No. 766,962. PATENTED AUG. 9, 1904.

H. W. MORROW.

MACHINE FOR MAKING SPIRAL TUBES.

APPLICATION FILED DEC. 12, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

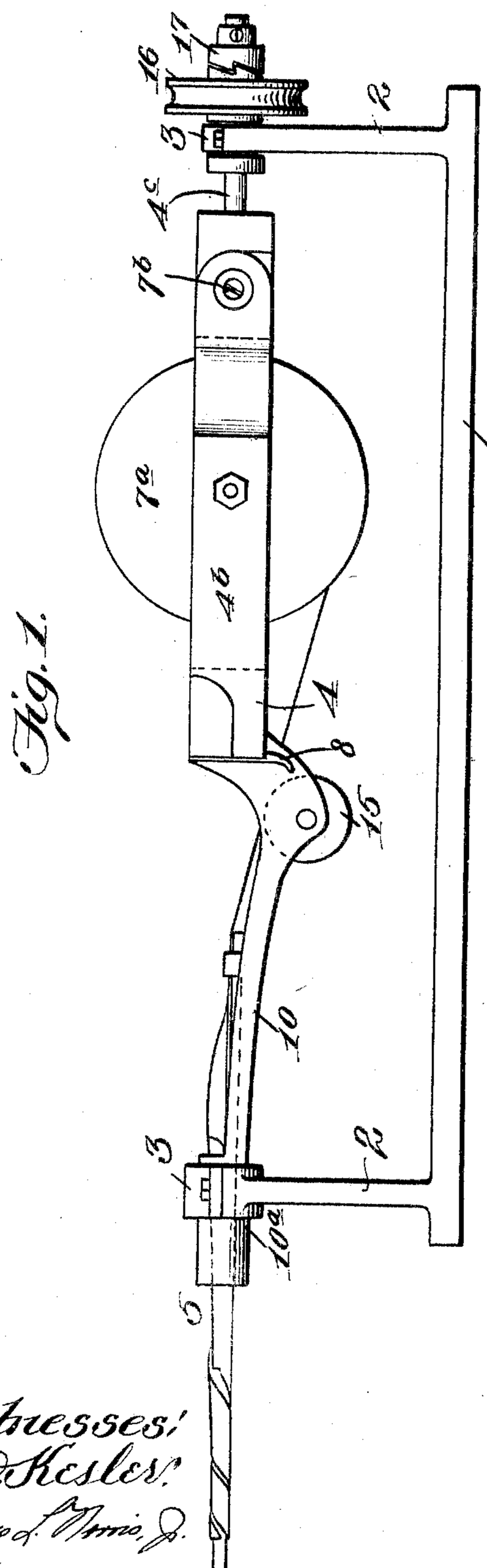

Fig. 1.

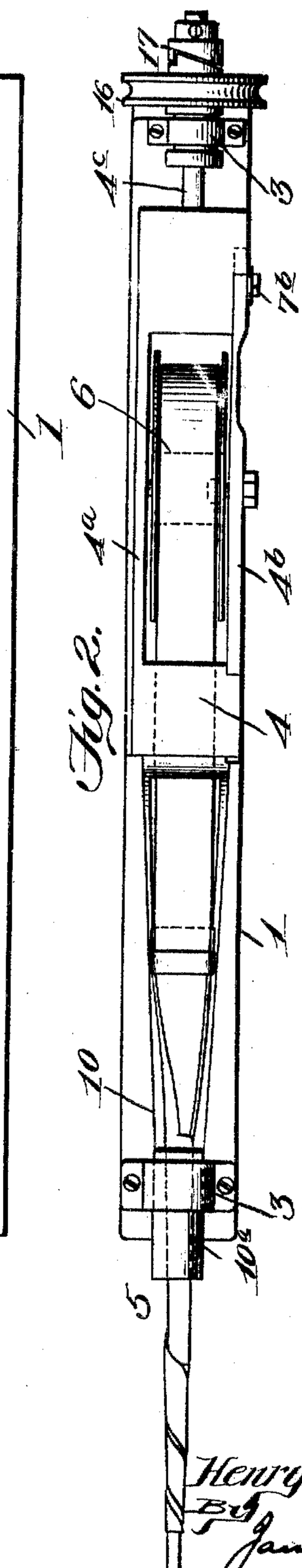

Fig. 2.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3.

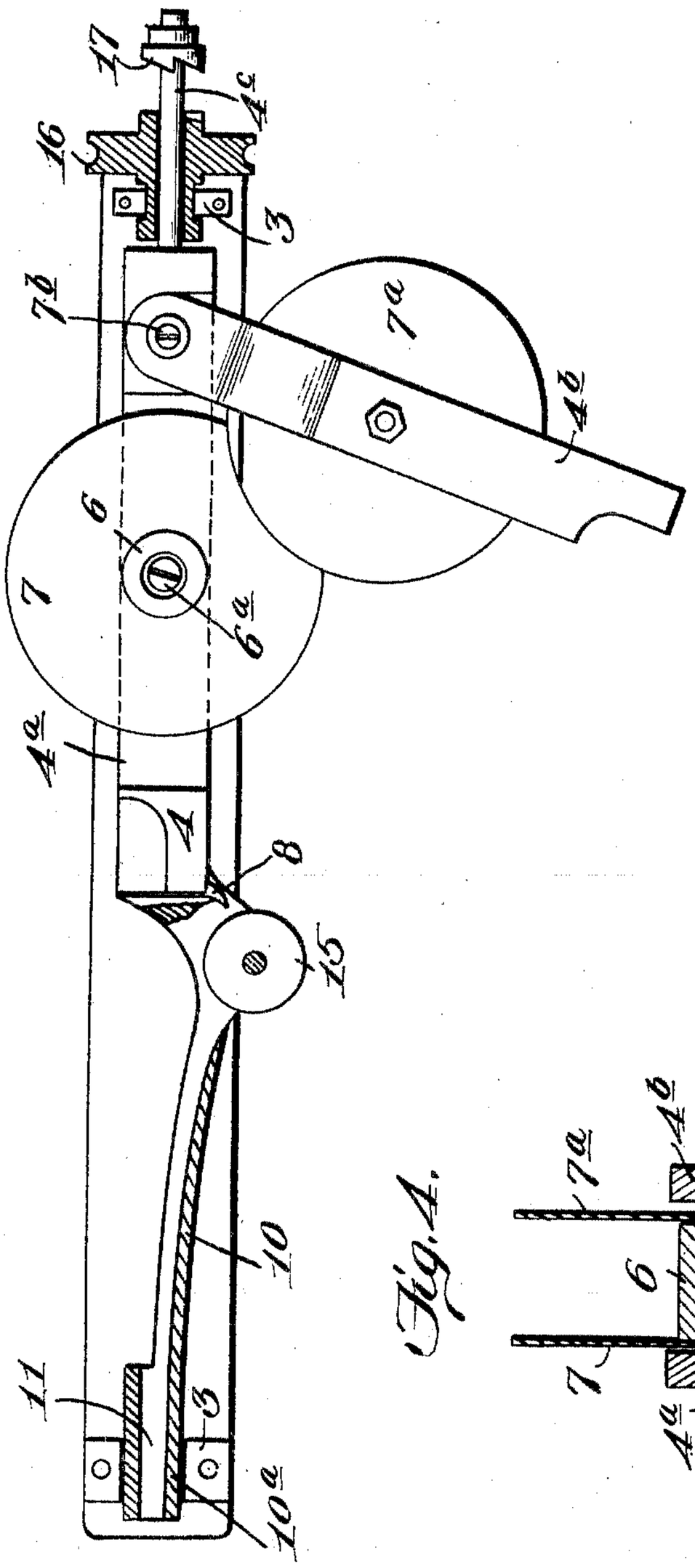
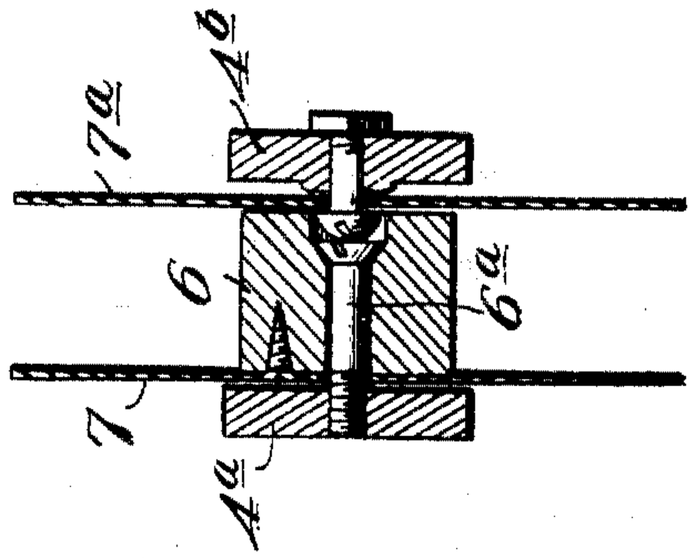


Fig. 4.



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 5.

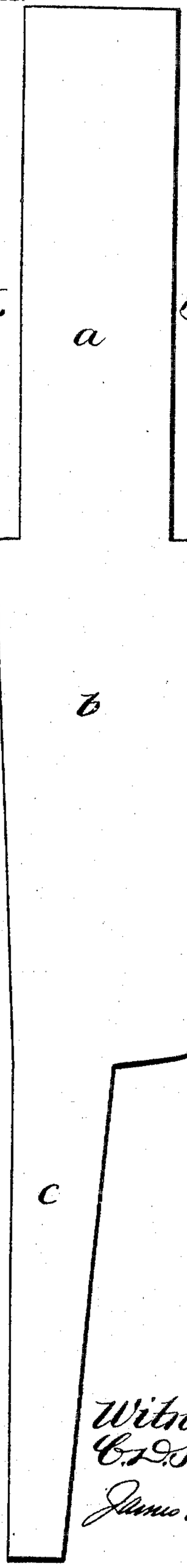


Fig. 6.

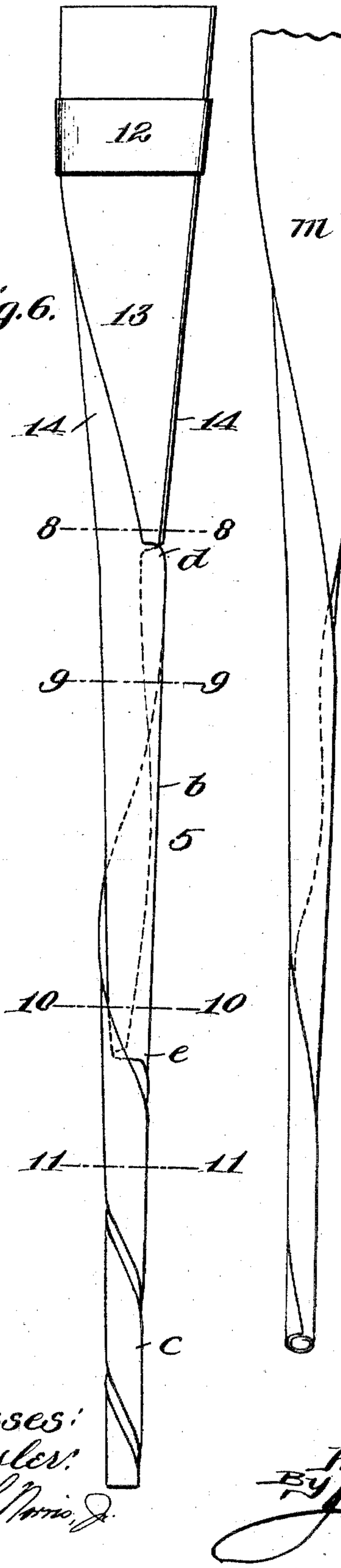


Fig. 7.

Fig. 8.

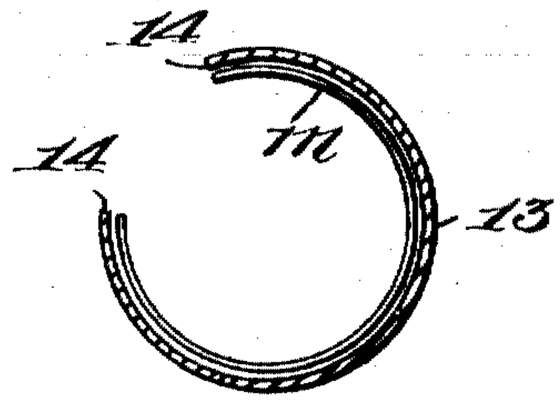


Fig. 9.

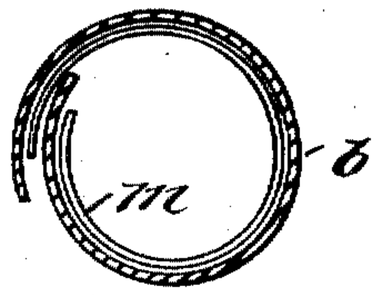


Fig. 10.

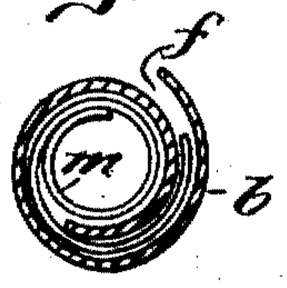
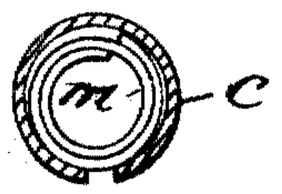


Fig. 11.



Witnesses:
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No. 766,962. Patented August 9, 1904.

UNITED STATES PATENT OFFICE.

HENRY W. MORROW, OF LISBON, OHIO, ASSIGNOR TO THE UNION MANUFACTURING COMPANY, OF LISBON, OHIO, A CORPORATION OF OHIO.

MACHINE FOR MAKING SPIRAL TUBES.

SPECIFICATION forming part of Letters Patent No. 766,962, dated August 9, 1904.

Application filed December 12, 1903. Serial No. 184,933. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. MORROW, a citizen of the United States, residing at Lisbon, in the county of Columbiana and State of Ohio, have invented new and useful Improvements in Machines for Making Spiral Tubes, of which the following is a specification.

My invention relates to improved mechanism for forming spiral tubes of paper, pasteboard, or the like for use in the construction of tubes; and the invention has for its object to provide a simple, economical, and efficient machine for this purpose.

To the end stated the invention consists in the novel combination and the novel arrangement and in the novel mode of operation of parts hereinafter described and claimed.

In the accompanying drawings, illustrating the preferred and best known embodiment of my invention, Figure 1 is a side elevation of the improved machine. Fig. 2 is a top plan view thereof. Fig. 3 is a view partly in side elevation and partly in section and showing the means for introducing a paper-reel into and removing it from the machine. Fig. 4 is a section through the paper-reel. Fig. 5 is a plan view of a blank suitable for constructing a shaper for imparting a spiral-tube form to the paper, pasteboard, or other material of which the tube is to be constructed. Fig. 6 is a plan view of said shaper. Fig. 7 is a view of a strip of material, illustrating the spiral tubular convolutions imparted thereto in the said shaper. Fig. 8 is a sectional view on the line 8 8 of Fig. 6. Fig. 9 is a sectional view taken on the line 9 9 of Fig. 6. Fig. 10 is a sectional view taken on the line 10 10 of Fig. 6. Fig. 11 is a sectional view taken on the line 11 11 of Fig. 6.

In the said drawings the numeral 1 designates a suitable supporting-frame having standards or pedestals 2, provided with bearings 3, in which the mechanism is mounted to rotate. This mechanism comprises a reel-carrier 4 and a shaper 5, mounted in the bearings 3. In said carrier is journaled a reel 6. This reel may be journaled in the carrier in any suitable way, but preferably in the manner shown in Fig. 4 of the drawings, wherein the reel is rotatably mounted on a spindle 6^a, secured to one member, 4^a, of the reel-carrier. Preferably and for an obvious purpose the reel-hub is provided with end disks, of which one, 7, is attached to the reel and the other, 7^a, to a movable member 4^b of the reel-carrier, which member, together with the disk carried thereby, is movable, as shown in Fig. 3, to facilitate the placing of a supply of material upon the reel. As shown at 7^b in the drawings, this member 4^b is pivoted at one end and at its other end is adapted to engage a suitable catch 8, by which it is held in normal operative position.

The shaper 5 is hollow—that is to say, it is provided with a shaper-bore, and this bore tapers from its beginning to its finishing end and is suitably arranged in operative relation to the reel-carrier, in the instance shown in the drawings being supported upon a bed 10, with which the carrier is provided, and the end or extremity 10^a of which bed rests in one of the bearings 3 of the standards 2 of the machine and has a bore 11, in which the shaper is received. The shaper 5 is provided near its end with a loop or clasp 12, beneath which the material is passed and which insures the entrance of said material into the shaper in a proper manner to receive the spiral tubular formation. The shaper may be suitably formed from a blank such as shown in Fig. 5 of the drawings by shaping said blank upon a tapered mandrel, (not shown,) the portion *a* of said blank being thus shaped to constitute a trough 13, through which the material passes and the walls 14 of which are so fashioned that the opposite edges of the material are brought toward each other, imparting an approximately cylindrical formation thereto, as shown in Fig. 8 of the drawings, in which and the other figures of the drawings the letter *m* designates the material. The opposite edges of the body part *b* of the blank are brought together and one wound within the other about a tapered madrel, whereby the tapered formation is imparted thereto and preferably and as will be gathered from Figs. 6, 8, 9, and 10

of the drawings is made to have at least one complete spiral turn. The overlapped edges *d* at the commencing end are slightly separated to permit the entrance of one edge of the material thereinbetween, whereby said material is properly started one edge with the other on its course through the shaper, and a channel *f* is provided between the windings or layers of the shaper, as shown in Figs. 6 to 10, in which the material moves and is guided in its passage through the shaper, facilitating the spiral wrapping thereof.

I do not confine my invention to the specific blank and the specific details of formation of this shaper, as the invention contemplates other constructions of tapering shapers, provided they have means, such as the overlapping edges *d* at the commencing end or the equivalent thereof, to cause one edge of the material to pass inside the other and provided that the shaper is tapered from its commencing end *d* to its finishing end *e*, whereby the material, one edge of which is lapped within the other, as shown in Fig. 9, is caused to spirally wrap or lap within itself, as shown in Fig. 7 and the sectional views, Figs. 9 and 10.

A guide-roller 15 is preferably provided between the paper-reel and the shaper to properly guide the material to the latter.

The carrier is rotated from any suitable source of power through the medium of a power-transmitting device 16, arranged loosely on the shaft 4^c thereof. The said carrier and its shaft are capable of longitudinal movement, and the shaft is provided with a clutch 17 to engage and disengage the power-transmitting means. When it is desired to stop the operation of the machine, the carrier can be moved in the proper direction, which will release the clutch from engagement with the power-transmitting means, as shown in Fig. 3.

When the material has been trained through the shaper by hand, which is the initial manner of starting a web through, and the means for pulling the material through the shaper are connected up in operation, the action of pulling or drawing on the material will operate to automatically move the carrier and throw its clutch into engagement with the power-transmitting means, as shown in Figs. 1 and 2.

The tail portion *c* when folded, as shown in Fig. 6, does not constitute an active part of the shaper and is not essential to the spiral-tube-forming operation, but is a valuable adjunct, tapering slightly, as it does, to receive the spirally-formed tube and in the passage of the latter therethrough smooth down and cause the spiral edge to have close contact with the underlying layer of the tube.

As before explained, the reel-carrier and the shaper are rotary. Rotation of the reel-carrier is essential to prevent the material from twisting in the space between said reel and the commencing end of the shaper. It will be apparent that as the material is constantly turning about a longitudinal axis in the process of being formed into a spiral tube this turning movement thereof would gradually extend itself back to the reel and the material would become twisted, in which condition it would be useless. This difficulty is taken care of by the rotation of the reel in the same direction and with the same speed as the rotation of the material, and in this way a continuous feed of material to the shaper is accomplished. The rotation of the shaper causes the movement of the material necessary to wind it into the spiral-tube form. The material after emerging from the shaper in spiral-tube form may pass to other mechanism suitable for the character of finishing which it is desired to give thereto. For instance, if the paper tube is intended to be used for drinking-straws the continuous tube after emerging from the shaper may go to any familiar mechanism for coating the same with paraffin or other suitable coating, and the material may be drawn through the shaper and through the apparatus for subsequent treatment in any suitable way. These parts are not concerned in my invention and are therefore not illustrated or described herein.

By my invention I provide a machine of great simplicity and economy and one which is efficient and satisfactory in operation.

Having thus described my invention, what I claim is—

1. In a machine for forming spiral tubes, the combination of a rotary reel-carrier, and a rotary shaper provided with a shaper-bore.

2. In a machine for forming spiral tubes, the combination of a rotary reel-carrier, and a rotary shaper provided with a tapering shaper-bore.

3. In a machine for forming spiral tubes, the combination of a rotary reel-carrier, and a rotary shaper provided with a tapering shaper-bore, and having means for leading a web of paper into the said bore and causing one edge thereof to pass inside the other edge.

4. In a machine for forming spiral tubes, the combination of a rotary reel-carrier, and a rotary shaper having a tapering shaper-bore provided at its commencing end with overlapping edges to cause one edge of a web of material to pass inside the other edge.

5. In a machine for forming spiral tubes, the combination of a rotary reel-carrier and a hollow tapering, spiral, rotary shaper.

6. In a machine for forming spiral tubes, the combination of a rotary reel-carrier and a hollow tapering, spiral, rotary shaper, provided at its commencing end with overlapping edges to cause one edge of a web of material to pass inside the other edge.

7. In a machine for forming spiral tubes, the combination of a rotary reel-carrier, and a hollow tapering, spiral, rotary shaper provided

with means for causing one edge of a web of material to pass inside the other edge.

8. In a machine for forming spiral tubes, the combination of a rotary reel-carrier, a rotary shaper provided with a shaper-bore, and means to guide the material into said bore.

9. In a machine for forming spiral tubes, the combination of a rotary reel-carrier, a rotary shaper provided with a shaper-bore, means for causing one edge of the web of material to pass inside the other edge, and means to guide the material into said bore.

10. In a machine for forming spiral tubes, the combination with a longitudinally-movable rotary reel-carrier and a hollow spiral tube-shaper, of a power-transmitting means mounted on the shaft of said carrier and a clutch carried by the carrier-shaft, adapted to be disengaged from said power-transmitting means and to be automatically engaged therewith by the act of drawing upon the material, substantially as described.

11. In a machine for forming spiral tubes, the combination of a rotary reel-carrier and a hollow tapering, spiral, rotary shaper provided with a smoothing device.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HENRY W. MORROW.

Witnesses:
ALPHEUS ARTER,
HARRY V. GEORGE.