C. F. JENKINS.

PAPER TUBE MACHINERY.

APPLICATION FILED SEPT. 15, 1910.

984,002. Patented Feb. 14, 1911.

Fig. 1

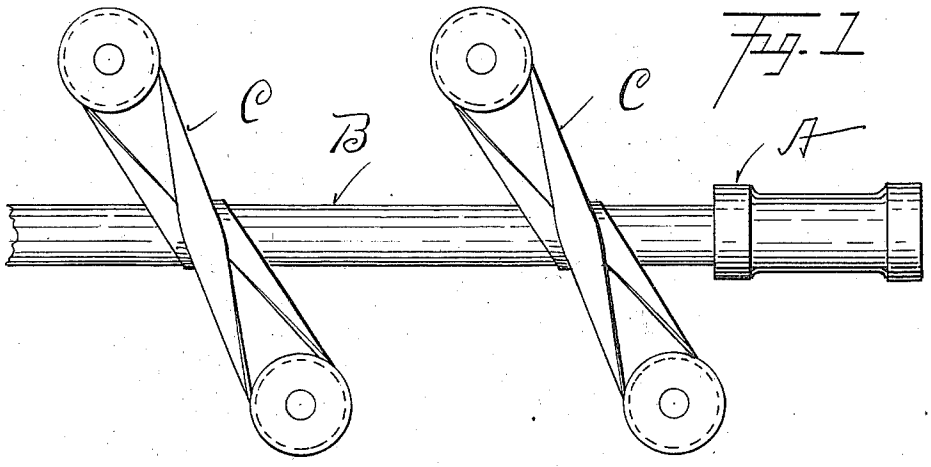


Fig. 2

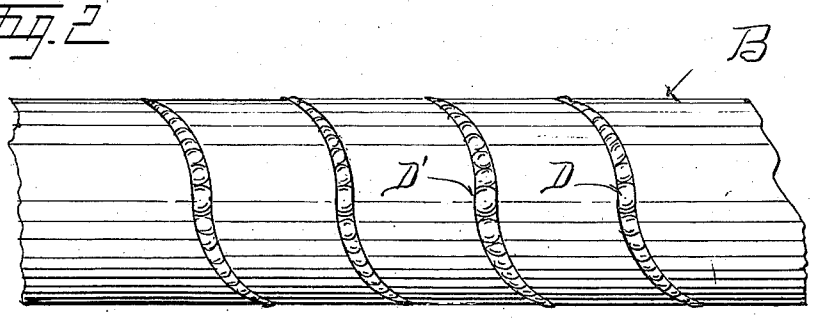
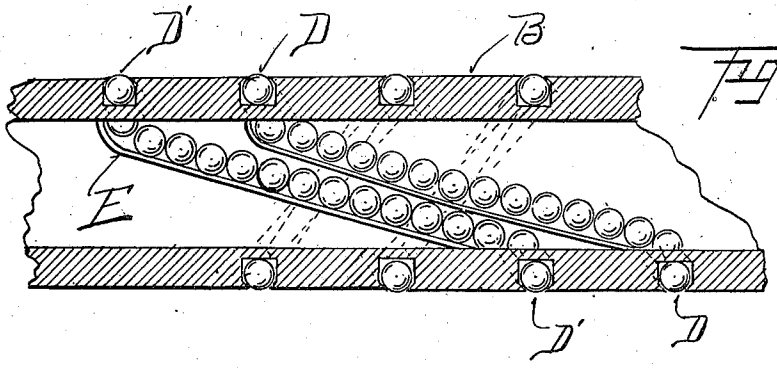


Fig 3



Witnesses

G. L. Jenkins

T. Martin

Inventor

C. Francis Jenkins

UNITED STATES PATENT OFFICE.

CHARLES FRANCIS JENKINS, OF WASHINGTON, DISTRICT OF COLUMBIA.

PAPER-TUBE MACHINERY.

984,002. Specification of Letters Patent. Patented Feb. 14, 1911.

Application filed September 15, 1910. Serial No. 582,276.

To all whom it may concern:

Be it known that I, CHARLES FRANCIS JENKINS, citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Paper-Tube Machinery, of which the following is a specification.

This invention relates to improvements in tubewinders, and has for its main object a more effective grip on the paper by the feeding belts.

Tubewinders are usually made with a stationary nonrotating mandrel and one or more driving belts lapped around this mandrel, the paper tube being formed between the two. The feeding traction on the paper, to advance it, is the difference in the amount of friction between the stationary surface of the mandrel, which resists, and which is kept as smooth as possible to make the resistance as little as may be, and the belt surface, which, to give it as great traction as possible, is preferably of a tacky character. This difference is small, so small, at times, for example, when an almost infinitesimal, actually invisible, amount of glue gets on the mandrel, that the paper stops. This difference, small as it is, must be not only enough to pull the paper along but overcome the drag of the paper through the gluing device. With thin paper this difference falls to almost nothing, under the best conditions, so that extreme care must be maintained to keep the machine operative.

The object of this invention is to increase this difference of resistance, *i. e.*, the resistance to movement by the paper in contact with the mandrel, and the tractive force of the belt on the larger diameter of the outside of the tube, by decreasing the amount of frictional resistance on the mandrel, and is accomplished by providing a grip on the inside of the paper tube. This is effected by arranging one or more rows of balls spirally around the mandrel so that the tops of the balls stand a little higher than the surface of the mandrel, with means for returning the balls from the end of the raceway back to the beginning of it, as shown in the drawings, in which—

Figure 1 is a top view of the common form of tubewinder; Fig. 2 a side view of a section of the mandrel under one or both of the winding belts, and concealed thereby; and Fig. 3 a vertical section of the same portion of the mandrel.

In the figures, A is a supporting frame for a mandrel B, around which belts C are wrapped.

D and D′ are balls in two channels or raceways arranged spirally around the mandrel, beginning at the underside of the mandrel as at D and D′ and ending on top of the mandrel as at D and D′ after making one and one-half turns around the mandrel. At this point the balls drop through the mandrel wall into the upper end of an inclined raceway E by means of which they are returned to the beginning of the spiral.

As the top of the balls are higher than the surface of the mandrel and lie under the belt it is obvious that the belt will bear hardest on the balls, and that paper running between the balls and the belt will be firmly gripped between them and driven forward, around the mandrel, with a traction amounting practically to a positive grip on the paper. In other words, the frictional resistance on the inside of the formed and forming tube is greatly reduced, and at the same time the tractive effect of the belts is multiplied, so that the paper is driven forward with a force sufficient to tear it in pieces if it is held at some point distant from the mandrel. The method of laying the paper on the mandrel, as well as the method of gluing up the several layers to form the paper tube, are so familiar to those skilled in the art that an illustration of just how paper is wound on these mandrels is believed unnecessary, and it is therefore omitted.

In the claims balls and rollers are considered mechanical equivalents, and the word balls only is therefore used.

What I claim, is—

1. In a tube-winder, a mandrel having a spiral raceway therein, and a plurality of rolling members in said raceway.

2. In a tube-winder, a mandrel having a spiral raceway therein, and a plurality of balls in said raceway.

3. In a tube-winder, a mandrel having a spiral raceway therein, and a plurality of balls in said raceway, the exposed portion of the balls extending slightly beyond the surface of the mandrel.

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

CHARLES FRANCIS JENKINS.

Witnesses:
G. L. JENKINS,
A. M. PARKINS.