3 Sheets—Sheet 1.

P. COOK.

Paper-Box Machines.

No. 217,729. Patented July 22, 1879.

Fig. 1.

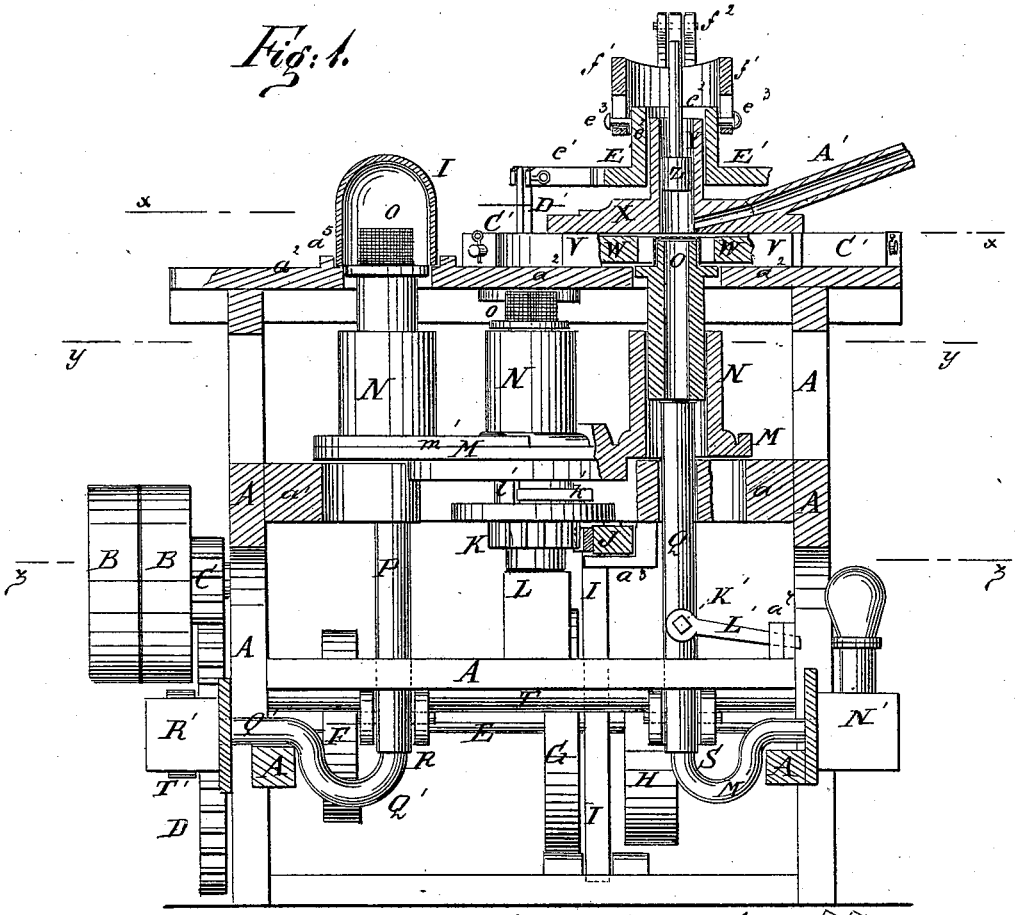
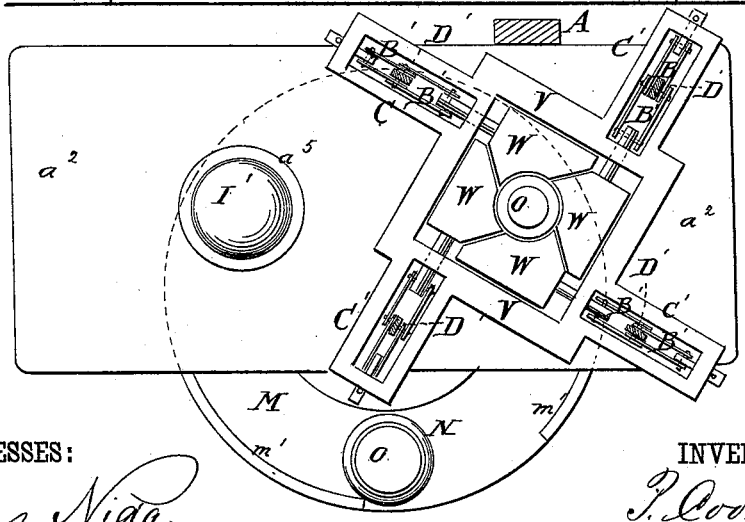


Fig. 2.



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3 Sheets—Sheet 2.

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Fig: 3.

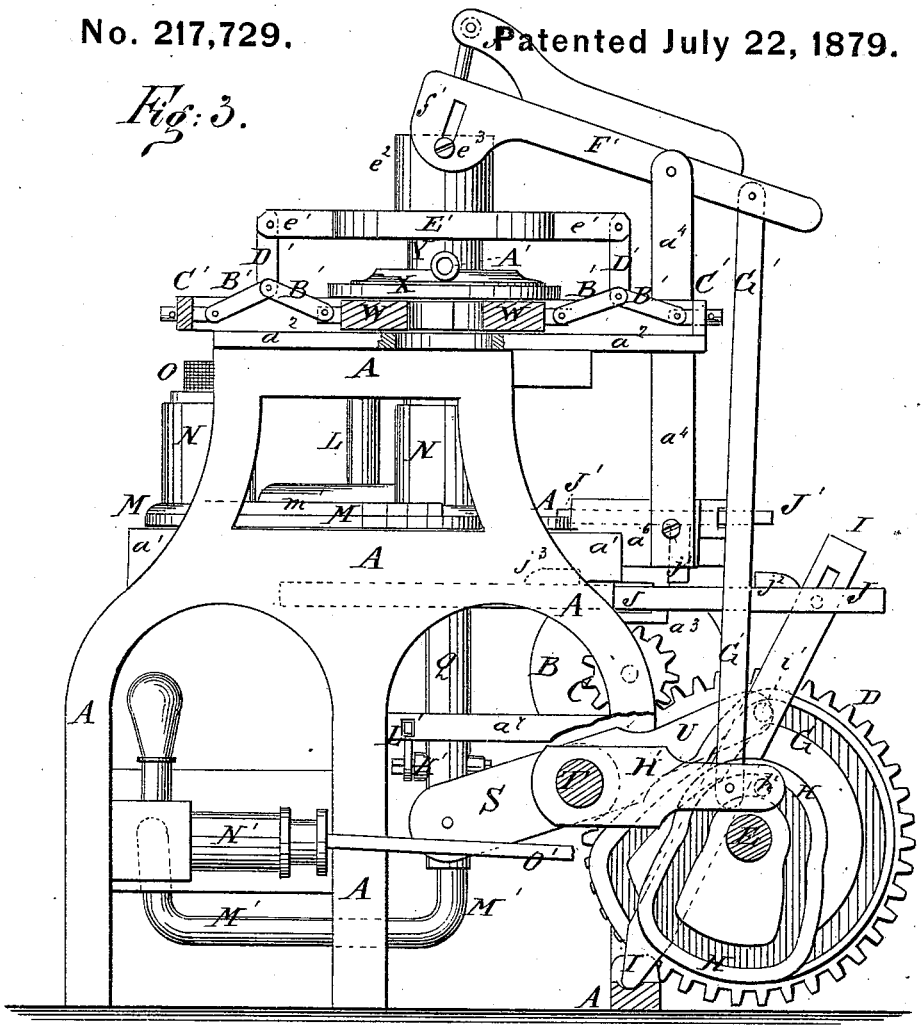
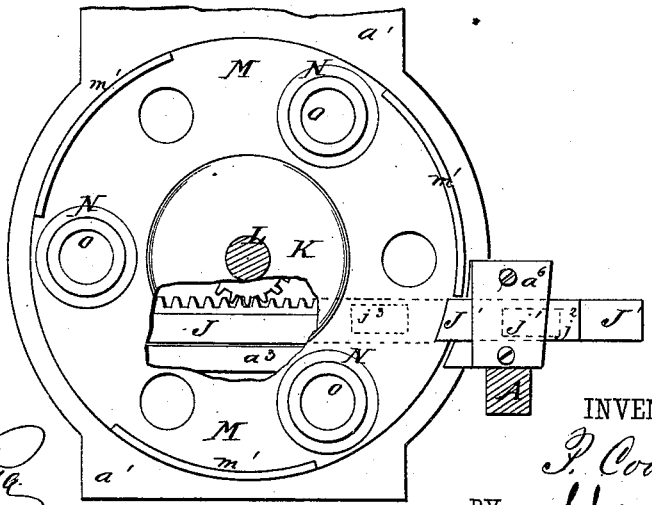


Fig: 4.



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3 Sheets—Sheet 3.

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Paper-Box Machines.

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Fig. 5.

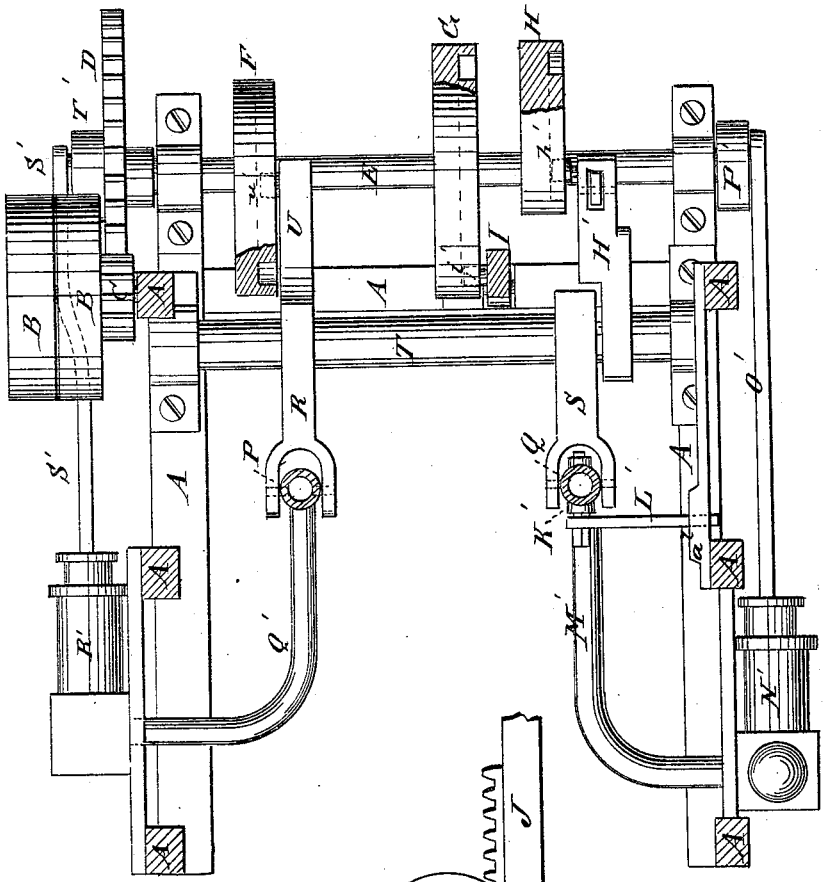
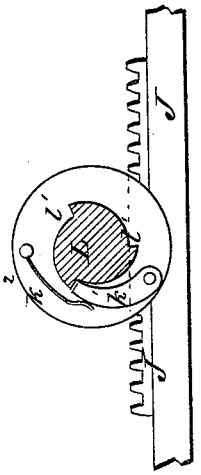


Fig. 6.



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UNITED STATES PATENT OFFICE.

PETER COOK, OF MATTAPAN, MASSACHUSETTS.

IMPROVEMENT IN PAPER-BOX MACHINES.

Specification forming part of Letters Patent No. **217,729**, dated July 22, 1879; application filed April 17, 1879.

To all whom it may concern:

Be it known that I, PETER COOK, of Mattapan, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Paper-Box Machines, of which the following is a specification.

Figure 1, Sheet 1, is a vertical section of my improved machine. Fig. 2, Sheet 1, is a horizontal section of the same, taken through the line *x x*, Fig. 1. Fig. 3, Sheet 2, is a side view of the same, parts being broken away to show the construction. Fig. 4, Sheet 2, is a horizontal section of the same, taken through the line *y y*, Fig. 1. Fig. 5, Sheet 3, is a horizontal section of the same, taken through the line *z z*, Fig. 1. Fig. 6, Sheet 3, is a detail section of the same, showing the rack, ratchet, and pawl.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved machine for making paper-boxes from pulp, which shall be so constructed that the formers may be cleaned immediately after being used and without stopping the machine, and which will make the boxes rapidly and of uniform thickness, and will allow any kind of stock and chemicals to be used.

The invention consists in a paper-box machine provided with a suction-pump for withdrawing the water from the pulp, and with a force-pump for cleaning the formers; in the combination of the bell-cap with the platform, the former, and the tube leading to the force-pump; in the combination of the pulp-tube and the plunger or die with the former, the dies, and the box containing the said dies; in the combination of the stop-cock or valve and its lever with the tube leading from the former, and from the die-box to the suction-pump; and in the combination of the sliding bolt, provided with the arm, with the stops upon the circular table that carries the formers, and with the stops upon the rack-bar that rotates the said circular table, as hereinafter fully described.

A represents the frame of the machine, which is made with two platforms or tables, a^1 a^2. To the lower part of the frame A is pivoted a pulley or wheel, B, to which power may be applied by a belt, a crank, or in any other convenient way.

With the pulley or wheel B is rigidly connected a small gear-wheel, C, the teeth of which mesh into the teeth of the large gear-wheel D. The gear-wheel D is attached to the shaft E, which revolves in bearings attached to the frame A, and to which are attached three wheels, F G H, which have cam-grooves formed in their sides.

In the cam-groove of the wheel G is placed a pin, i', attached to the side of the lever I, the lower end of which is pivoted to a base-bar of the frame A.

The upper end of the lever I is pivoted to the rear end of the bar J, which slides upon a support, a^3, attached to the frame A, and has ratchet-teeth formed upon its side to mesh into the teeth of the gear-wheel K. The gear-wheel K runs loosely upon the vertical shaft L, and is supported by a shoulder or collar formed upon or attached to the said shaft.

To the upper side of the gear-wheel K is pivoted a pawl, k^1, which is held forward by a spring, k^2, and which engages with the ratchet-teeth l', formed upon or attached to the shaft L, so that the gear-wheel K may carry the shaft L with it when turned forward, but may be turned back without revolving the said shaft.

The shaft L revolves in bearings attached to the frame A, and to it just above the lower platform, a^1, is attached a circular table, M, which is carried around by and with the said shaft L in its revolution, and to which are attached at equal distances apart three sockets, N, to receive the formers O. The upper part of the formers O are made of wire-gauze, and of the exact size and shape of the required boxes.

The formers are made with flanges around their upper parts to rest upon the tops of the sockets N, and are made hollow to allow water to pass through them freely. The formers O are raised at the proper time by the tubes P Q, which work up and down in guide-holes attached to the platform a^1, and are pivoted at their lower ends to the forked ends of the arms R S. The other ends of the arms R S are rigidly attached to the shaft T, which rocks in bearings attached to the frame A.

To the rock-shaft T is rigidly attached the end of an arm, U, projecting in the opposite

direction from the arms R S, and which may be an extension of one of the said arms R S.

To the side of the outer end of the arm U is attached a pin, u', which enters a cam-groove in the side of the cam-wheel F, which groove is so formed as to raise the tubes P Q at the proper time, hold them raised for the proper time, and then lower them to allow the circular table M to be turned forward.

In the upper platform, a^2, are formed two holes to receive the formers O when raised by the upward movement of the tubes P Q, one of which is surrounded by a square box, V, attached to the upper side of the said platform a^2, and within which are placed the four parts W of the die.

The outer edges of the parts W slide along the sides of the box V. Their side edges are inclined and slide upon each other, so as to be close together, however said parts W may be adjusted, to prevent pulp from working in between the said edges, and their inner edges are so formed as to give the desired shape to the paper box, the thickness of the dies being equal to the desired height of the box.

To the top of the box V is secured a cover, X, which fits down closely upon the tops of the dies W, and has a hole in its center to receive the end of a short tube, Y, through which the upper die or plunger, Z, moves up and down.

In the side of the tube Y is formed a hole, in which is secured the end of the tube A′, through which the pulp is introduced from a tank or pulp-engine. The inner end of the inlet or feed tube A′ should be so placed that the plunger or die Z may pass and close it before the dies begin to compress the pulp.

To the dies W, and parallel with their sides that slide along the sides of the box V, are attached short arms, which pass out through the sides of the said box V, and are pivoted to the inner ends of the inner bars of the toggle-joints B′. The toggle-joints B′ are placed in boxes C′, attached to the platform a^2, and the outer ends of their outer arms are pivoted to the outer ends of the said boxes C′.

To the toggle-joints B′ are pivoted the lower ends of the short bars, D′, the upper ends of which are pivoted to the arms e^1, formed upon or rigidly attached to the plate E′. The plate E′ has a hole through its center, and a collar, e^2, formed upon or attached to it to fit upon the tube Y.

To the opposite sides of the collar e^2 are attached pins e^3, which pass through short slots in the widened ends of the arms f^1 of the forked end of the lever F′. The lever F′ is provided with a third arm, f^2, which projects above the space between the arms f^1, and to its outer end is pivoted the upper end of the stem of the die or plunger Z.

The lever F′ is pivoted to a standard, a^4, attached to the frame A′, and to its outer end is pivoted the upper end of a connecting-rod, G′, the lower end of which is pivoted to the lever H′. The inner end of the lever H′ is pivoted to and rides upon the rock-shaft T, and to the side of its outer end is attached a pin, h', which enters the cam-groove of the cam-wheel H, which groove is so formed as to close and open the dies W Z at the proper times. Around the other hole in the platform a^2 is formed a collar, a^5, which is made a little larger than the hole through the said platform, so as to form a seat for the bell-cap I′.

To the circular table M are attached, or upon it are formed, stops m', to strike against a bar or bolt, J′, which slides in a support, a^6, attached to the lower platform, a^1, and has a downwardly-projecting arm, j^1, attached to it.

The arm j^1 projects nearly to the rack-bar J, so that it may be struck by the projections j^2 j^3, formed upon or attached to the said rack-bar J, to move the bolt J′ in and out at the proper times to stop and release the circular table M.

The lower part of the tube Q, leading up to the dies W Z, is provided with a stop-cock or valve, K′, to the stem of which is attached the end of a lever, L′, the other end of which enters a hole in a bar, a^7, attached to the frame A, so that the said stop-cock or valve may be closed by the downward movement of the said tube Q, and opened by the upward movement of the said tube.

With the lower end of the tube Q is connected the end of a flexible tube, M′, the other end of which is connected with a suction-pump, N.

The piston-rod O′ of the pump N′ is connected with a crank or crank-wheel, P′, attached to the end of the driving-shaft E.

With the lower end of the tube P is connected the end of a flexible tube, Q′, the other end of which is connected with the force-pump R′.

The piston-rod S′ of the pump R′ is connected with a crank or crank-wheel, T′, attached to the end of the driving-shaft E.

With this construction, when the machine is in operation, and a sufficient quantity of pulp has been fed in through the tube A′, the plunger or die Z descends and closes the end of the said feed-tube A′, and all the dies W Z then move forward together, pressing the pulp upon the former O, and forcing out the water through the cavity of the said former O and tube Q. The withdrawal of the water is assisted by the suction of the pump N′, which is operated at the same time.

As the formation and compression of the box are completed, the dies W Z are withdrawn, the tube Q is drawn down, the former O descends below the platform a^2, and the wheel M revolves through one-third of a revolution, bringing the next former into place below the dies W, which former is then raised, and another box is formed in the same way.

While each box is being formed the box last formed is being removed from its former O, and the former O, from which the previous box had been removed, stands beneath the

bell-cap I′, and a stream of water is forced up through it by the force-pump R′, removing all particles of pulp that may have adhered to it, and thoroughly cleaning it, ready to be again used, so that the operation of the machine may be continuous.

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

1. A paper-box machine provided with a suction-pump, N′, for withdrawing the water from the pulp, and with a force-pump, R′, for cleaning the formers O, substantially as herein shown and described.

2. The combination of the bell-cap I′ with the platform a^2, the former O, and the tube P, leading to the force-pump R′, substantially as herein shown and described.

3. The combination of the pulp-tube A′ and the plunger or die Z with the former O, the dies W, and the box V, containing the said dies W, substantially as herein shown and described.

4. The combination of the stop-cock or valve K′ and its lever L′ with the tube Q, leading from the former O and from the die-box V to the suction-pump N′, substantially as herein shown and described.

5. The combination of the sliding bolt J′, provided with the arm j^1, with the stops m', upon the circular table M, that carries the formers O, and with the stops j^2 j^3 upon the rack-bar J, that rotates the said circular table M, substantially as herein shown and described.

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R. H. BARHAM,

EDMUND BURKE.