

(No Model.)

2 Sheets—Sheet 1.

C. E. GARDINER.

APPARATUS FOR THE MANUFACTURE OF TUBULAR ARTICLES OF
CONFECTIONERY.

No. 478,279.

Patented July 5, 1892.

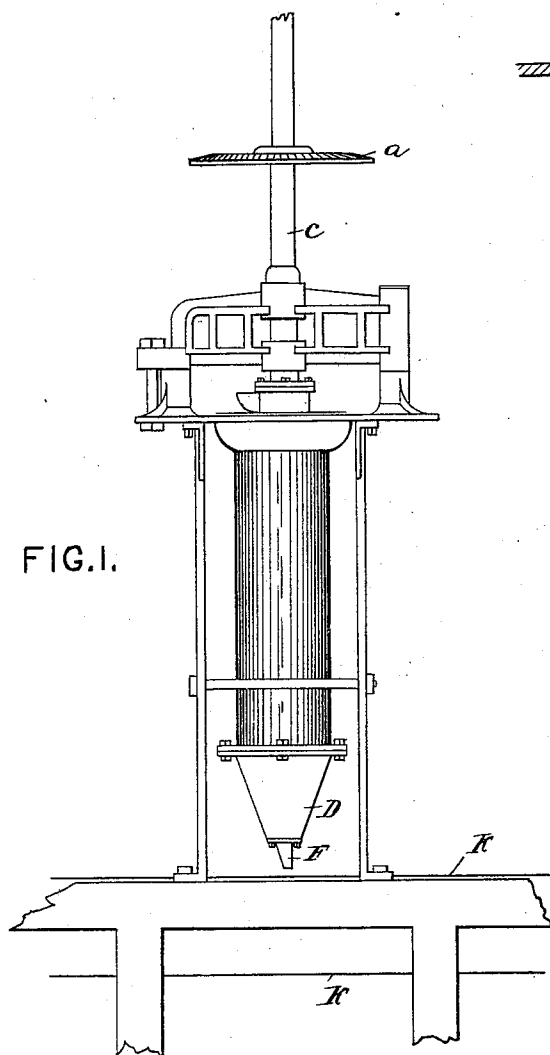


FIG. I.

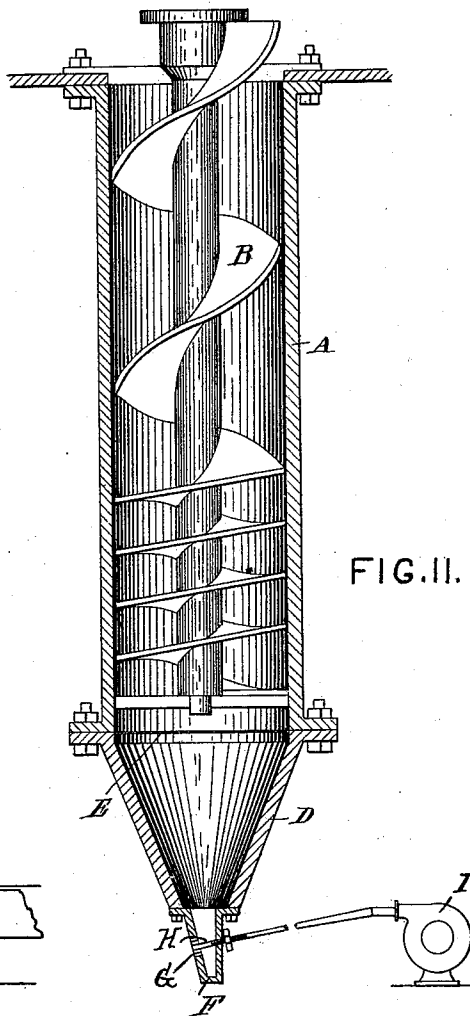


FIG. II.

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FIG. III.

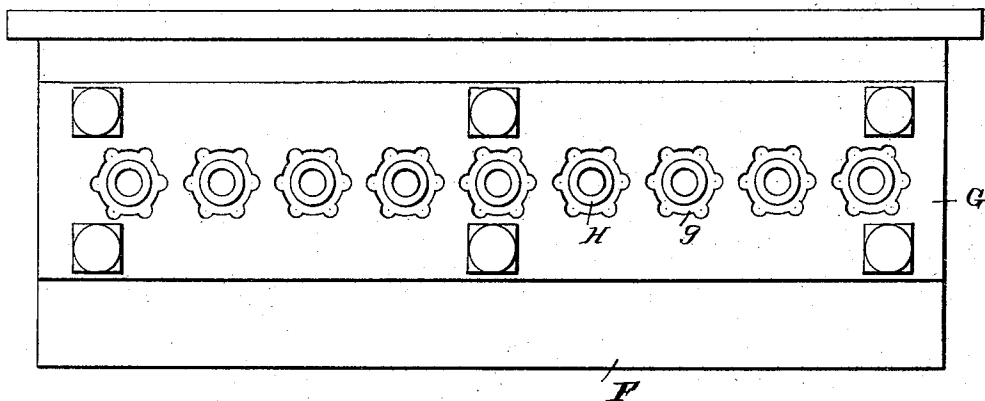
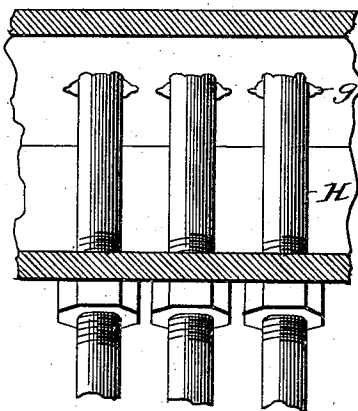


FIG. IV.



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UNITED STATES PATENT OFFICE.

CLEMENT E. GARDINER, OF HEMPSTEAD, NEW YORK.

APPARATUS FOR THE MANUFACTURE OF TUBULAR ARTICLES OF CONFECTIONERY.

SPECIFICATION forming part of Letters Patent No. 478,279, dated July 5, 1892.

Application filed January 20, 1892. Serial No. 418,672. (No model.)

To all whom it may concern:

Be it known that I, CLEMENT E. GARDINER, of Hempstead, in the county of Queens and State of New York, have invented a new and useful Improvement in Apparatus for the Manufacture of Tubular Articles of Confectionery and for Similar Purposes, which improvement is fully set forth in the following specification.

This invention has reference to the production of tubular articles—such as candies and other confectionery—by forcing the plastic mass from a reservoir or receptacle through a suitable die-orifice, as in the well-known maccaroni-machine. It is applicable generally to the production of tubular articles from plastic material, such as clay, soap, and the like.

In machines of this type the compression of the material is generally effected by a reciprocating plunger; but a screw has been used in place of a plunger, so that the operation may be continuous.

In carrying out my invention I prefer to employ a screw with threads of varying pitch, the threads at the lower part being closer together than those at the top of the screw.

Beneath the screw is a tapering mouthpiece, and between this and the body of the receptacle I interpose a perforated or reticulated diaphragm, (such as wire-cloth,) whereby the material is strained and rendered of uniform consistency, and is also distributed with uniformity through the area of the mouthpiece.

In operating with some materials—such as above specified—the atmospheric pressure around the tube as it issues from the die-orifice tends to compress or distort the tube, and this tendency to collapsing is proportional to the softness and pliability of the material being worked. To overcome this difficulty, the center of each die-orifice is occupied by a hollow tube, the other end of which is in open communication with the atmosphere, so that at the moment of issuing from the die the atmospheric pressure is equalized on both sides of the tube. In carrying out this part of the invention the die-plate is preferably located on the side of the mouthpiece instead of at the lower end thereof, and the air-tube is carried across and through the walls of the

mouthpiece, one end lying in the center of the die-orifice and the other projecting a suitable distance through the opposite side of the mouthpiece. There will of course be one air-tube for each die-orifice, and these individual tubes may each be open to the atmosphere or may be connected with a common air-pipe, as may be most convenient.

For certain purposes it is desirable to connect with the air-tube means—such as a pump—for applying air under pressure through the air-tube. By this means the tube as it is formed may be expanded more or less, and by applying the pressure regularly or intermittently a variety of novel shapes can be produced. For instance, by varying the pressure—that is, increasing and then diminishing it gradually—I have produced hollow articles having an oval shape.

The invention will be better understood from the following detailed description, reference being made to the accompanying drawings, in which I have illustrated one form of apparatus embodying the invention.

Figure I is an elevation of the machine. Fig. II is a vertical section of the cylinder. Fig. III is a side elevation of the die-plate, and Fig. IV is a horizontal section through the mouthpiece.

A is an upright cylinder, in which is a close-fitting screw B, which receives a rotary motion from shaft C through the bevel-gear *a*. The pitch of the screw-thread is, as shown, much greater at the upper than at the lower end. To the lower end of the cylinder A is bolted the tapering extension D, and between the parts A and D is placed the reticulated diaphragm E, the latter being directly beneath the lower end of the screw B. The mouthpiece F is bolted to the lower end of extension D, forming a continuation thereof. As shown, one side of this mouthpiece is vertical, while the opposite side is inclined. The die-plate G, Fig. III, is attached to the inclined side of the mouthpiece. It is provided with any suitable number of die-orifices *g* of the size and configuration which it is desired to impart to the tubular article. The air-tubes H, one for each orifice, pass in a direction substantially horizontal through the mouthpiece F, one end terminating in the center of the corresponding die-orifice, while the other is

open to the atmosphere or is connected with an air-forcing apparatus, such as a pump I. (Shown in Fig. II.) Beneath the mouthpiece F is an endless traveling apron K, which is
5 moved at a proper speed to carry away the tubular articles or forms as they issue from the die-orifices.

The operation of the machine will be readily understood. A proper supply of the material to be shaped into tubes is fed into the
10 mouth of the cylinder A and is carried down by the screw, rapidly at first and then more slowly, but with greater force as the threads of slight pitch act upon it. The last convolution of the screw forces the material through
15 the strainer E. The extension D and mouthpiece F become filled, and as the screw continues to operate the plastic material is forced through the die-orifices. It is obvious that
20 with many materials the end of the tube as it is made, unless kept open, would collapse; but this is prevented by the internal pressure of air supplied by the air-tube H. The molded articles, now in the form of hollow rods or
25 sticks, are delivered upon trays or boards carried by the apron K, and, being removed therefrom, are cut into suitable lengths, dried, and finished in a manner appropriate to the particular material under treatment.

30 While in order to obtain the best results it is preferred to use the invention as a whole, it is obvious that parts thereof may be used separately and that modifications may be made in details of construction and arrangement.
35

Having now fully described my said invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for forming hollow articles

from plastic materials, the combination of the
40 cylinder or receptacle for the plastic mass, provided with a die-orifice and with means for forcing the material through said orifice, and an air-tube, one end of which occupies
45 the center of the die-orifice and the other extends beyond the wall of the cylinder, substantially as described.

2. The combination of the cylinder having a contracted mouthpiece forming its lower end, a die-plate with an orifice or orifices on
50 one side of said mouthpiece, and air-tubes, one extending from the center of each orifice through the opposite side of the mouthpiece, substantially as and for the purpose set forth.

3. The combination of the cylinder provided with a die-orifice, an air-tube having its end in the center of said die-orifice, and means, such as an air-pump, for supplying air under pressure through said tube, substantially as
55 described.

4. A machine for forming hollow articles from plastic materials, said machine comprising, in combination, the cylinder or receptacle, the feed-screw, the tapering extension beneath the feed-screw, the diaphragm between
65 the cylinder and extension, the mouthpiece having a die-plate, and the air-tubes extending through the mouthpiece and terminating one in each die-orifice, substantially as described.
70

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

CLEMENT E. GARDINER.

Witnesses:

E. S. COLLINS,
A. K. GARDINER.