E. E. Clarke. Sheet 1. 2 Sheets.

Pasteboard Cutting Mach.

No. 46448. Patented Feb. 21. 1865.

FIG. 1.

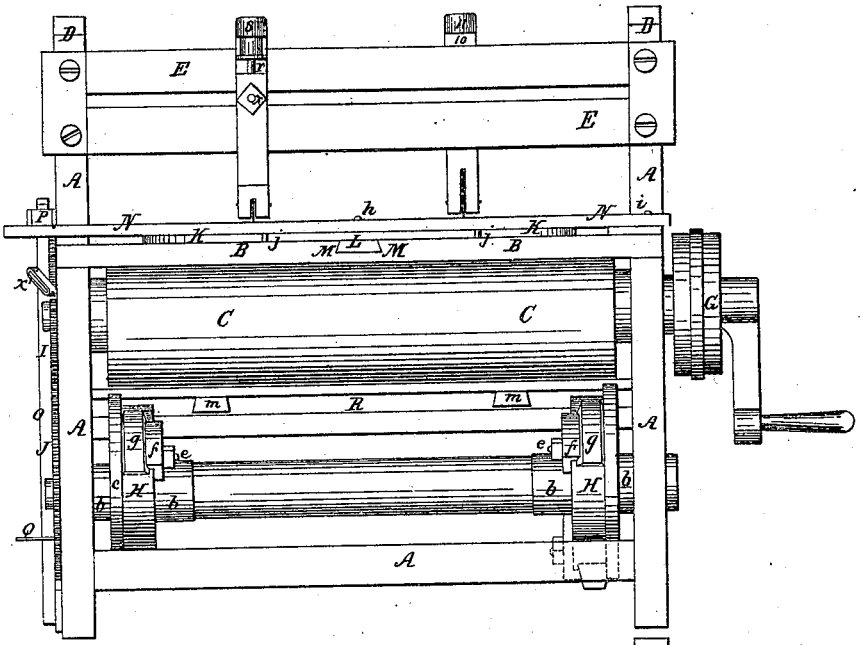
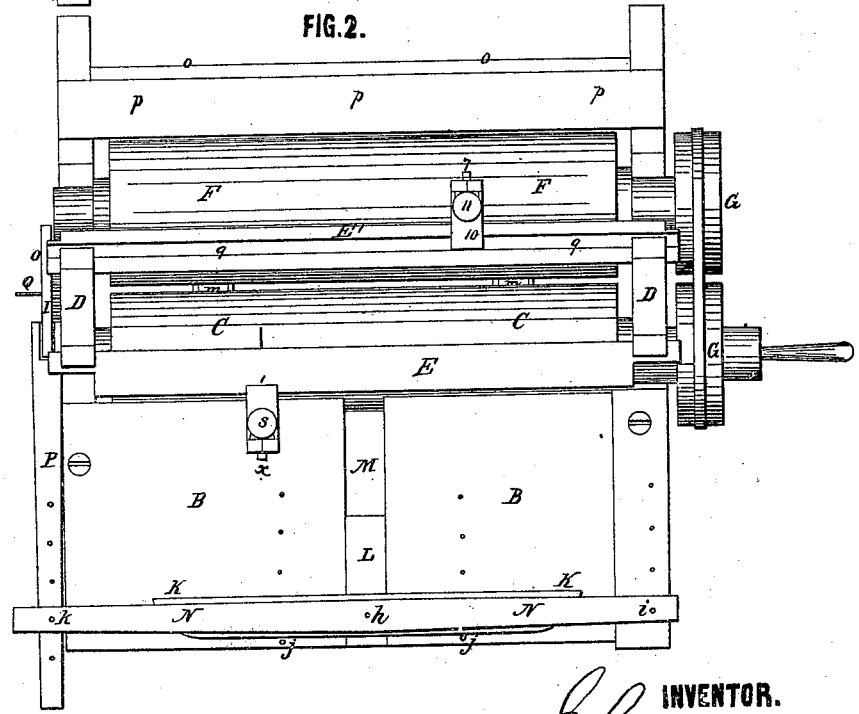


FIG. 2.



WITNESSES.

L. D. Bownes.

Wm. L. Coombs.

INVENTOR.

E. E. Clarke.

by A. Pollok his atty.

E. E. Clarke. Sheet 2. 2 Sheets.

Pasteboard Cutting Mach.

No. 46448. Patented Feb. 21. 1865.

FIG. 3.

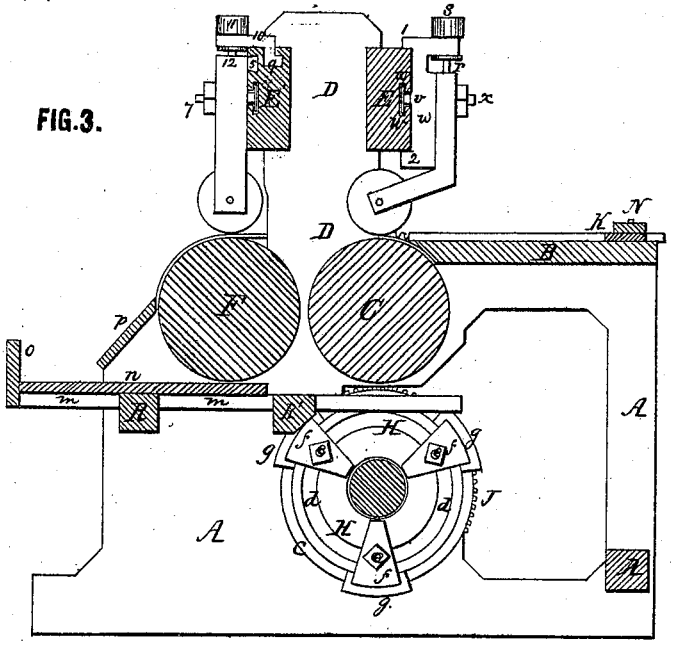


FIG. 4.

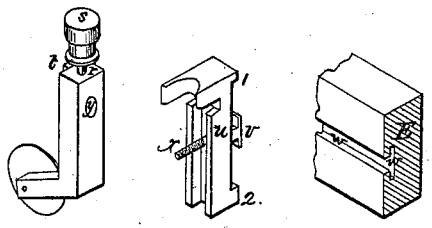


FIG. 7.

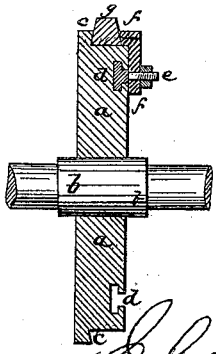


FIG. 5.

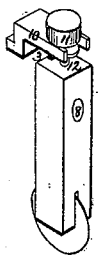
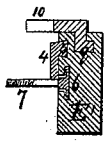


FIG. 6.



WITNESSES.

L. T. Downes.

Jos. L. Coombs.

INVENTOR.

E. E. Clarke.

by A. Pollok his atty.

UNITED STATES PATENT OFFICE.

ELIZUR E. CLARKE, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO FRANKLIN N. CLARKE.

MACHINE FOR CUTTING PASTEBOARD.

Specification forming part of Letters Patent No. **46,448**, dated February 21, 1865.

To all whom it may concern:

Be it known that I, ELIZUR E. CLARKE, of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful improvements in machinery for cutting paste or leather board or other similar substances made into sheets preliminary to being fashioned or worked into boxes of various descriptions; and I hereby declare that the following, taken in connection with the accompanying drawings, forms such a full, clear, and exact description of the same as to enable others skilled in the art to make and use the same.

The mode of cutting pasteboard for the purpose of making therefrom boxes being well understood, it will suffice to refer to the fact that two kinds of cuts are made—viz., the through-cut, severing the sheet according to certain predetermined lines, and the scoring-cut, indenting or cutting partly through without severing the sheet, for the purpose of enabling it being bent to form angles. These operations were heretofore effected on machines by rotary cutters, adjusted according to the depth of cut intended, and the sheets were directed in such machines onto a roller by hand and by means of gages or guides governing the lengths of the cuts. These machines not only required the attendance of experienced operators in order to properly guide the sheets to and from the cutters, but often necessitated the sheets being passed through other cutting machines or presses whenever a through-cut was to be made in continuation of a scoring-cut.

The object of this invention is to so organize a machine for cutting pasteboards as that both the scoring and the through cut may be effected at one operation, and to so construct and combine the parts of the machine that the same may be worked in great measure automatically with greater accuracy and more expeditiously and efficiently; and my invention consists, first, in the method, hereinafter described, of cutting pasteboard by combining with fixed cutters and revolving cylinder a mechanism for raising and lowering the said cylinder to and from the cutter at given intervals of space, to more or less, or not at all, indent the pasteboard, or to produce a through-cut, at pleasure; secondly, in combining in one machine with two cutter-bars provided with adjustable or fixed cutters two cylinders geared so as to revolve with equal velocities, one of the said cylinders revolving in fixed bearings, while the other, actuated by suitable mechanism, is raised to or lowered from the cutters, as hereinafter described; thirdly, in combining with adjustable or fixed cutters and revolving cutter-cylinder a cam cylinder or wheels revolving in unison with the cutter-cylinder and actuating it to more or less impinge against the cutters at given intervals of space; fourthly, in combining with the cutters, cutter-cylinder, and cam-wheel a feed-bar actuated by the cam-wheel, or any part moving in unison therewith, in such manner as to feed the sheet to the cutters automatically and at proper intervals of time during the revolution of the cam-wheel to receive the through and score cuts between given points; fifthly, in the method, hereinafter described, of regulating the automatic feed-bar in accordance with the width of sheets to be cut, by combining it with a lever operated by the cam-wheel, but moving upon adjustable fulcra; sixthly, in the combination and arrangement of the cam-wheel so that the cams may be located and fixed in variable positions upon the periphery of the wheel, and replaced by others, according to the work to be performed; seventhly, in the combination of the grooved and flanged disk with detachable cams and clamps and screw-bolts to fasten the cams to the periphery of the wheel; eighthly, in combining with a machine for cutting pasteboard a sliding and adjustable platform or table for receiving the scored and cut sheets, the arrangement being such that the said table may be slid under the main cylinder, so as to admit of the operator approaching the cutters to adjust them; ninthly, in the combination of a cutter holder and stock fitted together by means of vertical tongue and groove with one or more horizontal guide-tongues on the back of the stock and fitting and sliding in a corresponding groove or grooves in the cutter-bar, together with a binding-bolt passing through the central guide-tongue; tenthly, in the combination, with the above, of projecting studs on the cutter-stock, lapping over and under the cutter-bar; eleventhly, in the combination, with the above, of the forked arm on

the cutter stock, clasping a collar screw-nut on the screw-shank of the cutter-holder; twelfthly, in the method of holding and adjusting the cutter without the employment of a cutter-stock, by combining with a cutter-bar having two side grooves and one top groove a cutter-holder slotted and grooved vertically for adjustment on a binding-bolt and horizontally-sliding stud, together with horizontally-sliding fork and collar-screw for the vertical adjustment of the cutter.

In the accompanying drawings, Figure 1 is a front elevation, Fig. 2 a plan view, and Fig. 3 a sectional elevation, of a machine for cutting pasteboard, to which my improvements are applied. Figs. 4, 5, 6, and 7 are detail views, partly in isometrical perspective view and partly in section, representing the mode of construction and attachment of the cutters to the cutter-bar and of the cam-wheel, respectively.

In said figures, A is the frame, consisting of uprights united or braced laterally by means of cross-pieces. The frame supports the table B in front of the cutter-cylinder C in the manner usual in most machines of similar character. At either side of the table there are standards D, to which are attached the cutter-bars E E′—that is to say, one in front or toward the table and the operator, and the other in the rear toward the delivery end of the machine. To the cutter-bars are secured, by the means hereinafter described, rotary cutters, the axes of which are in vertical planes with the axes of the cutter-rollers underneath, each set of cutters having a cutter-cylinder. In this instance two cutter-rollers are used—one behind the other—their upper peripheries being tangential to a horizontal plane in continuation with or slightly above the table before referred to. The back roller, F, revolves in fixed bearings, and is geared by means of a band and pulleys, G, or by suitable cog-wheels to move in unison and in the same direction with the cutter-roller C. Underneath the latter there is arranged in suitable brackets a cam-cylinder or cam-wheel, H, which receives its motion from the cylinder C by means of the cog-wheels I and J.

In the drawings two wheels are shown, mounted upon a shaft at either end thereof. The wheels shown in front and side elevation in Figs. 1 and 3, and in section in Fig. 7, are composed of a disk, *a*, provided with a hub, *b*, and an external circumferential flange, *c*. On the inner face of the wheel there is a T-groove *d*, running parallel with the rim of the wheel, into which groove are fitted binding-bolts *e*, for the adjustment of clamps *f*, whereby the cams *g* may be adjusted on the face of the wheel and against the flange thereof in any desired position. The cams may be flanged, or they may be made tapering, so as to afford a wedge-grip to the clasp. By this arrangement the cams may be adjusted upon the circumference of the wheel to suit the work to be performed, their object being to raise the cutter-cylinder toward the cutters whenever in their revolution they come in contact with it.

It will also be understood that the cams may be replaced or interchanged for various purposes. The size of the cam-wheel is calculated according to the length of the cutter-rollers, which is equal to or slightly exceeding the greatest dimensions of the pasteboard sheet generally used, the development of the circumference being equal to the length of the cutter-rollers. The sheets of pasteboard are fed to the cylinder and cutters by means of a feed-bar, K, which is caused to move in a line parallel with the roller by means of a piece, L, sliding in a groove, M, which is at right angles to the feed-bar. Both the feed-bar and the sliding piece L (which are rigidly connected and form a T) are united by a hinged joint at *h* to the lever N, the fulcrum of which is at *i*. The lever is operated by means of a tipping-bar, O, and connecting-rod P, the former being actuated by a stud or projection, Q, on the cog-wheel J. A spring, *x′*, keeps the feeding mechanism in place against the stops *j*, in front of the machine.

It will be understood that with each revolution of the cam-wheels the feed-bar is advanced by the action of the projection Q on the tipping-bar O. Provision is made for sheets of various dimensions by changing the location of the fulcrum of the lever N or by shortening the connecting-rod P, or by both. For this purpose a series of holes is wrought in the side of the table for the adjustment of the fulcrum-pin, and a series of holes is cut in the connecting-rod P for the insertion of the connecting-pin *k*, also in the table for the stops *j*. In rear of the machine and under the cutter-rolls C and F are two cross-bars, R R′, having transverse dovetail grooves *l*, into which are fitted sliding rods *m*, to which is attached a platform, *n*, provided at the rear end with a guard or stop board, *o*. An incline, *p*, is also arranged in rear of the second roller and above the table *n*. The pasteboard fed to the cutters is conveyed down the incline *p* onto the platform *n*, which for that purpose is drawn out the required distance to contain the cut pieces. When the cutters on the cutter-bar in the rear of the machine require adjustment, the operator may approach the cutters by sliding the platform back under the rollers.

The mode of attaching the cutters to the cutter-bar so as to allow of lateral and vertical adjustment may be effected either with or without a cutter stock. The former mode is represented in Fig. 4. The cutter-holder *g* is bent so as to carry the rotary cutter under the cutter-bar directly over the cylinder. From the upper part starts a screw, *r*, which is mounted by a nut, *s*, recessed on the sides so as to form a collar or neck therein. In the rear the cutter-holder is provided with a vertical tongue, *t*, which corresponds to a vertical groove in the cutter-stock *u*. The latter has on the side facing the cutter-bar a tongue or projection, *v*, fitting the outer part of the hori-

zontal T grooxe in the cutter-bar. Through this projection passes toward the front and through the orifice *y* of the cutter-holder a binding-bolt, *x*. On top of the stock a fork projects forward, embracing the collar of the nut *s*. It will be understood that the up-and-down adjustment is effected by the nut *s*, while the lateral adjustment is performed by moving both the stock and the holder in the groove *w*, and by then applying the binding-screw. Studs 1 and 2, lapping over and under the cutter-bar, may be applied to the stock for the purpose of giving greater rigidity to the adjustment.

The other mode of adjusting the cutters dispenses with the use of the stock. The arrangement shown in Figs. 5 and 6 illustrates this mode of adjustment. The cutter-holder, which may be straight or bent, has a vertical groove, 3, in the rear, into which groove fits a stud, 4, which, in its turn, is capable of a lateral motion in the cutter-bar by having its rear end engaged in a dovetail groove, 5, in the face of the cutter-bar. A T-groove, 6, running parallel with the former, is cut in the face of the cutter-bar, and contains a laterally-sliding binding-bolt, 7, which passes through the slot 8 in the cutter-holder. An L-shaped groove, 9, is cut in the top of the cutter-bar, and contains a forked lever, 10, clasping a collar-nut, 11, on the screw 12 of the holder, whereby the vertical adjustment of the cutter is effected in a manner similar to that before described.

The operation of the machine may be understood from the preceding description of its construction and arrangement and of the functions of the several parts referred to. I would, however, observe that, all the parts being properly adjusted, the operation is entirely, or nearly so, automatic, it only requiring that the sheets, properly trimmed, be placed on the table against the gages for that purpose provided. Supposing, therefore, the machine to be in running order, the sheet of board will be fed automatically to the cutters by the feed-bar at the right moment when the necessary score or through cut is to be applied. The cutter will more or less indent the sheet, according to the position of the roller underneath, which position is determined by the cams of the cam-wheel, as before described. The first series of cutters—that is to say, the cutters above the movable cylinder—alternately cut and score the sheet. The dividing of sheets is effected by a second series of cutters, in combination with the second cylinder. In this way a sheet may be cut, scored, and divided at one operation, or by only once passing it through the machine.

Having thus described my invention, I shall state my claims, as follows:

1. The method, herein described, of cutting pasteboard by combining with fixed cutters and revolving cylinder a mechanism for raising and lowering the said cylinder to and from the cutters at given intervals of space, to more or less, or not at all, indent the pasteboard, or to produce a through-cut, at pleasure, substantially as set forth.

2. Combining in one machine two cutter-bars provided with adjustable or fixed cutters with two cylinders geared so as to revolve with equal velocities, one of the said cylinders revolving in fixed bearings, while the other, actuated by suitable mechanism, is raised to or lowered from the cutters, as herein described.

3. In combination with adjustable or fixed cutters and revolving cutter cylinder, a cam cylinder or wheel revolving in unison with the cutter-cylinder and actuating it to more or less impinge against the cutters at given intervals of space, substantially as set forth.

4. The combination, with the cutters, cutter-cylinder, and cam-wheel, of a feed-bar actuated by the cam-wheel, or any part moving in unison therewith, in such manner as to feed the sheet to the cutters automatically and at proper intervals of time during the revolution of the cam-wheel to receive the through and score cut between given points, substantially as set forth.

5. The combination of the grooved and flanged disk with detachable cams and clamps, and screw-bolts to fasten the cams to the periphery of the wheel, substantially as set forth.

6. In combination with a machine for cutting pasteboard, a sliding and adjustable platform or table for receiving the scored and cut sheets, the arrangement being such that the said table may be slid under the main cylinder, so as to admit of the operator approaching the cutters to adjust them, substantially as set forth.

7. The combination of the cutter holder and stock, fitted together by means of a vertical tongue and groove, with one or more horizontal guide-tongues on the back of the stock, and fitting and sliding in a corresponding groove or grooves in the cutter-bar, or the projecting studs on the cutter-stock lapping over and under the cutter-bar, together with a binding-bolt passing through the central guide-tongue, substantially as set forth.

8. The forked arm and grooved screw-nut working therein, in combination with the inverted-T groove in the side of the cutter-bars, with the bending screw-bolts and nuts, substantially as described, for the purpose specified.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

ELIZUR E. CLARKE.

Witnesses:

A. POLLAK,

R. FITZGERALD.