(No Model.)

M. E. BRIGHAM.

PAPER BOX MAKING MACHINERY.

No. 390,442. Patented Oct. 2, 1888.

FIG. 1

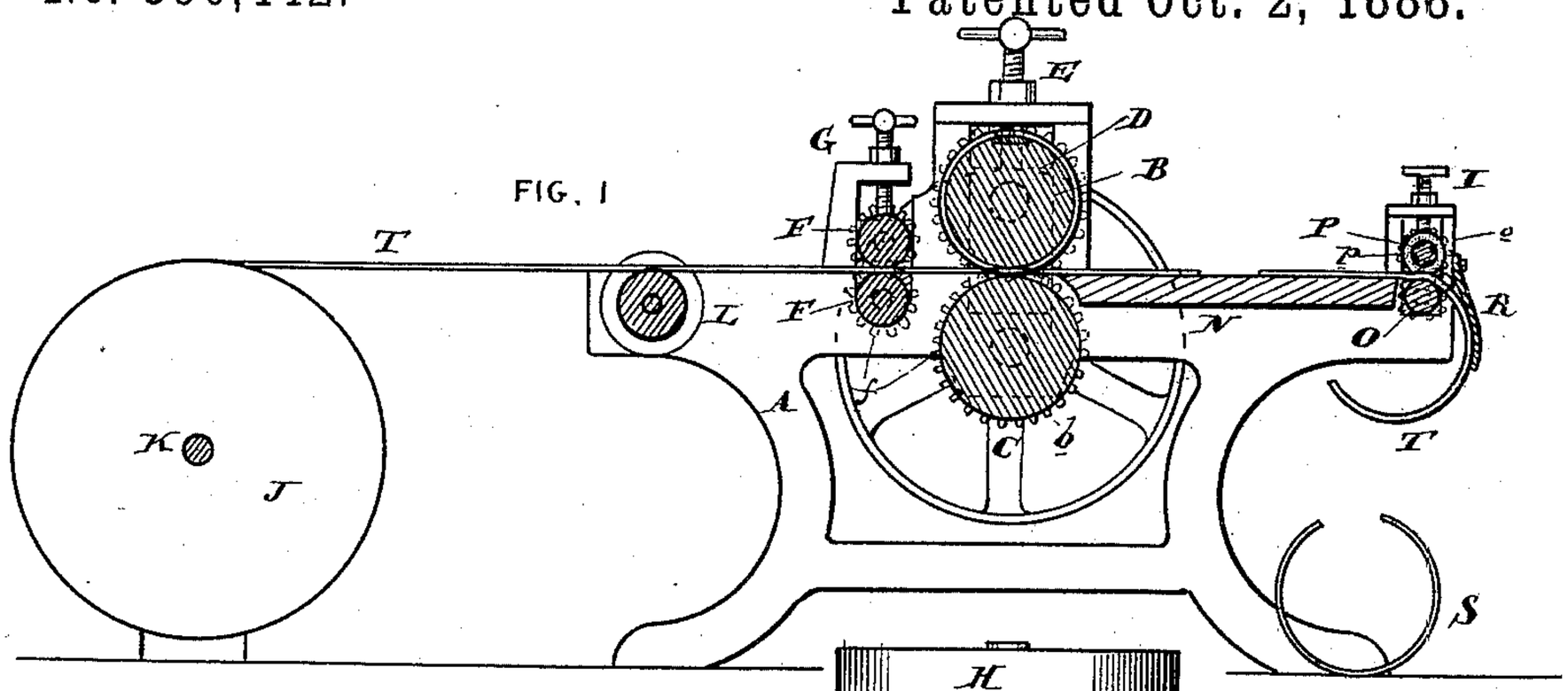


FIG. 2

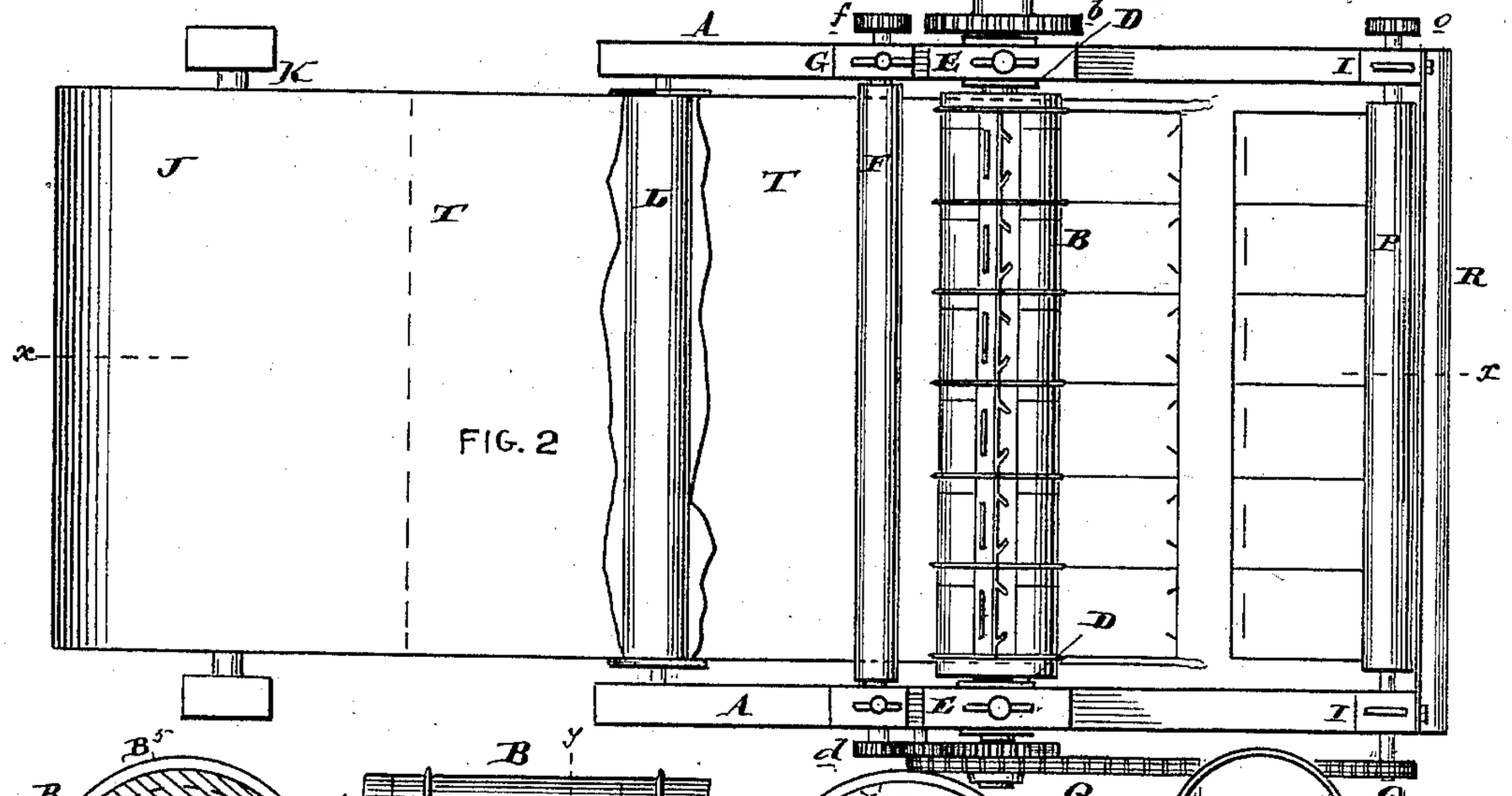


FIG. 3

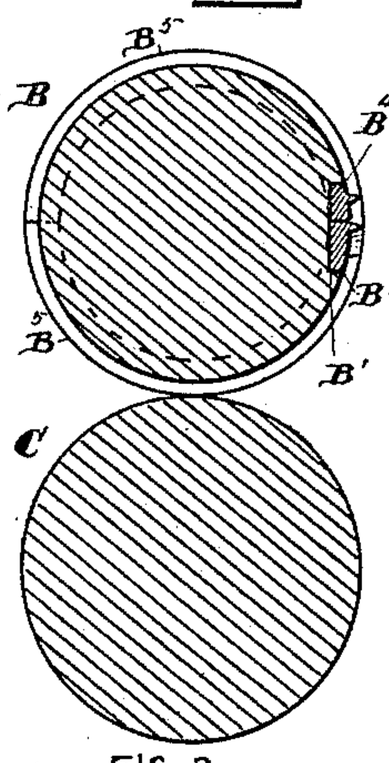


FIG. 4

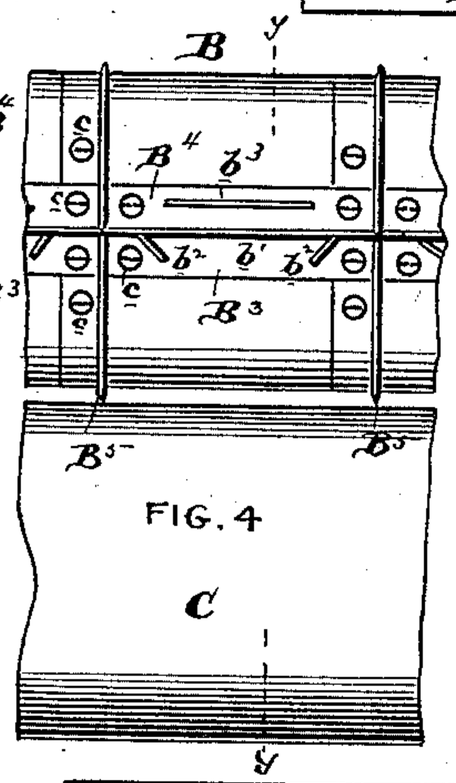


FIG. 5

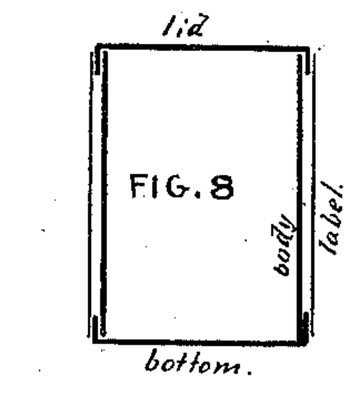


FIG. 7

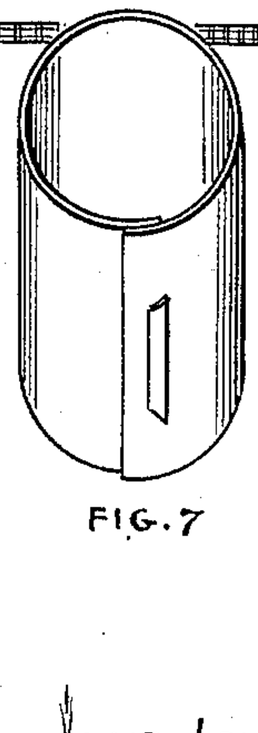
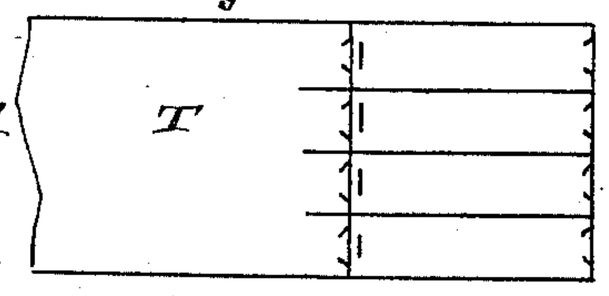


FIG. 8

FIG. 6



Attest
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Inventor
Martin E. Brigham
By his Atty
[signature]

UNITED STATES PATENT OFFICE.

MARTIN E. BRIGHAM, OF PHILADELPHIA, PENNSYLVANIA.

PAPER-BOX-MAKING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 390,442, dated October 2, 1888.

Application filed May 18, 1886. Serial No. 202,521. (No model.)

To all whom it may concern:

Be it known that I, MARTIN E. BRIGHAM, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Paper-Box-Making Machinery, of which the following is a specification.

My invention has reference to paper-box-making machinery; and it consists in certain improvements, all of which are fully set forth in the following specification, and shown in the accompanying drawings, which form part thereof.

The object of my invention is to provide means for slitting and perforating card-board or equivalent material into the proper shapes or forms, whereby the ends of same may be united to form a cylinder. This cylinder, after having its edges united, has a stamped card-board head glued or cemented on one end, and after being filled with the material which it is to contain the other head is placed on and a label securely pasted about the body, so as to secure the last-mentioned head or lid upon the box and at the same time make the box as an entirety practically air-tight. It is to make the body portion of such a box that my improved machine is designed. It is necessary to sell certain articles so cheap that it is impossible to use anything but a paper receptacle; and heretofore, as far as I am aware, there has been no machine for forming the cylinder for a paper box where a sufficiently great production can be had in a limited time to reduce the cost within a reasonable limit.

In carrying out my invention a roll of card-board is fed between rotary cutters having peculiarly-shaped dies for cutting-plates thereon, whereby the card-board is slit longitudinally and transversely and at the same time perforated and notched on the ends of the pieces so cut that when bent into shape they will form a locked connection. The cut cards so shaped are then automatically received by a curling or forming device, whereby they are curled or rolled into the cylindrical shape approximating that which they finally assume. These parts are geared or otherwise connected together, and are so timed that the machine is automatic in its action.

In the drawings, Figure 1 is a sectional elevation on line *x x* of a machine embodying my improvements. Fig. 2 is a plan view of the machine. Fig. 3 is a cross section of the cutting-rolls on line *y y*. Fig. 4 is a front elevation of a portion of same. Fig. 5 is a side elevation of one of the slitting-cutters removed. Fig. 6 is a plan view of the end of the card-board, showing the manner of cutting the same. Fig. 7 is a perspective view of the cylinder of the box when ready for the lids, and Fig. 8 is a sectional elevation of a completed box.

A is the frame of the machine.

B is the roller or cylinder carrying the cutters which cut upon the roller C. These rollers are geared together at *b*, and are adjusted to or from each other by adjustable journal-boxes D and screws E. The cylinder B is formed with grooves about its periphery at given intervals apart, and into these grooves the semicircular cutters shown in Fig. 5 are placed and secured therein by screws *c* to form the continuous slitting-cutters B^5, of which there are seven in all, to cut six box-bodies simultaneously. These cutters are made in sections, whereby they may be removed in case of breakage and replaced by new ones without dismantling the machine.

B^4 is the slitting or perforating cutter having the short slitting portion b^3, and B^3 is a transverse cutting and notching cutter and has the cutting-blades b' and b^2. These cutters set in a longitudinal groove, B′, on the cylinder B, and are secured therein by screws *c*, whereby either one may be removed for repairs in case of breakage or wearing out.

H is the power-wheel, and transmits motion preferably to the cylinder C, which through the mediation of the gearing *b* rotates the cutting cylinder.

F F are feeding-rolls between which the card-board passes, and by which it is fed to the cylinders B and C. These rollers are geared together at *f* and receive their motion from gearing *d* connecting with the cutting-cylinders, and their pressure upon the card-board is regulated by an adjusting-screw, G.

L is a guiding-roller over which the card-board T passes.

K is the axle or support for the roll J of the card-board.

Located in the rear of the cutting-rolls B C are the curling-rollers O P, the former of which is made solid, while the latter is provided with

an elastic or rubber covering, *p*, and these rollers are pressed together by an adjusting-screw, I, so that the card-board in passing between them is bent slightly to the curvature of the roller O, and is thereby set in a curved shape and is guided downward by the curved plate R in the rear of said rollers. The blank as it leaves the said rollers is shown at S. These rollers are geared together at *o* and receive their motion by chain and sprocket wheel Q from the cutter-rollers. Their surface speed is somewhat in excess of that of the rollers B and C, so that the card in passing through them is separated from the next advancing card to a slight extent to prevent them conflicting.

N is a guide over which the said cards pass to the rollers P O, and the distance between the centers of the cutting-rollers and curling-rollers should be equal to the length of the card sections, so that the instant the transverse cut is made the curling-rollers grip the card. This avoids any tearing. It is self evident that in place of using a single roller, P, two rollers might be used, the additional roller being shown in dotted lines, and in this case it would be possible to dispense with the elastic covering *p*.

I am aware of Patent No. 240,542 to Powers, and claim nothing therein set out or shown.

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

1. In a machine for forming paper-box bodies, the combination of a support for a roll of card-board, cutting-rollers for cutting the card-board transversely into short lengths of the right shape, with a curling device to curl or curve the card to give it a cylindrical shape, and a connecting device, substantially as described, for imparting to the cutting and curling devices continuous and constant relative speeds, whereby the operation of cutting and curling the cards is continuous, substantially as and for the purpose specified.

2. The cutter for a paper-box machine, consisting of a straight cutter, b', having two oblique cutters, b^2 b^2, extending therefrom and approaching each other at their free ends, and a cutter, b^3, parallel to the cutter b', and arranged at a distance from cutter b' equal to the distance of the free ends of the cutters b^2 from said cutter b', and having a length equal to the distance between the free ends of cutters b^2 b^2, substantially as shown.

3. In a machine for forming paper-box bodies, the combination of a support for a roll of card-board, and the cutting-rolls to cut the card-board transversely into short lengths of the proper shape, with the curling device, substantially as described, to curl or curve the card into a cylindrical shape, the distance between the said cutting-rolls and curling device being equal to the length of the card to be curled, substantially as and for the purpose specified.

4. In a machine for forming paper-box bodies, the combination of a support for a roll of card-board, and the cutting-rolls to cut the card-board transversely into short lengths of the proper shape, with a curling device, substantially as described, to curl or curve the card into a cylindrical shape, the distance between the said cutting-rolls and curling device being equal to the length of the card to be curled, and a supporting guide or table to sustain the card in its passage from the guiding-rolls to the curling device, substantially as and for the purpose specified.

5. In a machine for forming paper-box bodies, the combination of the cutting-rolls to cut the card-board into the proper shape, with a curling device formed of two rolls of unequal hardness to curl or curve the card into a cylindrical shape, the distance between the said cutting-rolls and curling device being equal to the length of the card to be curled, a curved guide to depress the curved card as it leaves the curling device, and gearing or equivalent devices to make the surface speed of the curling-rolls greater than that of the cutting-rolls, substantially as and for the purpose specified.

6. In a machine for forming paper-box bodies, the combination of the cutting-rollers with the curling-rollers and gearing connecting the cutting-rollers and the curling-rollers, whereby the curling-rollers move at a greater speed than the surface-rollers.

7. In a machine for forming paper-box bodies, the combination of cutting-rollers for cutting the card-board into right shape and dividing it transversely, with a curling device consisting of a solid roll, and an elastic roller of larger diameter than the solid roller pressing thereon, and between which the card passes to be curled or curved to give it a cylindrical shape, and gearing to rotate said curling-rollers at the same velocity and at a greater velocity than the cutting-rolls, substantially as and for the purpose specified.

8. In a machine for forming paper-box bodies, the cutting-cylinder having longitudinal and circumferential grooves upon its face, and separate longitudinal and transverse slitting-cutters secured in said grooves and separately removable therefrom for repairs without removing the cylinder, in combination with a solid roller upon which the cutters cut, substantially as and for the purpose specified.

9. In a machine for forming paper-box bodies, the combination of the cutting-cylinders B, having the transverse cutter b', the notching-cutter b^2, and the perforating or slitting cutter b^3, with cylinder C, upon which they cut, and curling-rollers located in the rear, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

MARTIN E. BRIGHAM.

Witnesses:
R. M. HUNTER,
RICHD. S. CHILD, Jr.