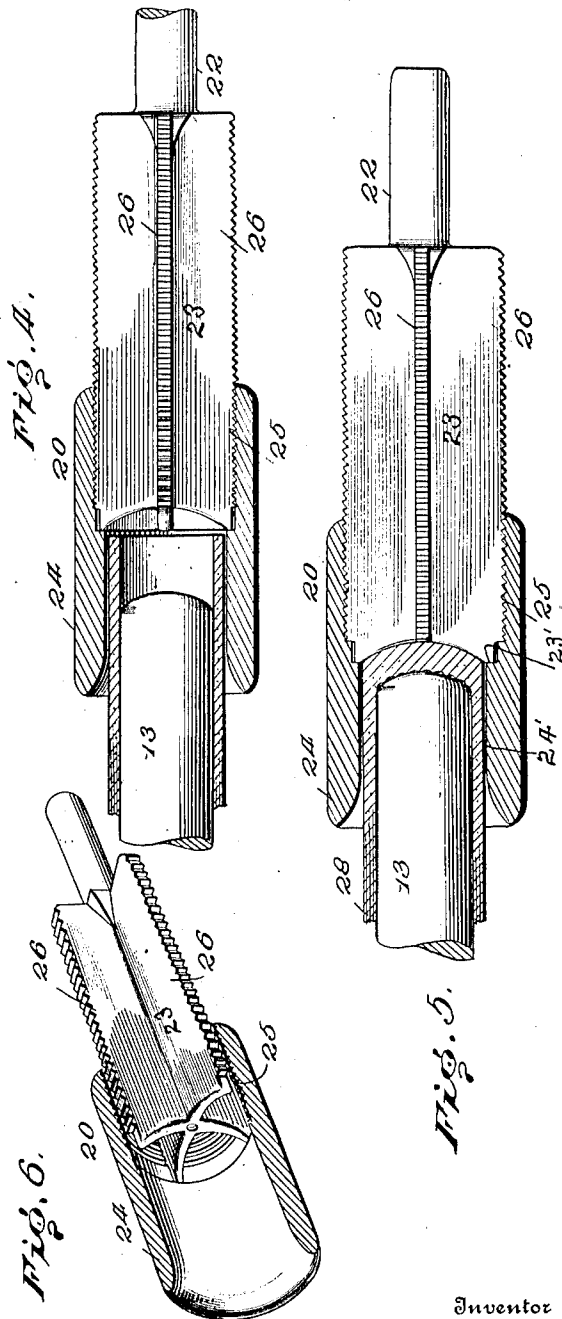
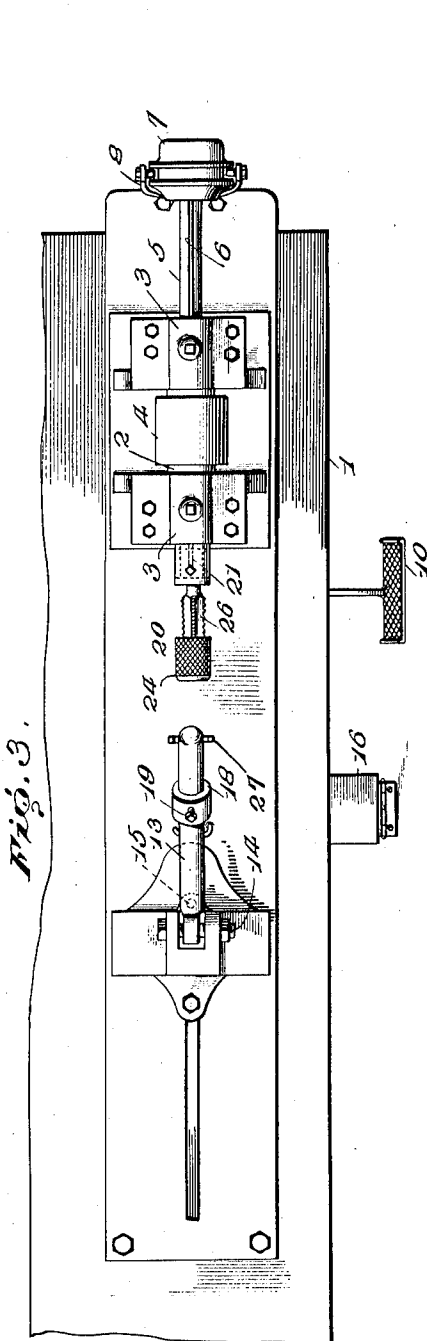
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UNITED STATES PATENT OFFICE.

FRANK DUTCHER, OF VERSAILLES, PENNSYLVANIA.

MACHINE FOR CLOSING THE ENDS OF PAPER TUBES.

1,012,530.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed December 5, 1907. Serial No. 405,280.

To all whom it may concern:

Be it known that I, FRANK DUTCHER, a citizen of the United States, residing at Versailles, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Closing the Ends of Paper Tubes, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in machines for closing the ends of paper tubes, the object of which is to provide a mechanism which first by pressure crimps inwardly an extended end of the tube, and then by increased rotary pressure closely mechanism which first by pressure crimps portion so as to produce an absolutely closed end for the tube which has a smooth outer surface.

In the accompanying drawings, Figure 1, is a side elevation of a machine embodying my invention. Fig. 2, is an end elevation of the same. Fig. 3, is a top plan view thereof. Fig. 4, is a longitudinal sectional view of the closing tool with the extended end of the tube in position therein ready to be crimped and closed. Fig. 5, is a similar view showing the tube after the crimping operation is performed. Fig. 6, is a sectional perspective view of the closing tool.

In carrying out my invention, a suitable table or support 1 is provided, and at one end of this table or support a hollow shaft 2 is journaled in suitable bearings 3. This shaft 2 carries a suitable pulley 4 located between the said bearings by means of which the hollow shaft is rapidly rotated. Passing through this hollow shaft is a tool-carrying shaft 5, and this shaft 5 is longitudinally movable through the hollow shaft 2, but is caused to rotate therewith by reason of a feather or key 6. The outer end of this shaft 5 carries a circumferentially-grooved head 7 with which a yoke 8 upon the upper end of an intermediately-pivoted lever 9 co-acts for the purpose of moving the shaft 5 through the hollow shaft 2. A suitable treadle 10 is connected with the opposite end of the lever 9 by means of a link 11, and a contracting spring 12 has its lower end connected with the treadle and its upper end connected with the table or support 1. The spring 12 serves to hold the

parts normally in the positions shown in full lines Fig. 1.

A tube-mandrel member 13 has its outer end pivotally supported at the point 14, whereby it may swing vertically, and it is normally held in its upper position by means of a suitable spring plunger 15. This member 13 is connected with a treadle 16 by means of a suitable rod or link 17. Placed upon the member 13 is an adjustable sleeve 18 adapted to be firmly held in its adjusted position by means of a set-screw 19 and forming a stop against which the end of the tube abuts to limit the outward movement thereof. The tube to have its end closed is placed upon the outer end of the member 13, and the inner end of the tube abutting against the sleeve 18.

The closing tool 20 is secured in a suitable holder or chuck 21 which is attached to the inner end of the shaft 5 by grasping the end 22 of the tool. The tool consists essentially of two members, a winged member 23 and a sleeve member 24. One end of the sleeve member is reduced and internally screw-threaded as shown at 25, and the wings 26 of the member 23 have their edges screw-threaded as shown, to engage the threads of the sleeve 24. The wings 26 have their outer crimping ends 23' greater than the bore 24' of the sleeve 24. The normal position of the members 23 is that shown in Figs. 4 and 5. The inner ends of the wings 26 are concaved or curved radially as shown in Figs. 4, 5 and 6, which crimps the end of the tube more readily and rounds the end thereof. This construction of closing tool forms passageways for the separated fibers of the paper tube, and prevents the clogging thereof.

The winged member 23 is elongated for the purpose of taking up the wear which is the consequent result of the friction thereon of the end of the paper tube, and the sleeve 24 is detachable for the purpose of enabling the re-shaping of the inner end of the winged member. A V-shaped centering-and-tube-holding member 27 projects from the support or table 1, which serves to center the paper tube 28 in respect to the closing tool and to prevent the paper tube from being revolved by the friction of the closing tool.

In the operation of the invention, a paper

tube is placed upon the outer end of the tube-carrying member 13 with its inner end against the sleeve 18, which has been adjusted so that the opposite end of the paper tube projects the required distance beyond the end of the member 13. The member 13 is then brought to the position shown in dotted lines, Fig. 1, by depressing the treadle 16, the member 27 serving to center and hold the tube against rotation. The rapidly-rotating closing tool 20 is then caused to embrace the end of the paper tube by pressing downward on the treadle 10. As the rapidly revolving tool engages the projecting end of the paper tube its wall is first crimped in and the continued movement of the tool toward the tube-carrying mandrel 13 compresses the crimped in portion against the end of the mandrel 13, and the rapidly-rotating tool causes the outer surface of the crimped in portion to be intimately combined, which produces a closed in end for the paper tube having a smooth outer surface.

I find that the end of the tube may be closed with this machine, when the paper of the tube is dry, but the best results are produced by first dampening the projecting end of the paper tube, and I preferably dampen it with paste or cement.

In the operation of this device, some of the fiber of the paper tube is disintegrated, and is combined with the end of the tube, while other fibers become detached, and these detached fibers are lodged into the spaces between the wings 26. By this arrangement the mandrel 13 forms a support for the tube and prevents it from collapsing under the crimping pressure of the extended end of the tube, and forms a support for the inner wall of the crimped in portion, enabling it to be subjected to heavy pressure for compressing the crimped in portion intimately together, and for subjecting the outer surface of the crimped in portion to a correspondingly heavy rotary pressure. The rapidly rotating tool causes considerable friction on the end of the tube, and this in practice is found to be sufficient to practically dry the closed end of the tube, so that when it is removed from the mandrel 13 the end of the tube is provided with a permanent closure.

I am aware that paper tubes have had their ends closed by means of a cutting tool which removed an inner portion of the wall of the tube, but in this event there was no mandrel to enable the closed in end to be compressed, and no means for compressing the closed in end and insuring a permanent closure at the end of the tube.

So far as I am aware a machine of the character herein described has not been provided with a combined tube-supporting and compression mandrel, and a tube-embracing,

supporting and rotating closing device adapted to compress the closed in portion of the tube against the end of the mandrel.

The pitch of the screw-threads on the sleeve 24 and wings 26 is such that the rotation of the tool and its friction against the paper tube serves to screw the sleeve upon the winged member 23, and thus prevents any separation of these members, while at the same time providing an efficient manner of adjusting the two members.

I desire it to be understood that certain modifications and changes in detail of construction could be made from that herein shown and described, without departing from the essential features of my invention hereinafter claimed.

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

1. A machine for closing the end of a paper tube, comprising a tube receiving and supporting mandrel, a rotatable crimping tool composed of radial arms having their edges screw-threaded, the ends of said arms concaved to form the crimping surfaces, and a cylindrical inclosing member screwed upon the threaded portion of the arms.

2. A machine for closing the end of the paper tube, comprising a tube-receiving and supporting mandrel, an adjustable stop carried thereby, a clamping and centering device for the mandrel, a rotatable crimping tool composed of a shaft having radially-extending arms, the edges of said arms screw-threaded, the outer ends of said arms curved to form concaved crimping surfaces, means for longitudinally moving the shaft, means for rotating the shaft and a cylindrical tube-inclosing member screwed upon the threaded edges of the arms.

3. A machine for closing the end of a paper tube comprising a swinging tube receiving and supporting mandrel, an adjustable stop carried by the mandrel, a clamping and centering device for the mandrel, a crimping tool composed of a rotatable shaft having radially-extending arms, the edges of said arms screw-threaded, the outer ends of said arms curved to form concaved crimping surfaces, means for rotating the shaft, means for moving the shaft longitudinally while rotating, and a cylindrical tube inclosing member screwed upon the threaded edges of the arms and having a reduced portion to receive the tube and of a diameter less than that of the crimping arms.

4. A machine for closing the end of the paper tube, comprising a tube-receiving and supporting mandrel, laterally movable, an adjustable stop carried thereby, a centering device for the mandrel, a rotatable crimping tool composed of a shaft having radially extending arms, the edges of said arms screw-threaded, the outer ends of said arms curved

to form concaved crimping surfaces, means for longitudinally moving the shaft, means for rotating the shaft and a cylindrical tube-inclosing member screwed upon the threaded edges of the arms.

5 5. A machine for closing the end of a paper tube comprising a swinging tube receiving and supporting mandrel laterally movable, an adjustable stop carried by the mandrel, a centering device for the mandrel, a crimping tool composed of a rotatable shaft having radially-extending arms, the edges of said arms screw-threaded, the outer ends of said arms curved to form concaved crimping surfaces, means for rotating the shaft, means for moving the shaft longitudinally while rotating, and a cylindrical tube inclosing member screwed upon the threaded edges of the arms and having a reduced portion to receive the tube and of a diameter less than that of the crimping arms.

6. A machine for closing the end of a paper tube, comprising a swinging tube receiving and supporting mandrel laterally movable, an adjustable sleeve carried by the mandrel, a centering device for the mandrel, a crimping tool composed of a rotatable shaft having crimping arms, a sleeve adjustable on said arms and inclosing the same, said shaft being longitudinally movable, means for rotating the shaft, a collar carried by the shaft and having a peripheral groove therein, and an intermediately pivoted lever having a bifurcated end in said groove whereby the shaft is moved longitudinally while rotating.

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

FRANK DUTCHER.

Witnesses:

CORA LENHART,
JOS. A. CONNELLY.