A. French & C. Frost. Sheet 1. 2 Sheets.

Paper Molding Mach.

No. 15,228. Patented Jul. 1, 1856.

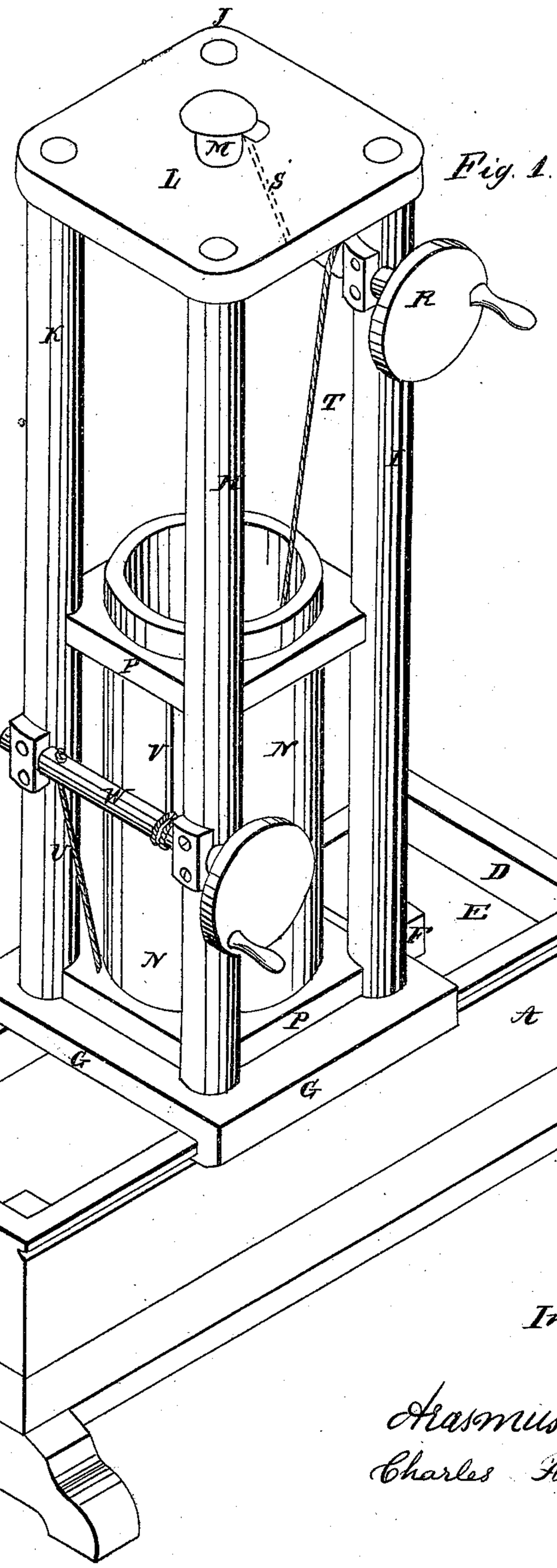

Fig. 1.

Inventors

Erasmus French

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Fig. 2.

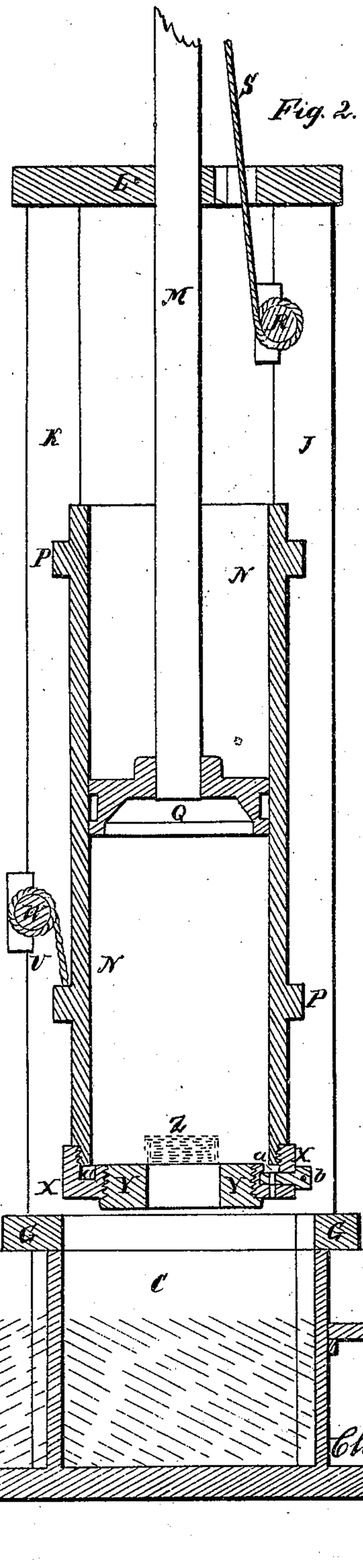


Fig. 3.

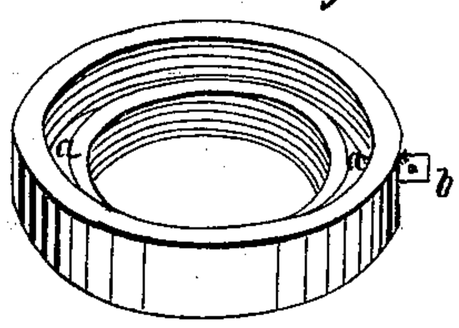


Fig. 4.

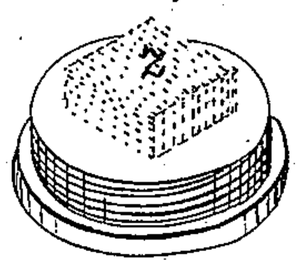


Fig. 5

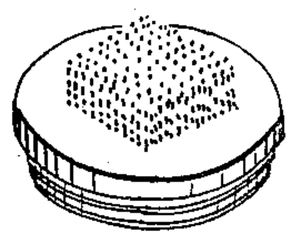
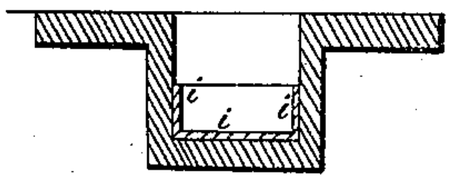


Fig. 6.



Inventors
Aramus French
Charles Frost

UNITED STATES PATENT OFFICE.

A. FRENCH AND C. FROST, OF WATERBURY, CONNECTICUT.

METHOD OF MAKING BOXES OF PAPER-PULP.

Specification of Letters Patent No. 15,228, dated July 1, 1856.

To all whom it may concern:

Be it known that we, ARASMUS FRENCH and CHARLES FROST, of the city of Waterbury, in the county of New Haven and State of Connecticut, have together invented a new and useful machine for manufacturing paper boxes and other articles by the aid of atmospheric and hydrostatic pressure and from the materials in a state of pulp, the boxes so made having no seams, as they have when manufactured from paper in the sheet; and we do hereby declare that the following is a full and exact description of the construction and operation of said machine, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, making a part of this specification, in which—

Figure 1 represents a perspective view of the machine and Fig. 2 a longitudinal vertical section of the same. Fig. 3 represents a grooved rim that is screwed on the lower end of the cylinder; it is invisible in Fig. 1 but represented in section by X X, Fig. 2. Fig. 4 represents a perforated mold, attached to a circular plate that is screwed into the rim, the mold projecting upward from the plate. A vertical section of this plate, with the mold attached, is represented at the bottom of the cylinder by Y Y in Fig. 2. Fig. 5 represents another perforated mold, projecting downward from the plate to which it is attached, and is here represented in an inverted position; it may, if thought advisable, be substituted for the one represented in Fig. 4. Fig. 6 is a vertical section of a shelf, with a cavity in the center; and when the mold represented in Fig. 5 is used may be substituted for the shelf E, and the block F, represented in Fig. 2.

N. B. The same letters in all the drawings, and in the specification, refer to the same parts of the machine.

A A in Figs. 1 and 2 is a long vat divided transversely into three compartments B, C, and D. Two of these compartments B, and C contain the pulp from which the boxes or other articles are to be made. In the compartment D, and resting on a shelf E, is a block F, corresponding, in size and form at the top, with the inside of the box or other article to be made. G G is a bed plate resting on the vat, and can be moved along from one end of the vat to other. L is a cap connected with the bed plate by four round columns H, I, J, and K. The bed plate, cap, and columns constitute a frame, within which is placed a hollow cylinder N N, having permanently attached to it, two square collars P and P one at the top and the other near the bottom. The corners of these collars are rounded out so as to fit the columns that serve as guides to the cylinder which moves up and down within the frame. The bed plate is perforated to admit the cylinder, and the cap is perforated to admit the piston rod M, which is attached to a piston Q within the cylinder. The cylinder N N, and the piston Q may move up and down together, or independently of each other. The upper end of the piston rod is connected, by the cord S, with one end of the windlass R, and the lower end of the piston rod is connected with the other end of this windlass by the cord T; the piston being worked up and down by turning this windlass. The cylinder is connected with the windlass W, by the cords U and V, and is moved up and down in the same manner. X X is a vertical section of the rim; *a a* is a circular groove in this rim that serves as a receptacle for the water which enters the cylinder. Communicating with the groove in the rim, is a stop cock *b*, by which the water can be drawn off. The rim, its groove, and stop cock, are represented in perspective by Fig. 3. Y Y is a vertical section of the circular plate, with the perforated mold Z attached, as represented in perspective by Fig. 4. The internal surface of this perforated mold should correspond in shape and size to the external surface of the article to be made.

The vat A A, and its partitions may be made of wood. The perforated mold may be made of sheet metal, wire gauze, or of any thing that will keep its shape, permit the air and water to pass through it, and yet retain the denser substances of the pulp from which the article is to be made. All the other parts of the machine may be constructed of cast iron, or of any other material of sufficient strength for the purpose.

When the machine is to be put in operation, the bed plate is moved along the vat, until the cylinder is directly over the compartment that contains the pulp from which the article is to be made. The cylinder is then let down, until its lower collar touches the bed plate, and its lower end is immersed in the pulp, the piston being at the bottom of the cylinder as represented in Fig. 1. The

piston is then drawn up a short distance, so as to leave a vacuum in the cylinder below. The pressure of the pulp, together with the pressure of the atmosphere upon its surface, will force it up into the mold, *z*, and a small quantity of water will pass through the perforations into the cylinder, depositing a layer of the material on the inside of the mold. The cylinder and piston then are both raised together above the surface of the pulp in the vat. The piston is then drawn up near the middle of the cylinder, as is shown in Fig. 2, the vacuum beneath is increased, and the atmospheric pressure on the substance in the mold becomes greater, thereby rendering it more compact and adhesive. The bed plate is then moved along the vat until the mold is directly over the block F in the compartment D. The piston Q is then brought down and the article in the mold blown bottom upward upon the block, where it is represented in section by *e e e* Fig. 2. The water in the cylinder which will be deposited in the circular groove *a a* of the rim, may now be drawn off by the stop cock *b*, and the machine is then ready for another operation.

With this machine, a box or any other similar article, may be made of different kinds of material; the body of the article may be formed of straw or any other cheap substance, capable of being converted into pulp, and coated both inside and outside with a finer material of a more desirable color; the finer pulp may be placed in the compartment C, and the coarser pulp in the compartment B. The lower end of the cylinder is first plunged into the finer pulp and a very thin layer of it deposited on the inside of the mold, forming a coating for the outside of the article. The cylinder is next plunged into the coarser pulp, and a thick layer of this deposited forming the body of the article. The cylinder is again plunged into the finer pulp, and another thin stratum of this deposited, forming a coating for the inside of the article which is then blown out of the mold as before described.

The perforated mold represented by Fig. 5, may be inserted in the rim at the bottom of the cylinder and used instead of the one represented by Fig. 4. It must be remembered that this mold is represented by Fig. 5 in an inverted position. When it is inserted in the rim at the bottom of the cylinder ready for use, it projects downward from the circular plate to which it is attached, and the article to be made is produced on the outside of the mold, taking its shape and size therefrom. The process of coating the surfaces of the article with this mold is the same as that when the mold represented by Fig. 4 is used, except that the shelf with a cavity in its center, represented by Fig. 6, is substituted for the shelf E, and the block F. This cavity should correspond in shape and size to the exterior of the article to be made, which is blown into it bottom downward from the mold, and which is represented in section at the bottom of the cavity by *i i i*, Fig. 6.

We do not claim as our invention the making of boxes and other articles from pulp with a perforated mold and by means of a vacuum.

What we do claim is—

1. The method of disengaging the article when formed from the mold by forcing air upon it as herein described by bringing down the piston or other equivalent means.

2. We claim the use of the movable block F and the movable shelf with a cavity in it as represented by Fig. 6. Both block and cavity corresponding in shape to the boxes or article made and are used to receive them and preserve their shape when they are blown from the mold.

3. We claim the circular groove, *a a* in the rim *x x* (see Figs. 2 and 3) and such a constriction of the plate to which the mold is attached as would be equivalent to it. The object of this groove being to receive the water which enters the cylinder through the perforated mold when the pulp is deposited thereon so that it may be drawn off by the stop cock *b*. Whereas this water if permitted to remain and accumulate would by the pressure of the air upon it be forced through the sides of the article formed when they are blown from the mold. We claim no other parts of the machine as our invention.

ARASMUS FRENCH.
CHARLES FROST.

Witnesses:
EDWD. B. COOKE,
GEO. L. TOWNSEND.