(No Model.)

C. F. ANDERSON.

PAPER BOX MACHINE.

No. 464,628. Patented Dec. 8, 1891.

Fig. 1.

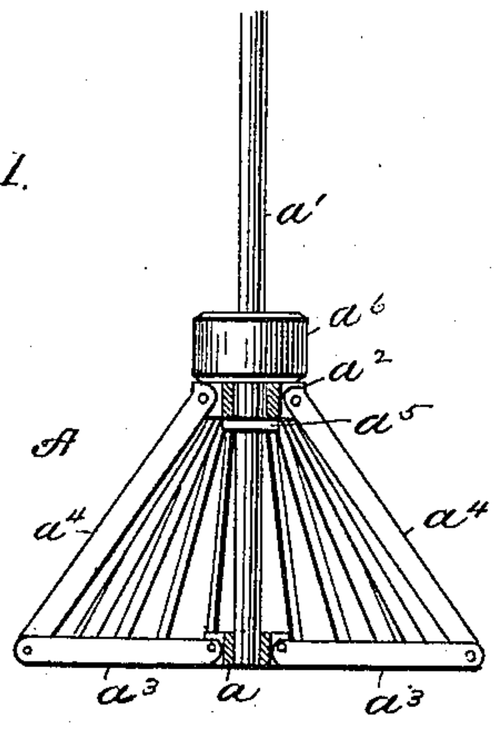
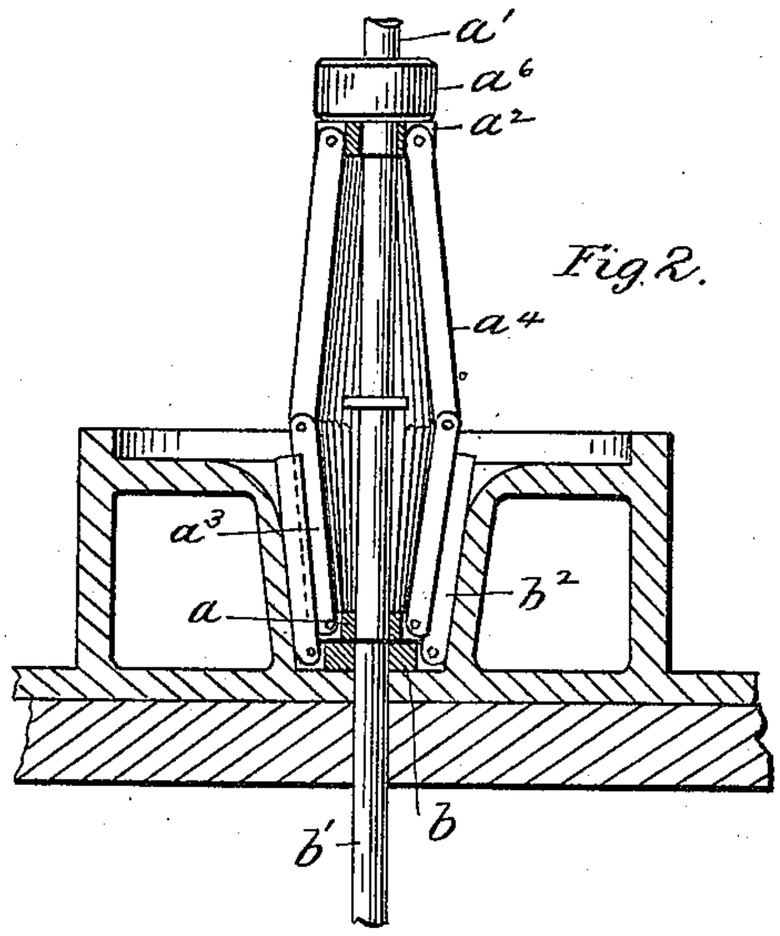
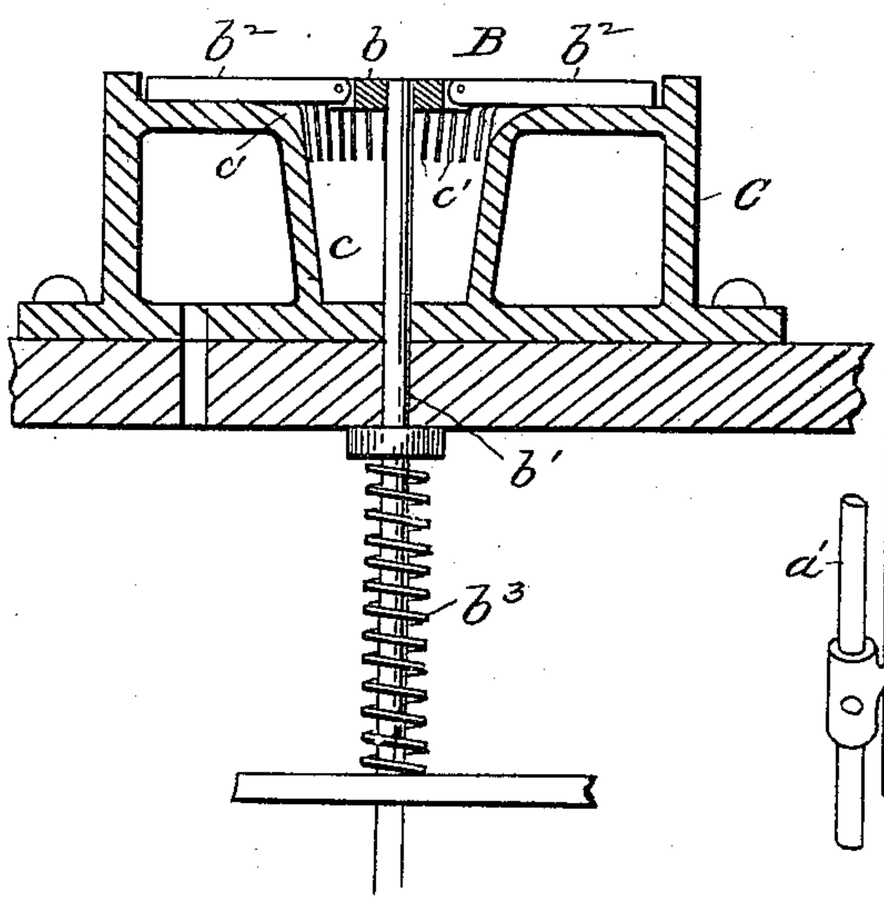


Fig. 2.





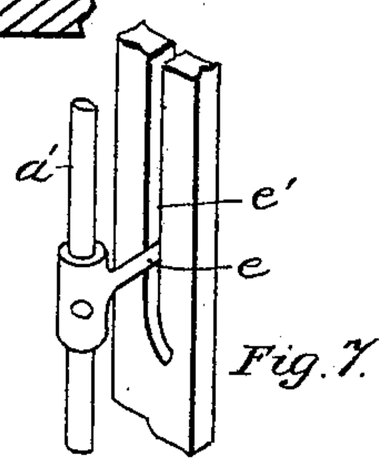


Fig. 7.

Fig. 4

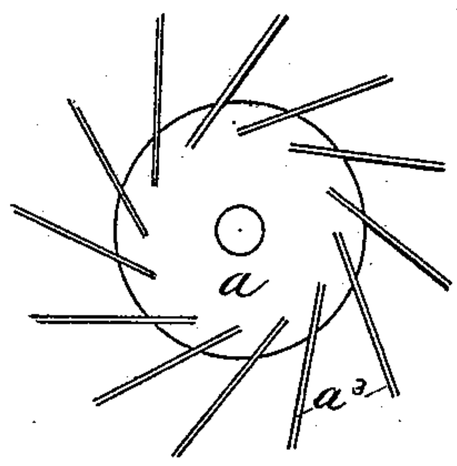


Fig. 5.

Fig. 6

Fig. 8.

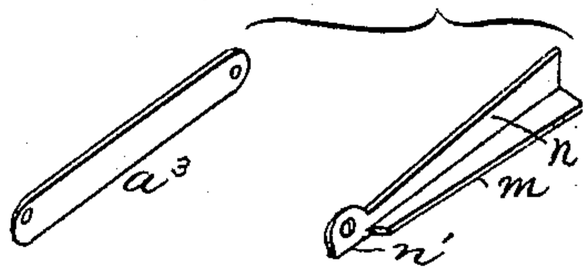


Fig. 3.

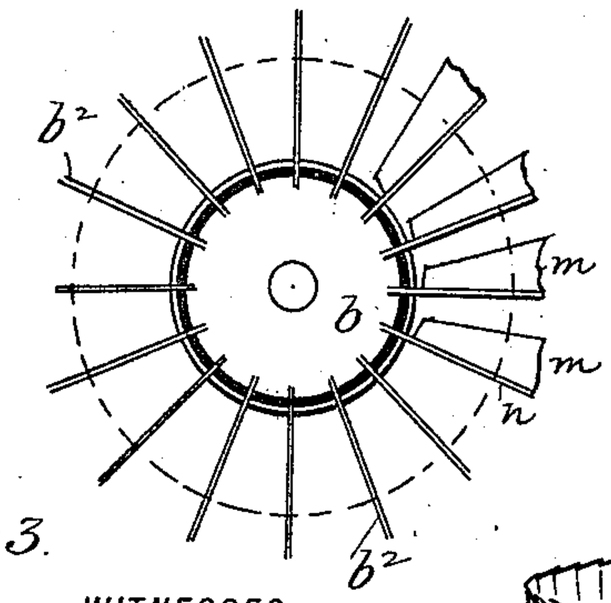
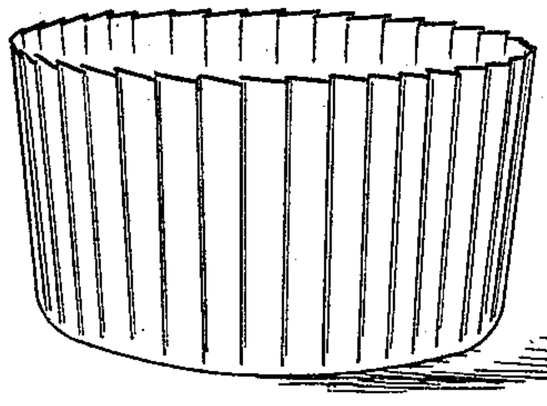


Fig. 9.



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PAPER-BOX MACHINE.

SPECIFICATION forming part of Letters Patent No. 464,628, dated December 8, 1891.

Application filed February 11, 1889. Serial No. 299,365. (No model.)

To all whom it may concern:

Be it known that I, CARL F. ANDERSON, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Paper-Box Machines, of which the following is a specification.

My invention relates to machinery for the manufacture of boxes, cups, or other vessels of a general cylindrical form from a single piece of stock. The stock may be of any suitable flexible material in sheet form, such as paper, leather, thin metal, or any composite material having a like nature.

The object of the invention is the production of an apparatus which, in conjunction with other machinery well known in the art, will manufacture the above-mentioned articles in an expeditious, cheap, and efficient manner, the finished article being neat, light, and ornamental in appearance.

The invention consists, mainly, in a novel construction of dies for shaping a blank into the desired form and in other details connected therewith, which will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 represents a vertical central section of my improved dies and shaper, the dies being open or apart. Fig. 2 represents a similar view of the dies together or closed upon the blank. Fig. 3 is an enlarged plan view of the lower die, showing two forms of blade, the outer edge all around being broken away for the purpose of economizing space on the sheet. Fig. 4 is a detail view of a modified construction. Figs. 5 and 6 are details and diagrammatical views showing the relative positions of the blades and blank, the former designed to flute the blank and the latter to plait it. Fig. 7 is a detail view of mechanism to be used when the blank is plaited. Fig. 8 shows views of two different forms of blade used, and Fig. 9 is a view of one form of product manufactured by this machine.

Referring to the view of the box, it will be seen to be cup-shaped. It has a circular flat or plain bottom and plaited or fluted sides. These plaits or flutes will be seen to be regular and even.

Referring to the drawings by letter, A represents the upper or male die, and B the lower or female die, while C is what I term the "shaper." The upper die consists of a disk or plunger-head a, fixed rigidly to the end of a thrust-rod a'. While this head is rigidly secured to the rod, it is to be understood that it is also removably attached thereto by means of a bolt, set-nut, or any other suitable means.

a^2 represents a sliding collar upon the rod a'.

To the disk or head a is pivoted or hinged a series of blades a^3. This construction is best shown in Fig. 3. The blades stand in vertical planes radiating from the disk and are hinged in slits or kerfs in the disk by the ordinary umbrella or any other suitable form of hinge. The pivots are slightly eccentric, so that when the blades swing out of the horizontal plane of the disk their outer edges will always be in lines outside of the edges of the disk. These blades are the same length, and each one is connected by a pivot-joint at its outer end with another series of blades a^4, which in turn are pivoted to the sliding collar a^2. The form of blades a^4 is not material, except that they be of sufficient strength to resist the strain. Their object is simply to connect the ends of the blades a^3 with the collar a^2. The movement of the collar toward the disk a is limited by a fixed stop or collar a^5. The location of this stop is such that the lower edges of the blades a^3 will be maintained in the same plane with the lower face of the disk a when the die is in its upper position. A weight a^6 is placed loosely upon the rod a' above the collar a^2 for the purpose of forcing the collar down, and thus having the tendency to maintain the blades a^3 in the horizontal position shown. From this description of the upper die it will be seen that the structure has the appearance of a cage with a flat bottom and that its shape may be altered by sliding the collar a^2 up and down upon the rod.

Referring now to the lower die, this die is almost a counterpart of the lower part of the upper die, the difference being that the disk or center portion b has a larger diameter than the disk a, so that the upper disk may cover only the middle portion of the lower disk. It is well to remark here that the diameter of the upper disk is the same as the internal diameter of the finished box. Die B is supported, normally, upon the upper sur-

face of the shaper C and by the rod b', which is held upward by spring b^3. The rod is secured to the disk and the blades lie out upon the shaper.

The shaper C consists of a casting having a central circular chamber c of the shape of the box or vessel manufactured. As shown its sides are slightly flared.

Around the shaping-chamber may be formed a steam-chamber for the purposes of heating the die. Across the corner of the casting, where the wall of the shaping-chamber meets the upper surface of the casting, a number of grooves c' are cut, one directly beneath each blade. These are for the purpose of guiding the blades, aiding in maintaining each blade in its proper position, and allowing of an easy and timed upward movement of the blades when the die is forced into the shaping-chamber, as will be set forth hereinafter.

The blades in each die are arranged in alternate vertical planes, so that when the dies come together and close upon each other the blades will intermesh.

It is to be understood that these dies are to be operated by power. The rod supporting the upper die may be connected with a pitman driven by a crank from a main shaft or in any other manner which will impart a reciprocating movement to the die.

In Fig. 7, a' represents the rod of the upper die. It has attached to it a laterally-projecting finger e, which moves in a slot e' in a portion of the frame of the machine. The lower end of the slot curves to one side, and when the finger enters this curved portion the shaft is given a slight rotation. The finger enters the curved portion of the slot at the end of the movement of the die and imparts to the die a slight rotary motion for the purpose hereinafter described.

The operation of the dies is as follows: A circular blank of paper or other material is placed concentrically upon the lower die in the position shown in dotted lines in Fig. 3. The upper die then comes down upon it and drives the lower die into the shaping-chamber. In passing into this chamber the blades b^2 are forced upward against the edges of the blank, which lie between the blades of each die. This upward pressure of the lower blades is met by the downward pressure of the upper blades, caused by weight a^6. The edges of the blank are therefore gripped between the two sets of blades; but inasmuch as the blades of each die are in alternate planes and strong pressures are acting in opposite directions upon the blades they will be forced to intermesh and carry the blank before them. While this operation is going on the edges of the blank are being bent up more and more toward a vertical position, thus allowing the blades to deepen the flutes or plaits. When the dies reach the bottom of the chamber, a slight extra pressure of the plunger is given, accompanied by the partial rotation of the upper die. The extra pressure "sets" the plaits and the rotation makes one side of the flute shorter than the other, so that when it is removed and ironed in another die the flutes will fall over upon themselves and form the plait. When the upper die rises, the lower die follows it, and the opening of the dies allows the box to drop off onto the lower die, whence it may be removed in any manner desired.

The dies which I have described are designed to form a box with vertical flutes or plaits.

In Fig. 4 I have shown an arrangement of the blades by which the flutes or plaits are formed on the bias or inclined. The blades instead of being set radially are set in lines approaching tangents. This will be readily understood by reference to the figure.

In Fig. 8 details of two forms of blade are shown. One is the ordinary flat strip, while the other has a lateral web m, formed by bending the flat strip longitudinally at right angles. That portion n of the blades which intermeshes with the blades in the opposite die is narrow at its inner end and grows wider toward the outer end for the purpose of making the flutes of gradually-increasing depth. The pivoted end is provided with a lug n', through which the pivot passes. When this form of blade is used, the material is carried between the blades and pressed against the angles. In this way the flutes are creased and more firmly set.

In Fig. 6 the blades are shown as set on inclined pivots. The object of this is to facilitate the plaiting operation. When the final rotation of the shaft is given, the blades will slightly overlap and carry the flutes of the blank with them.

It is to be understood that the shape and size of the box produced in this machine may be varied in a number of different ways.

The machine herein described is capable of making boxes or cups of different depths by simply changing the size of the blank, as the depth of the box in a given die is dependent upon the extent which the edges of the blank project beyond the center disk or hubs.

I do not confine myself to the particular form of shaping or forming chamber herein described, inasmuch as the only portion thereof which is necessary to the operation is the upper edge of the chamber.

Having described my invention, I claim—

1. The upper fluting-die consisting of a central hub or block and a series of blades hinged thereto, a weight whose tendency is to maintain the blades in their normal position, the lower fluting-die consisting of a central hub or block and a series of blades hinged thereto, and a spring whose tendency is to maintain the blades in their normal position, in combination with a shaping-die, the fluting-dies being movable with respect to the shaping-die, the said die being arranged to force

the blades into their abnormal positions against the power of both weight and spring, substantially as described.

2. A die consisting of a fixed hub, as a, having pivoted thereto a series of blades, as a^3, a number of links, as a^4, pivoted at one end to the outer extremities of said blades a^3 and at the other end to a movable collar, as a^2, and a stop, as a^5, to limit the movement of said movable collar.

3. A die consisting of a fixed hub, as a, having pivoted thereto a series of blades, as a^3, a number of links, as a^4, pivoted at one end to the outer extremities of said blades a^3 and at the other end to a movable collar, as a^2, and a stop, as a^5, to limit the movement of said movable collar, and a weight tending to maintain the movable collar against said stop, substantially as described.

4. The combination of the dies, the reciprocating rod connected to one of said dies, the finger rigidly connected with said rod, and the frame having a slot curved at one end, said finger running in said slot.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CARL F. ANDERSON.

Witnesses:
WM. A. ROSENBAUM,
FRANK C. GRUEN.