C. A. CANDA.

MACHINE FOR MAKING TUBES AND TIRES.

APPLICATION FILED DEC. 16, 1914.

1,159,895.

Patented Nov. 9, 1915.

2 SHEETS—SHEET 1.

Fig: 1.

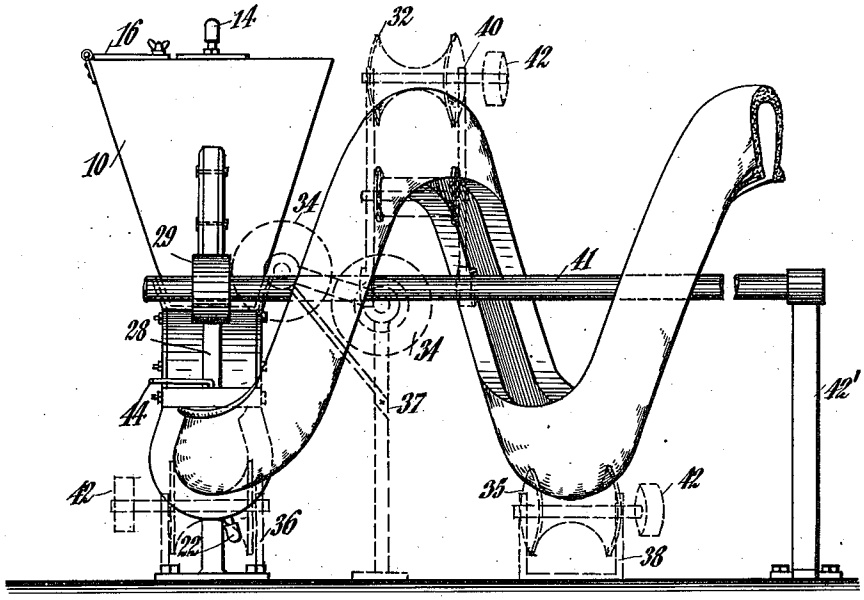


Fig: 2.

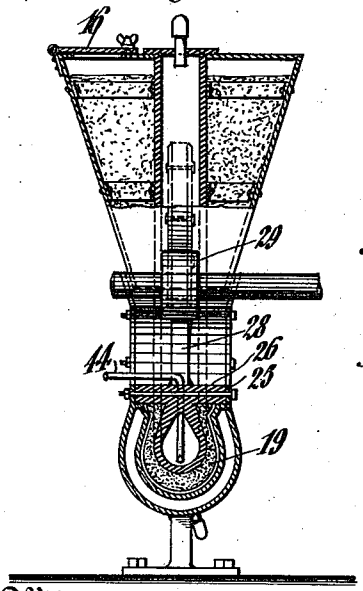
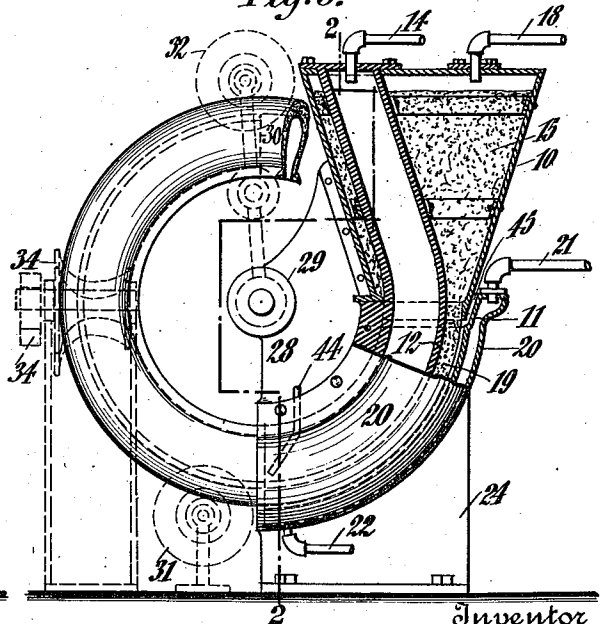


Fig: 3.



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2 SHEETS—SHEET 2.

Fig: 4.

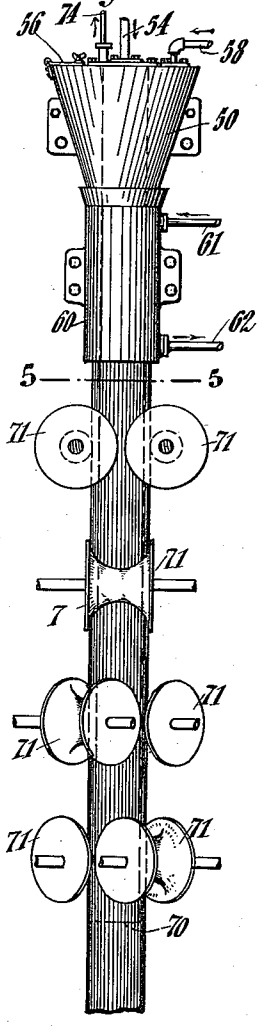


Fig: 6.

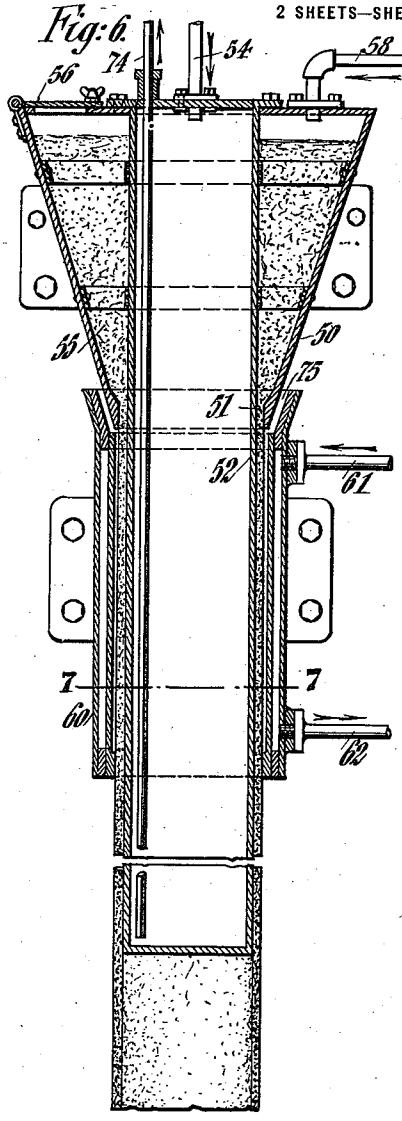


Fig: 5.

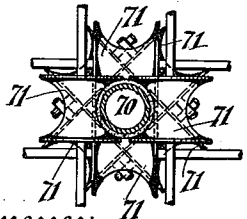
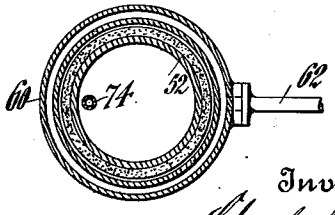


Fig: 7.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR MAKING TUBES AND TIRES.

1,159,895. Specification of Letters Patent. Patented Nov. 9, 1915.

Application filed December 16, 1914. Serial No. 877,496.

To all whom it may concern:

Be it known that I, CHARLES A. CANDA, citizen of the United States of America, residing at Elizabeth, Union county, New Jersey, have invented a new and useful Improvement in Machines for Making Tubes and Tires; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to a machine and process of cheaply and efficiently manufacturing, from paper, tire shoes, inner tubes, envelops, mailing tubes, cans, cups, other receptacles, and practically any article of paper pulp or other plastic material, having tubular or other cross-section after or during the process of making. To this end I have provided a machine wherein the plastic material is forced through a die and a mandrel where it is pressed into shape and partially or fully dried as it moves along the mandrel, the desired lengths being cut off and, in the case of tire shoes and inner tubes, cemented together at their ends and then vulcanized.

In the accompanying drawings, showing two of many possible embodiments of the invention, Figure 1 is a side elevation of the machine for forming tire shoes; Fig. 2 is a section of the line 2 . . . 2 of Fig. 3; Fig. 3 is an end elevation, partly in central vertical section; Fig. 4 is a side elevation of a machine for forming mailing tubes or other tubular structures; Fig. 5 is a section, taken on the line 5 . . . 5 of Fig. 4; Fig. 6 is an axial section of the machine of Fig. 4, and Fig. 7 is a section taken on line 7 . . . 7 of Fig. 6.

Referring first to Figs. 1 to 3, the machine is shown comprising a pulp box 10 having an outlet 11 with which the hollow mandrel 12 coöperates to form a die having a cross-section approximating that of the tire shoe. The mandrel 12 is partly arcuate and partly spiral in its general shape, and is continued up through the pulp box and receives steam through the pipe 14, for heating the mandrel.

The paper pulp 15, placed in the pulp box 10 through the door 16, Fig. 2, is forced downwardly by air or steam under pressure admitted through the pipe 18, and passes out through the outlet 11 and moves along the mandrel 12, this portion 19 of the pulp having there the general shape of a segment of the finished tire shoe. A hollow steam-box 20 surrounds this portion 19 almost in contact with the same, and has live steam introduced thereto through the pipe 21. Any water that may condense in the steam-box is carried out through the drain pipe 22. The steam-box 20 is carried on a bracket 24, which may be integral therewith. The inner edges of the steam-box are provided with flanges 25, to which are bolted the inverted base 26 carrying the mandrel 12. On this base is carried a web 28 carrying a boss 29. To this web 28 is also bolted the hopper 10.

The mandrel 12, projects beyond the steam box 20 in an approximate helix to the point 30 (Fig. 3). In order to press the pulp 19 into shape and to assist in moving it along the mandrel, a plurality of pressing rollers are provided, the lower pressing roller 31 and the upper roller 32 press upon the tread portion of the tire in formation, while the side rollers 34 press the side of the tire into shape. After the pulp passes from the mandrel it is further supported by a supporting roller 35. The rollers 31, 34 and 35 are journaled in suitable brackets 36, 37 and 38 supported on the floor, while the upper roller 32 is journaled in a bracket 40 carried on a fixed shaft 41 in turn carried by a bracket 42′ and the boss 29. All of the rollers are provided with pulleys 42 for the reception of belts from a source of power, for driving the rollers.

A blow-off pipe 44 is provided for blowing the water of condensation from the mandrel.

The pulp is prepared by pulping any kind of mixture of paper or like material into a homogeneous mass of doughy consistency. Some earthy materials may be mixed with the pulp, as well as chemicals, resinous substances and glue, to harden and render waterproof the resulting product.

The machine of Figs. 1 to 3 operates as follows: The doughy pulp 15 is put into the hopper 10, and pressed by means of compressed air, steam, or plunger or feed screw or the like, and forced out through the outlet 11 giving to the pulp a cross-section approximating that of the finished tire. Impelled by the ejecting force and the rollers 31, 32 and 33 the pulp passes along the mandrel and within the steam-box, the heat from these and the pressure of the rollers driving out the moisture from the pulp, the steam driven out by the steam-box passing out through the opening at 45. The pulp passes off from the mandrel, in ap-

proximate helical form, on to the supporting roller 35 after which it is cut into the correct lengths for tire shoes, the ends cemented or otherwise fastened together and the tire shoe put in molds and finished by vulcanizing under heat and pressure.

The general arrangement of the machine of Figs. 4 to 7 is similar to that of Figs. 1 to 3, except that it is for straight tubular work rather than for tire shoes.

In Figs. 4 to 7 the machine is shown comprising a pulp box 50 having at its lower part an outlet 51 with which the straight hollow mandrel 52 coöperates to form an annular die having approximately the same cross-section as a completed tube. Live steam is fed into the mandrel through the pipe 54. The paper pulp 55 placed in the pulp box through the door 56 is forced downwardly by air or steam under pressure admitted through the pipe 58 and passes through the opening 51 and moves down along the mandrel 52 between the mandrel and the steam box 60. The pipe 61 introduces steam to the steam box and the pipe 62 leads off the water of condensation. The mandrel 52 extends to a point 70 (Fig. 4) a considerable distance below the outlet 51, and between this outlet and said point there are placed, in pairs, a plurality of suitably journaled and driven rollers 31 for pressing the pulp into tubular shape and squeezing the water therefrom. As the pulp passes down on the mandrel the heat from the mandrel and the steam box also aids in expelling the moisture, the steam from the pulp passing out through the opening. Water of condensation may be forced out of the mandrel through the pipe 74. After the pulp is passed from the mandrel it may be cut into lengths for mailing tubes, or made into cylindrical containers, paper bags, envelops or other articles. With the mandrel 52 curved, inner tubes for tires can be made.

Of course, various other changes may be made in the machines, process and articles without departing from the scope of the invention as claimed.

I claim as my invention:—

1. In combination, a pulp box having an opening therein; a mandrel in said opening and forming therewith a die and extending a distance from said opening; and a steam box surrounding said mandrel and spaced therefrom and separated from said die and having an internal diameter greater than the external diameter of said die.

2. In combination, a pulp box having an opening therein; a mandrel in said opening and forming therewith a die and extending a distance from said opening; and a steam box surrounding said mandrel, at the part that extends from said opening, and having an internal diameter greater than the external diameter of said die.

3. In combination, a pulp box having an opening therein; a mandrel in said opening and forming therewith a die and extending a distance from said opening; a steam box surrounding said mandrel and rollers associated with the mandrel between the outer end of the mandrel and the steam box and adapted to squeeze and move the pulp upon the mandrel.

4. In combination, a pulp box having an opening therein; a mandrel in said opening and forming therewith a die and extending a distance from said opening; and rollers associated with the mandrel between the outer end of the mandrel and the die and adapted to squeeze and move the pulp upon the mandrel.

5. In combination, a pulp box having an opening therein; a steam heated mandrel in said opening and forming therewith a die and extending a distance from said opening; and rollers associated with the mandrel between the outer end of the mandrel and the die and adapted to squeeze and move the pulp upon the mandrel.

6. In combination, an air-tight pulp box having an opening in the lower part thereof; a straight tubular mandrel passing through said opening and forming therewith a die opening of curved cross-section; a steam-box spaced a short distance from said pulp box and mandrel and conforming somewhat to the shape of and surrounding the latter; inlet and outlet pipes for said mandrel and steam-box; and rollers associated with said mandrel between the outer end of the mandrel and the steam-box and adapted to squeeze and move pulp upon the mandrel.

7. In combination, an air-tight pulp box having an opening in the lower part thereof; a substantially helical tubular mandrel passing through said opening and forming therewith a die opening of curved cross-section; a steam-box spaced a short distance from said pulp box and mandrel and conforming somewhat to the shape of and surrounding the latter; inlet and outlet pipes for said mandrel and steam-box; and rollers associated with said mandrel between the outer end of the mandrel and the steam-box and adapted to squeeze and move pulp upon the mandrel.

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

CHARLES A. CANDA.

Witnesses:

JOHN H. HOVING,

H. M. KILPATRICK.