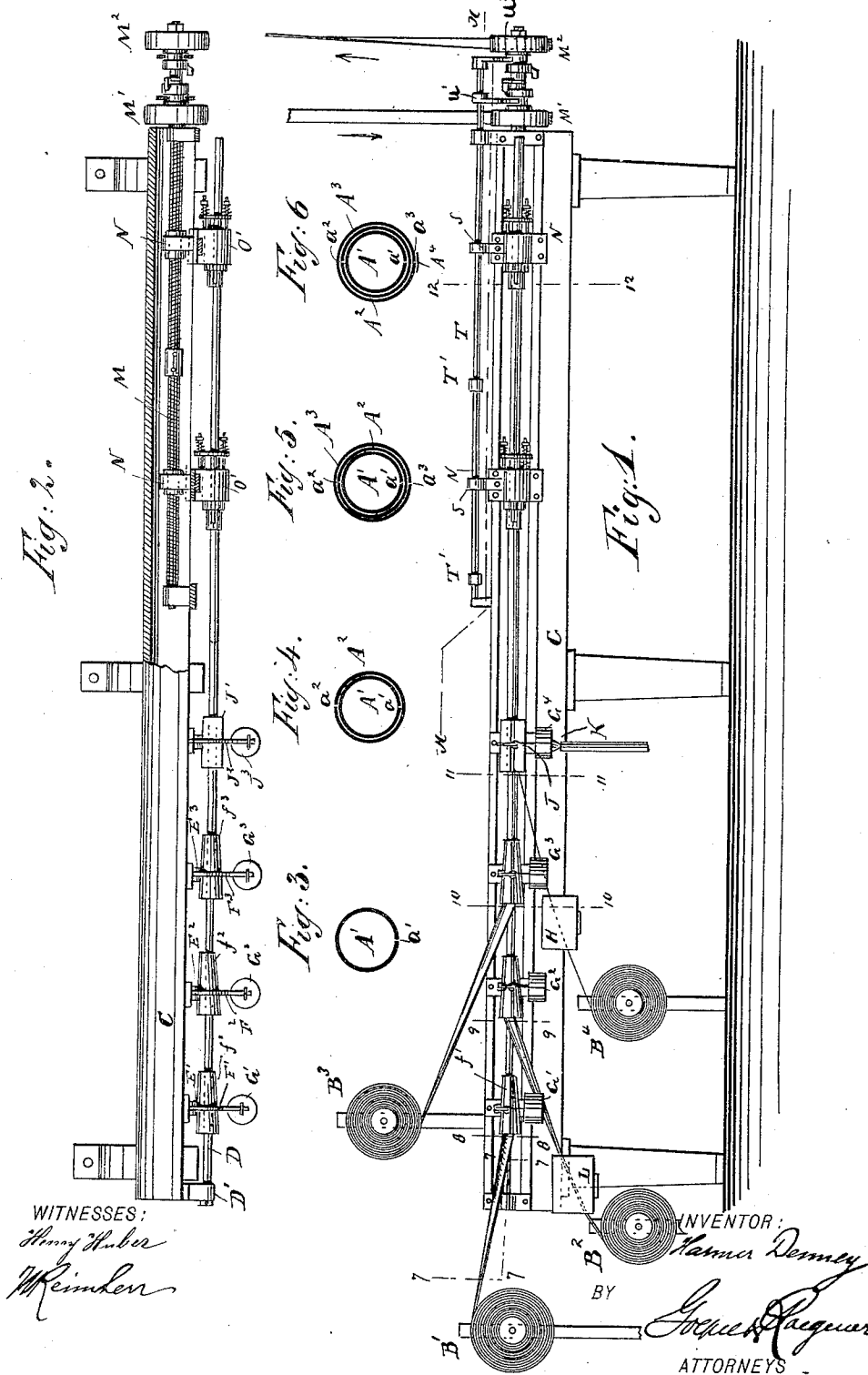


H. DENNEY.

MACHINE FOR MAKING PAPER TUBING.

No. 445,135.

Patented Jan. 20, 1891.



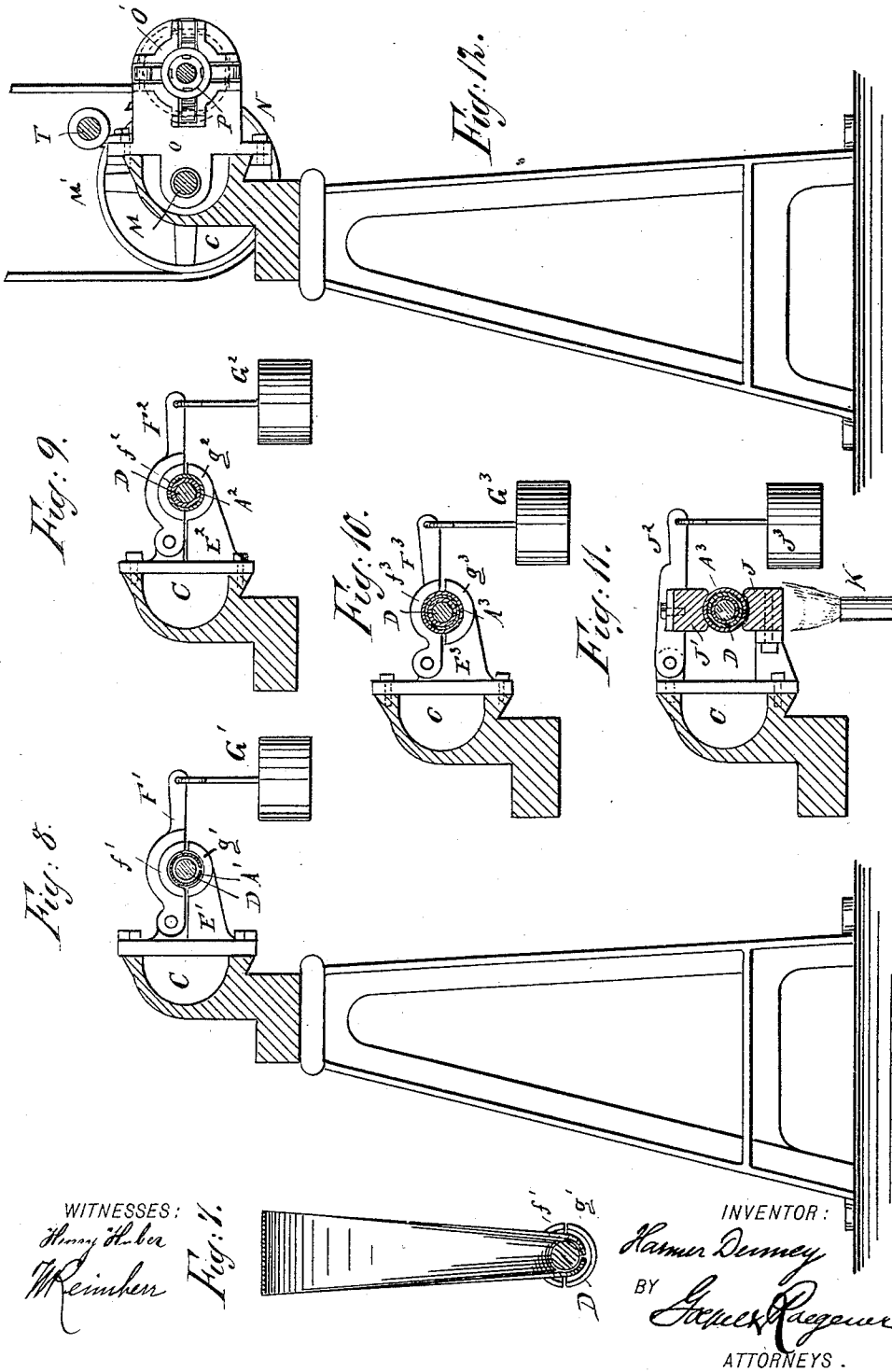
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4 Sheets—Sheet 2.

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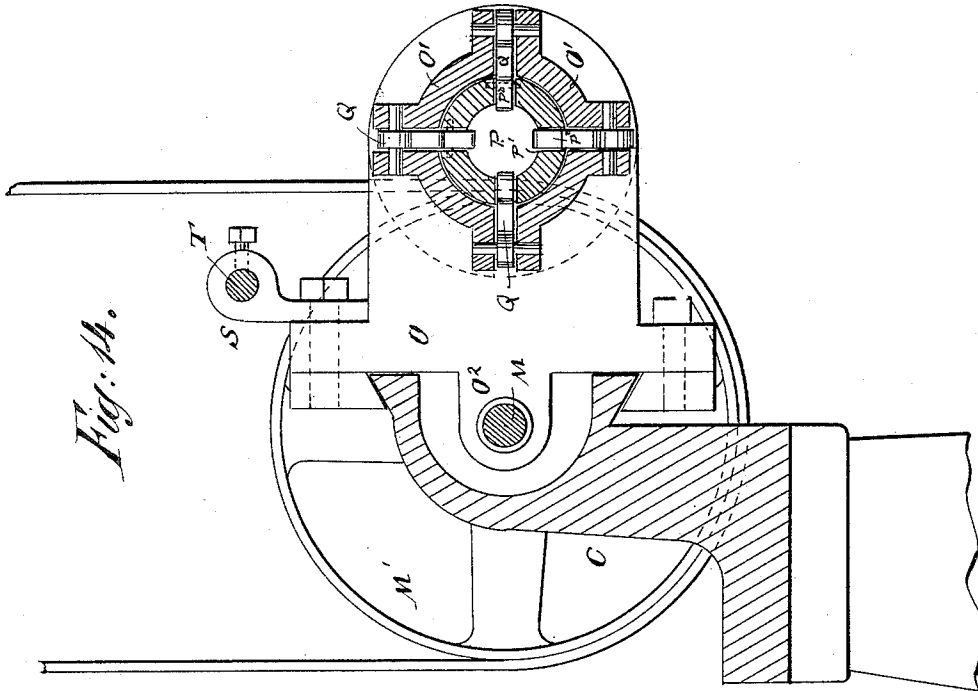
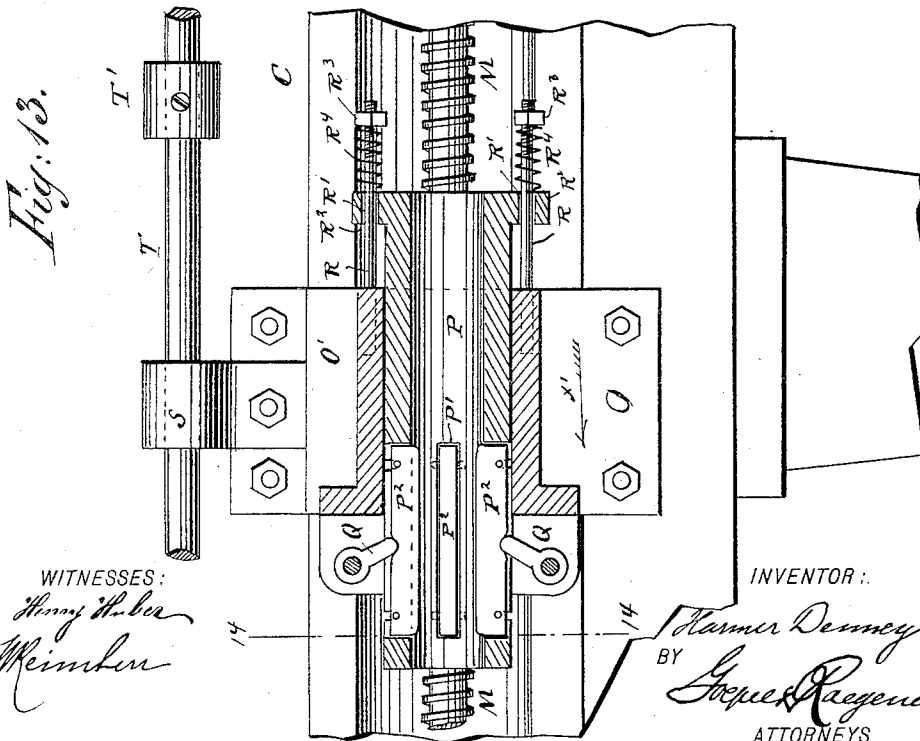
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WITNESSES:
Henry Huber
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INVENTOR :

Harmer Denney
BY *Gregory R. Regener*
ATTORNEYS

(No Model.)

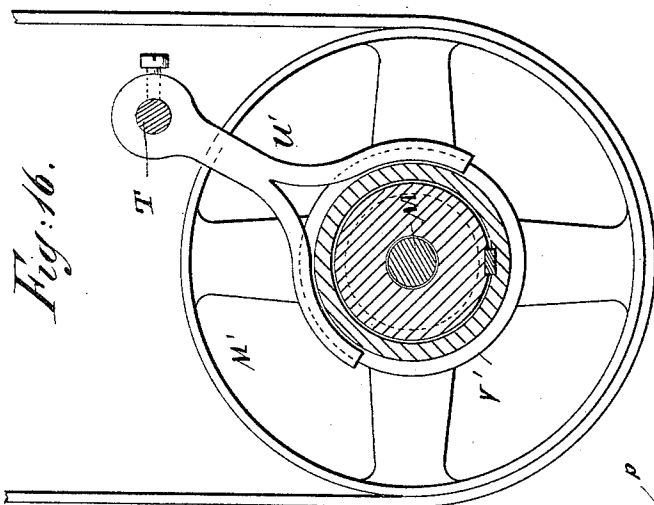
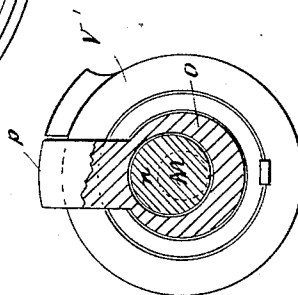
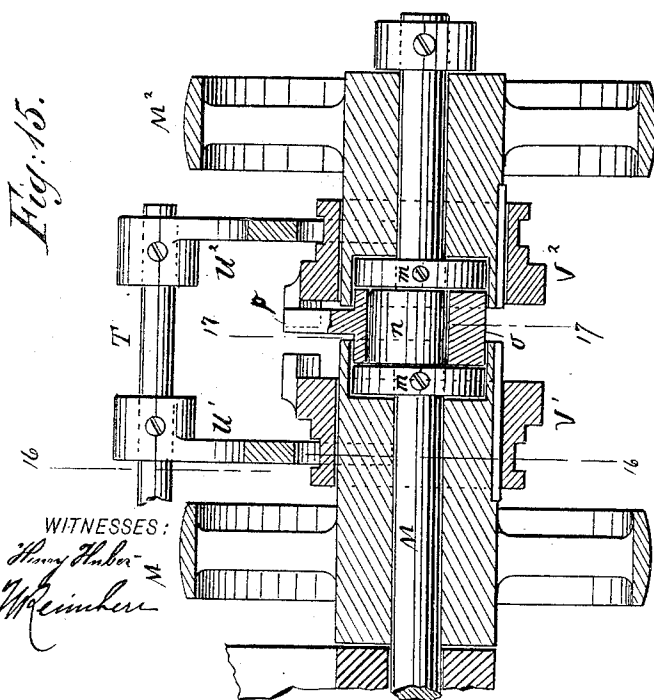
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UNITED STATES PATENT OFFICE.

HARMER DENNEY, OF BROOKLYN, NEW YORK.

MACHINE FOR MAKING PAPER TUBING.

SPECIFICATION forming part of Letters Patent No. 445,135, dated January 20, 1891.

Application filed April 24, 1890. Serial No. 349,331. (No model.)

To all whom it may concern:

Be it known that I, HARMER DENNEY, of Brooklyn, in the county of Kings, in the State of New York, a citizen of the United States, have invented certain new and useful Improvements in Machines for Making Paper Tubing, of which the following is a specification.

This invention relates to an improved machine for making paper tubing for use as an interior or exterior conduit for electric conductors.

The object of my invention is to provide a new and improved machine which will automatically produce such paper tubes in continuous lengths.

The invention consists in the construction and combination of parts and details, as will be fully described and set forth hereinafter, and then pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal elevation of my improved machine for making paper tubing. Fig. 2 is a plan view of the same, parts being broken out and others shown in horizontal section on the line *x x*, Fig. 1. Figs. 3, 4, 5, and 6 are cross-sectional views of my improved paper tubing, showing the cylindrical layers forming it. Fig. 7 is an enlarged detail vertical transverse sectional view on the lines 7 7 7 7, Fig. 1. Figs. 8, 9, 10, 11, and 12 are vertical transverse sectional views on the lines 8 8, 9 9, 10 10, 11 11, and 12 12, respectively, of Fig. 1. Fig. 13 is an enlarged detail vertical longitudinal sectional view of the tube-clutching device. Fig. 14 is a vertical transverse sectional view of the same on the line 14 14, Fig. 13. Fig. 15 is a vertical longitudinal sectional view of the reversing-gear, and Figs. 16 and 17 are vertical transverse sectional views of the same on the lines 16 16 17 17 of Fig. 16.

Similar letters of reference indicate corresponding parts.

The paper tube A which is to be made on my improved machine has been described and claimed in an application filed by me on the 17th day of April, 1890, Serial No. 348,310, and is not claimed in this application. It is composed of a series of cylindrical layers of paper $A^1 A^2 A^3$, &c., each having a longitudinal seam $a^1 a^2 a^3$, which seams are so arranged as to break joints—that is to say, one seam

does not coincide with the other. The outermost seam is covered by a strip of paper A^4 , pasted on the same for the purpose of preventing the shell from separating at said seam. The paper strips for making the cylindrical layers $A^1 A^2 A^3$ and the paper for making the strip a^4 are wound on the reels B^1, B^2, B^3 , and B^4 , suitably arranged in relation to the frame C of the machine. The strip of paper from the first reel B^1 is drawn slightly downward over a mandrel D, held at one end in a bracket D' , projecting from the end of the machine-frame C. A short distance from said bracket D a bracket E' projects from the machine, and is provided in its upper surface with a semi-cylindrical guide g' for guiding the bottom portion of the tubular cylindrical shell A' . A lever F' is pivoted to the bracket E' , and is provided in its under side with a semi-cylindrical guide f' , the sides of which are adapted to fit on the top of the cylindrical shell A' surrounding the mandrel D, which lever F' is pressed upon the top of the cylindrical shell by a weight G' , suspended from the free end of said lever. The paper strip from the second reel B^2 is drawn upon the first cylindrical shell A' from the bottom to the top, so that the longitudinal seam a^2 of said second cylindrical layer will be at the top, whereas the longitudinal seam a^1 of the first cylindrical shell A' was at the top.

The two cylindrical layers A' and A^2 together, and while still on the mandrel D, are drawn between the bracket E^2 and lever F^2 , both provided in the adjacent surfaces with suitable semi-cylindrical guides $g^2 f^2$, the lever F^2 being weighted by a weight G^2 and pressed upon the upper surface of the second cylindrical layer A^2 . The paper strip from the reel B^3 , which forms the third cylindrical layer A^3 , passes upon the surface of the layer A^2 from the top downward, so that the seam a^3 of said third cylindrical layer A^3 will be at the bottom. The three layers A', A^2 , and A^3 together, and while still on the mandrel D, pass between the bracket E^3 and the lever F^3 , both of which are provided with semi-cylindrical guides $g^3 f^3$ in the adjacent surfaces, which lever F^3 is weighted by a weight G^3 and pressed upon the layer A^3 . The strip of paper from the reel B^4 passes from the bottom upward, so as to rest against the bottom

seam a^3 of the third cylindrical layer A^3 and to close the same. The said strip also passes through a box II containing some suitable paste; or the paste can be applied on the said strip in any other suitable manner. The three cylindrical layers $A^1 A^2 A^3$, together with the strip A^4 , are drawn over a block J having a transversely-curved longitudinal groove in its top, and which block is heated from a burner K below it. A block J' rests on the top of the tube directly above the block J, said block J' being secured to a lever J², which is pressed downward by a weight J³, suspended from the free end of the same. The heated block dries the adhesive material applied to the strip from the reel B⁴, causing the said strip to adhere very rapidly and thus prevent the opening of the bottom seam a^3 . The paper strips from the first reel B¹ and from the third reel B³ are not provided with adhesive material; but the paper strip from the intermediate reel B², which strip forms the intermediate cylindrical layer, passes through a box L containing adhesive material, so that both faces of said strip unwound from the reel B² are provided with adhesive material, and thus the central tubular cylindrical layer A² is pasted to the inner and outer layers A¹ and A³, respectively.

The longitudinal screw-spindle M, mounted in the frame C of the machine is provided at its end with two loose pulleys M' and M², which are rotated in opposite directions by suitable belts, and both of which are provided with a clutch device adapted to engage a clutch device on the spindle, so that accordingly as one pulley or the other is engaged with the spindle said spindle is rotated in one direction or the other. Half of the spindle M is provided with a right-hand screw-thread and the other half with a left-hand screw-thread, so that the two clutching devices N, mounted on the spindle, alternately travel toward and from each other.

The clutching device N consists of a bracket-plate O, dovetailed on the frame C in such a manner as to slide in the direction of the length of said frame, as shown in Fig. 14. Said bracket-plate is provided with a sleeve O', parallel with the screw-spindle, said screw-spindle passing through a nut formed in a projection O² of the bracket-plate. In the sleeve O' a sleeve P is mounted to slide lengthwise therein, which sleeve P is provided on one end with a series of longitudinal slots P', each containing a jaw P², which is guided to move radially in relation to the longitudinal axis of the sleeve P. At one end of the sleeve O' a cam Q is pivoted for each jaw P², the free ends of said cams resting in notches in the outer edges of the jaws P². From that end of the sleeve O' opposite the one provided with the cams Q, two rods R project, which pass through apertures R' in the flange R² of the sleeve P. Nuts R³ are screwed on the outer ends of said rods, and between said nuts and the flange R² springs R⁴ are coiled

on said rods, which springs press the sleeve P in the direction of the arrow x' , Fig. 13. Each bracket-plate O is provided with an apertured lug S, through which a rod T passes freely, said rod being guided on the frame of the machine to slide in the direction of its length and being provided with adjustable stops T', against which the lugs S can strike. If, for example, a clutching device N begins to move in the inverse direction of the arrow x' the friction between the surface of the paper tube which passes through the sleeve P and the edges of the jaws P² is sufficient to retard those jaws for a short time, and as the sleeve O continues to move in the inverse direction of the arrow x' the cams O are turned on their pivots and the jaws are forced down and grip the tube more firmly until the hold of said jaws on the tube is sufficient to carry the tube along.

When the direction of rotation of the spindle is reversed, the clutching device above mentioned begins to move in the direction of the arrow x' , and the gripping-jaws P² are disengaged from the tube and slide over the same in the inverse direction of the arrow x' . The springs R⁴ constantly press the sleeve P and jaws P² in the direction of the arrow x' , whereby the jaws P² remain pressed inward and in gentle contact with the paper-tube. When the gripping or clutching device N moves in the direction of the arrow x' the jaws P² give outward slightly.

The rod T is provided with two forks U' and U², which engage the collars V' and V², keyed on the hubs of the pulleys M' M² in such a manner that they can turn with the same and slide upon the same lengthwise. On the spindle M two collars m are fastened, and between the same an eccentric n is fixed on the spindle, which eccentric n is surrounded by a larger eccentric o , having an upwardly-projecting arm p . The eccentricities of the eccentrics n and o are opposite, so that the exterior surface of the eccentric o is concentric with the axis of the spindle M. When one of the clutching devices N has completed its stroke in the direction to the right, Fig. 1, its lug S strikes against a stop-piece T' on the rod T and moves said rod T to the right, whereby the two forks U' and U² are also moved to the right, and the clutch-collar V² is moved out of the path of the arm p of the eccentric o , and the projection of the clutch-collar V' is moved into the path of said arm p . As said clutch-collar rotates its projection strikes the arm p of the eccentric o , thereby turning said eccentric in such a manner as to cause it to bind on the hub of the pulley M'. The screw-spindle M is thereby reversed, so that the said above-mentioned clutching device N moves toward the left, and when it completes its stroke in the direction toward the left the rod T is shifted toward the left, and the clutch-collar V' is moved out of the path of the arm p , and the clutch-collar V² is moved into the path of the arm p , where-

by the eccentric *o* is turned in such a manner that it is disengaged from the hub of the pulley *M'* and is engaged with the hub of the pulley *M*², so that said pulley *M*² will be
 5 locked on the spindle, and the spindle thus rotated in the inverse direction, and so on.

In this application I have shown but not claimed the combination of means for forming a core and means for covering the same,
 10 clutching devices adapted to grip or clutch the tube formed constantly traveling in opposite directions, a screw having a right and left hand thread for operating said clutching devices, and means for automatically reversing the direction of rotation of the screw.
 15 These parts in combination have been claimed in my application, Serial No. 341,934, filed February 27, 1890, for an improvement in making paper tubing.

20 Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a machine for making paper tubing, the combination, with a mandrel, of a series
 25 of pairs of opposite semi-cylindrical guides embracing the mandrel, the lower guide of each pair being fixed and the upper one movable, and weights for pressing the movable guides downward, substantially as set forth.

30 2. In a machine for making paper tubing, the combination, with a mandrel, of a fixed block below the mandrel, a hinged block above the mandrel, a weight for pressing the hinged block downward, and a burner below
 35 the fixed block, substantially as set forth.

3. In a machine for making paper tubing, the combination, with a mandrel, of a series of reels arranged alternately below and above the mandrel, independent devices for press-

ing the strip from each reel independently 40 upon the mandrel or upon the strips previously applied on the mandrel, and of two tube-gripping devices mounted to reciprocate in opposite directions, substantially as set forth.

4. In a machine for making paper tubing, the combination, with a mandrel, of a series of reels arranged alternately below and above the mandrel, independent devices for pressing the strip from each reel independently 50 upon the mandrel or upon the strips previously applied on the mandrel, and of two tube-gripping devices mounted to reciprocate in opposite directions, and a right and left hand screw-spindle for operating said clutching devices, substantially as set forth. 55

5. In a machine for making paper tubing, the combination, with a mandrel, of a series of reels arranged alternately above and below the mandrel, independent devices for pressing the strip of paper from each reel independently upon the mandrel or upon the strips previously applied upon the mandrel, tube-clutching devices for drawing lengthwise the tube formed from the strips upon 65 the mandrel, a spindle having right and left hand screw-threads engaging said clutching devices, a sliding rod operated by the clutching devices, and a reversing-gear operated by said rod, substantially as set forth. 70

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

HARMER DENNEY.

Witnesses:

OSCAR F. GUNZ,
 W. REIMHERR.