

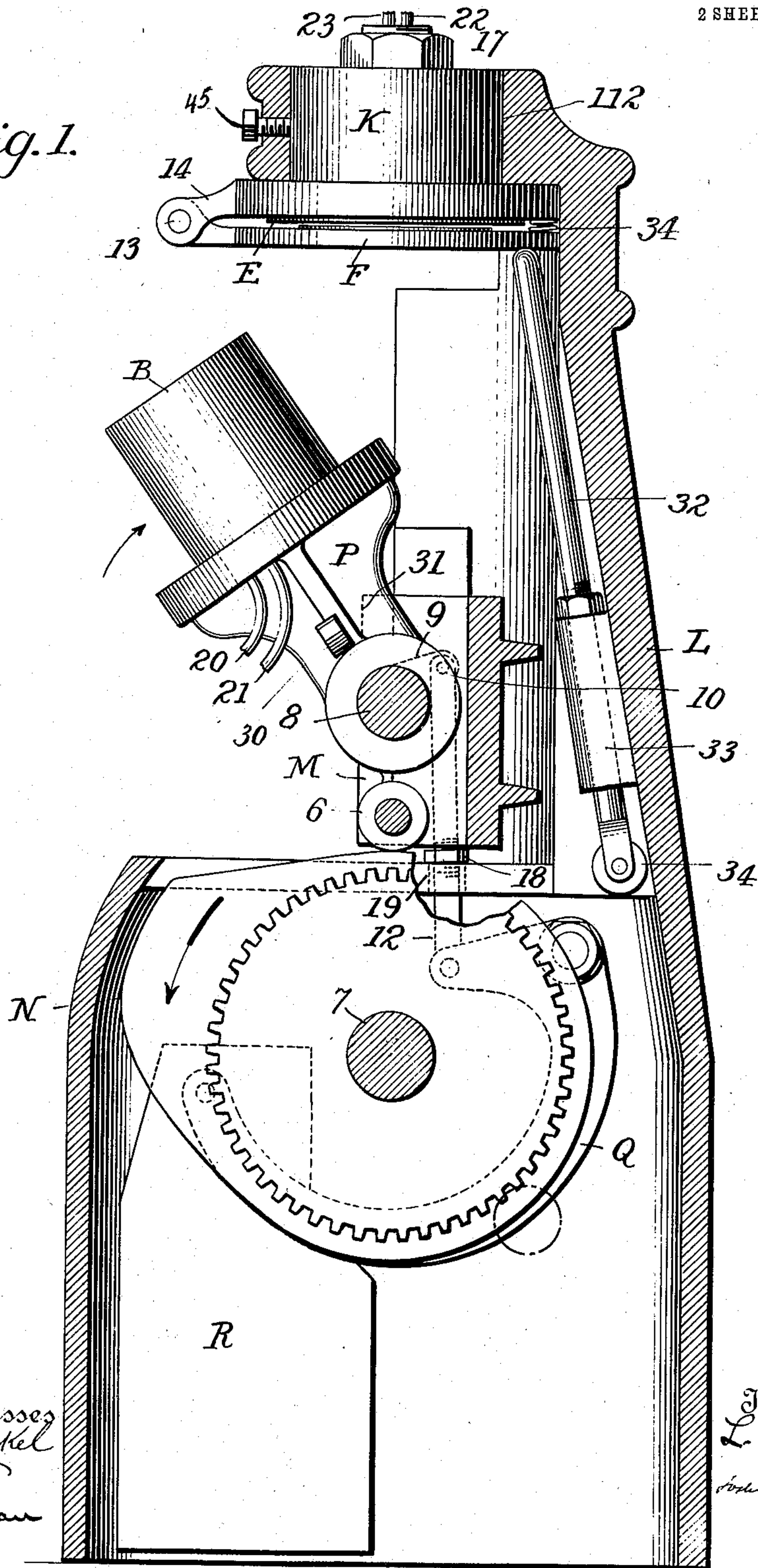
L. C. MALTBY.  
PAPER BOX MACHINE.  
APPLICATION FILED DEC. 15, 1903.

919,905.

Patented Apr. 27, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



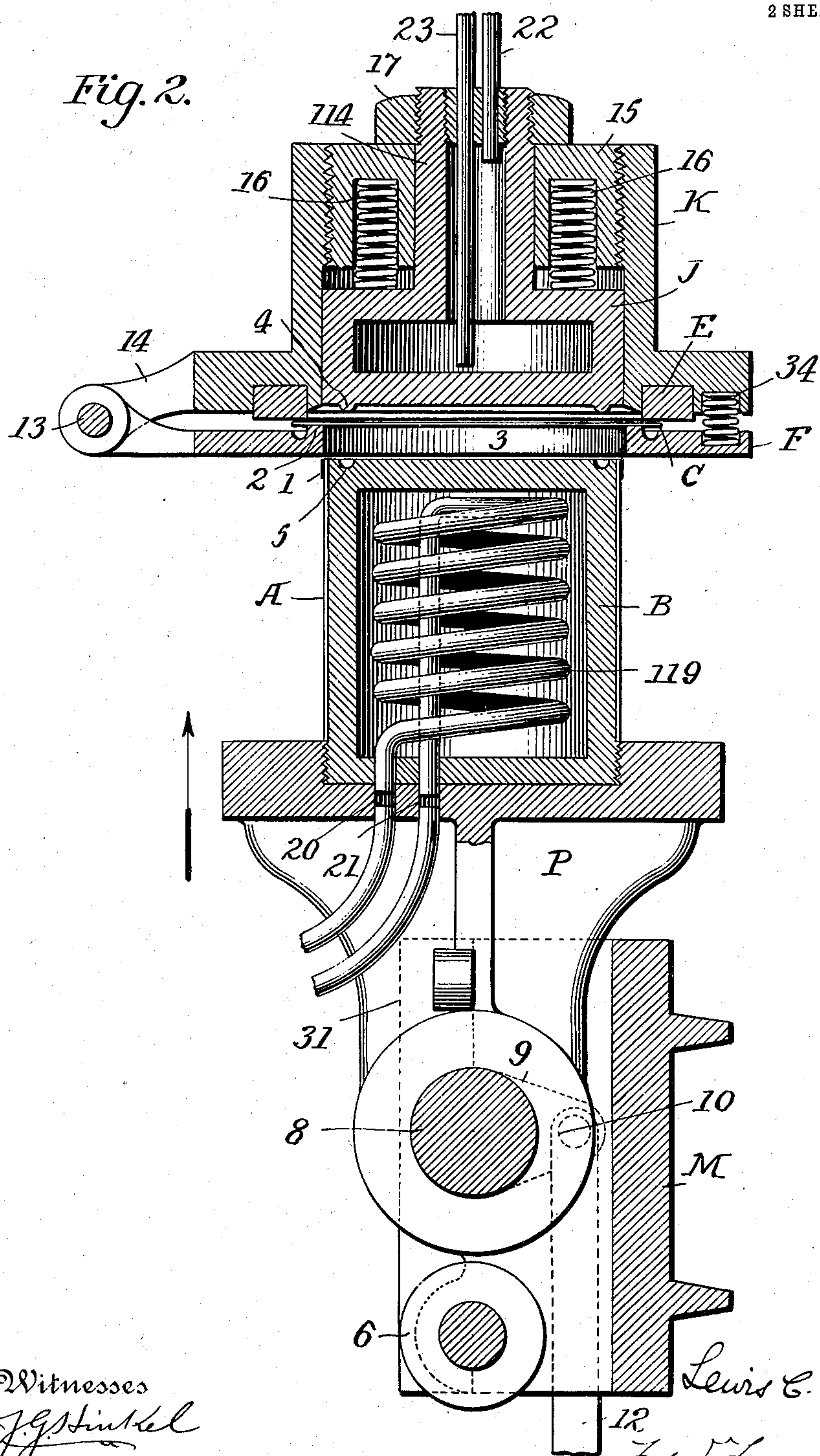
Witnesses  
J. G. Hinkel  
G. M. Freeman

Inventor  
L. C. Maltby  
J. H. Freeman & Watson  
Attorney


919,905.

2 SHEETS—SHEET 2.

*Fig. 2.*



Witnesses  
J. G. Hinkel  
G. H. Freeman.


 Lewis C. Maethy Inventor  
 12  
 (John) Freeman Gibson  
 Attorney



# UNITED STATES PATENT OFFICE.

LEWIS C. MALTBY, OF WASHINGTON, DISTRICT OF COLUMBIA.

## PAPER-BOX MACHINE.

No. 919,905.

Specification of Letters Patent.

Patented April 27, 1909.

Application filed December 15, 1903. Serial No. 185,313.

*To all whom it may concern:*

Be it known that I, LEWIS C. MALTBY, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Paper-Box Machines, of which the following is a specification.

My invention relates to apparatus for the manufacture of boxes of paper or other flexible material, and embodies a die and counter die, the latter supported in a fixed position and adapted to receive the former and to turn down upon the body of a box supported thereby, the edge of a disk, as fully set forth hereinafter and as illustrated in the accompanying drawings, in which—

Figure 1 is a vertical elevation of an apparatus embodying my invention; Fig. 2, a vertical sectional elevation drawn to an enlarged scale, showing the main parts of the apparatus.

Before referring to the details of the mechanism, I will describe the operations to be performed in connection with the cylindrical paper body A, made in any suitable manner, and a sheet of paper C, from which one end of the box is to be made. The said cylindrical body A has deposited upon it near one end and on the outside, a layer 1 of cement, preferably glue, and the body A is mounted upon a die B, preferably heated. The sheet of paper C is carried to a position above the die B and between an annular movable holder F having a cutter projection 2 and an annular stationary cutter E, and by the upward movement of the cutter 2, a disk is sheared from the sheet C of a diameter exceeding that of the body A, and the latter with the die B is then carried upward through an opening 3 in the holder F through a corresponding opening in a counter-die K, which opening is surrounded by a crimping ring having a beveled lower edge, and in said opening is a sliding block J, movable vertically in a recess in the die K, so that as the die B meets the disk, the latter is pressed between the top of the die B and the block J and as it is carried upward into the recess in the die K, the edge of the disk is turned outward and compressed onto the outside of the body A with a pressure that flattens all the folds formed by bending the disk, producing a comparatively smooth flange, which under the influence of the heat and pressure is cemented by the cement to the body. The die B then

descends and the block J is forced downward to carry the box out of the die K, and on the further descent of the die B, the box is drawn through the opening 3 in the holder F, and may then be removed from the die B.

While it is common in machines for flanging metal to bend down the edges of a disk to draw out and form a flange at right angles to the face of the disk, I have found from numerous tests that this cannot be practically effected in flanging disks of paper. This results from the fact that the paper almost invariably breaks at the bending point; in fact it cannot be "drawn" like metal. To remedy this defect I provide means whereby to permit a limited outward flow or feed of the paper in the act of bending and this has proved to be completely successful even with cheap short-fiber papers or boards. This is effected by forming an annular rib 4 upon the lower face of the block J and a corresponding annular recess 5 in the upper face of the die B and supporting the block J so that it can yield slightly upward as the flange is turned down. The springs 16 which support the block J to secure the described result must exert only sufficient pressure to indent the sheet as the dies are brought together, but to yield when the edge is turned down, allowing the stock that was taken up in the indentation to feed out across the edge of the die B. The presence of the body of the box on the die as the flange is turned down also tends to prevent tearing or fracture as the sheet is drawn over the end of the body which is soft and yielding.

The parts above described may be constructed and arranged to operate in any suitable manner, but as shown they are mounted upon an upright frame or casing L in which slides vertically a carrier M suitably guided and supported, with a roller 6, which bears upon the periphery of a cam N mounted upon a shaft 7 turning in bearings on the frame and driven in any suitable manner. Across a slot or recess in the carrier M extends a shaft 8 with which swings a bracket or holder P supporting the die B, and at the end of the shaft 8 is an arm 9 carrying a crank pin 10 from which a connecting rod 12 extends downward and is jointed to the short arm of a lever Q, to the long arm of which is pivoted a heavy weight R, the said weight and lever tending to carry the connecting rod 12 downward and swing



the holder P in the direction of its arrow to bring the die B to a vertical position.

The die K fits a socket 112 at the upper part of the frame and is secured therein by a set screw 45, and the cutter holder is pivoted by a pivot pin 13 to a bracket 14 extending from the die K, the axis of the pivot pin being on the same plane as the lower face of the cutter E, so that the cutter carried by the holder F will effect a progressive shearing of the sheet and secure a cleaner cut with the exertion of less power than if it was maintained in a horizontal position and then carried upward.

The block J is hollow and has a central tubular stem 114 extending through a block 15 secured in the die K and this block 15 is recessed to receive springs 16 which tend to carry the block J downward to an extent limited by an adjustable collar or nut 17 turning upon the threaded end of the stem 114. The block 15 as shown is threaded externally to fit a threaded socket of the block K and may be turned to raise or lower it in the socket to vary the position of the parts which it carries and to vary the tension of the springs 16.

The upward movement of the carrier M, holder and die B is effected by the rotation of the cam N, a projection upon which lifts these parts and as the projection passes from the roller 6, said parts are carried downward by the action of the weight R through its connections with the crank arm 9. When, however, the die B has been wholly removed from below the cutters, it is desirable to swing outward the holder P and the lower die, that the box may be removed; and this swinging movement of the parts is secured by providing the connecting rod 12 with an adjustable stop shown as a nut 18 which, by contact with a shoulder 19 on the frame, causes the arrest of the connecting rod 12, while the descent of the carrier M and shaft 8 causes the latter to be turned to swing the holder outward. After the box is removed, which may be done by hand, another box body A is placed upon the lower die and as the cam N rotates the carrier M and its shaft 8 are lifted, the weight tending to hold the rod 12 down and insuring the inward swing of the holder P until the lower die is in a vertical position, when a lug 30 on the holder P will make contact with the vertical face 31 of the carrier, and the carrier, holder and die will move upward as before.

The cutter holder F may be moved in any suitable manner to cut the disk from the sheet before the die B moves fully through the opening 3. As shown, a rod 32 slides in a guide 33 secured to the frame and bears with its upper end against the lower side of the holder F. A roller 44 at the lower end of the rod makes contact with the cam N which lifts the rod before it acts to lift the

lower die. A spring 34 serves to carry down the holder F to the extent permitted by the descent of the rod.

Any suitable means, electrical or otherwise, may be employed for heating the parts. As shown, the hollow die B has within it a coil pipe 119 communicating with an inlet port 20 and outlet port 21 in the holder P, with which ports may be connected flexible pipes for the admission and discharge of the heated fluid, as steam or hot water. The block J is supplied with a like heated fluid through a short pipe 22 passing through a plug at the top of the stem 114 and a discharge pipe 23 extends nearly to the bottom of the chamber in the block, so that in the use of steam, if there should be any water in said chamber, it will flow readily up in the pipe 23 and be discharged.

I have not shown any means for feeding the sheet of paper in successive steps after the different cuts, as any suitable feeding devices may be employed, or the sheet may be fed by hand.

While I prefer to hinge the lower cutting ring so as to get a progressive shearing effect as described, it may be carried up and down while its horizontal position is maintained. It will further be seen that while I have illustrated dies adapted to operate in connection with cylindrical box bodies, the parts will, of course, be shaped to correspond to the shape of the bodies of the boxes to be made. It will further be seen that although I prefer to arrange the cutters so as to shear or cut the disks in proper position to be met by the upward movement of the box body, the said disks may be otherwise cut and presented.

Without limiting myself to the precise construction and arrangement of parts described, I claim as my invention:

1. In a machine for flanging and applying bottoms to the bodies of paper boxes, the combination of a die adapted to be inclosed by the hollow box body, a counter die, recessed to receive the end of the body die, its box body, and the flange of the bottom disk, means for supporting the disk between the dies, a recess in the end of the body die adjacent to the sides thereof, a movable block extending into the counter die and provided with a rib adapted to the recess of the body die, and springs bearing on the block and adapted to yield as the body die enters the counter die, for the purpose described.

2. The combination in a box making machine, of a reciprocating die B adapted to receive a box body, a counter die adapted to receive the end of said body and to turn down onto the same the edge of a disk, a stationary annular cutter supported below the counter die, and a movable annular cutter pivoted to shear progressively with the stationary cutter, substantially as set forth.



3. The combination of a frame, counter die, carrier, a cam for vertically reciprocating the carrier, a holder connected to a shaft rocking in the carrier and supporting the die B, a crank arm upon said shaft, a weighted connecting rod pivoted to the said crank arm, and a stop for arresting the movement of the rod as the carrier completes its downward movement, substantially as set forth.

4. The combination with the frame, counter die, carrier, and operating cam, of a holder supporting the die B, a rock shaft turning in the carrier and connected to said holder and provided with a crank arm, a weighted lever pivoted to the frame and connected with said crank arm, a connecting rod, and means for arresting the downward movement of the connecting rod prior to the completion of the downward movement of the carrier, substantially as set forth.

5. The combination of a counter die, a block, sliding in said counter die and having a chamber for receiving a heated fluid, an inlet pipe communicating with said chamber, and an outlet pipe extending to the bottom of the chamber, substantially as set forth.

6. The combination of the sliding and swinging die B, counter die, fixed cutter, movable cutter, and a sliding rod for operating the movable cutter, substantially as set forth.

7. In a box machine the combination with a frame, of a carrier sliding thereon, a rock

shaft supported in bearings on said carrier, means for reciprocating the carrier and rocking the shaft, a primary die carried by the shaft to move therewith, a blank-holding member adapted to embrace the die, a hollow counter die and means for supporting the same, and a crimping ring surrounding the opening of the counter die.

8. In a box machine, the combination with a frame, of a primary sliding and rocking blank receiving die sustained thereby, means for reciprocating the die, a secondary die, a crimping ring surrounding the secondary die, and means for sustaining the said ring.

9. The combination of the sliding and swinging die B, a cam operating the same, a counter-die, fixed cutter, movable cutter, and a sliding rod for operating the movable cutter arranged to be operated by the cam.

10. The combination of the sliding and swinging die B, a cam operating the same, a counter-die, fixed cutter, movable cutter, and a sliding rod for operating the movable cutter arranged to be operated by the cam, substantially as set forth.

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

LEWIS C. MALTBY.

Witnesses:

CHARLES E. FOSTER,  
GAY N. FREEMAN.