

(No Model.)

W. B. HOWE.

MACHINE FOR CUTTING AND SCORING PAPER.

No. 569,873.

Patented Oct. 20, 1896.

Fig. 1.

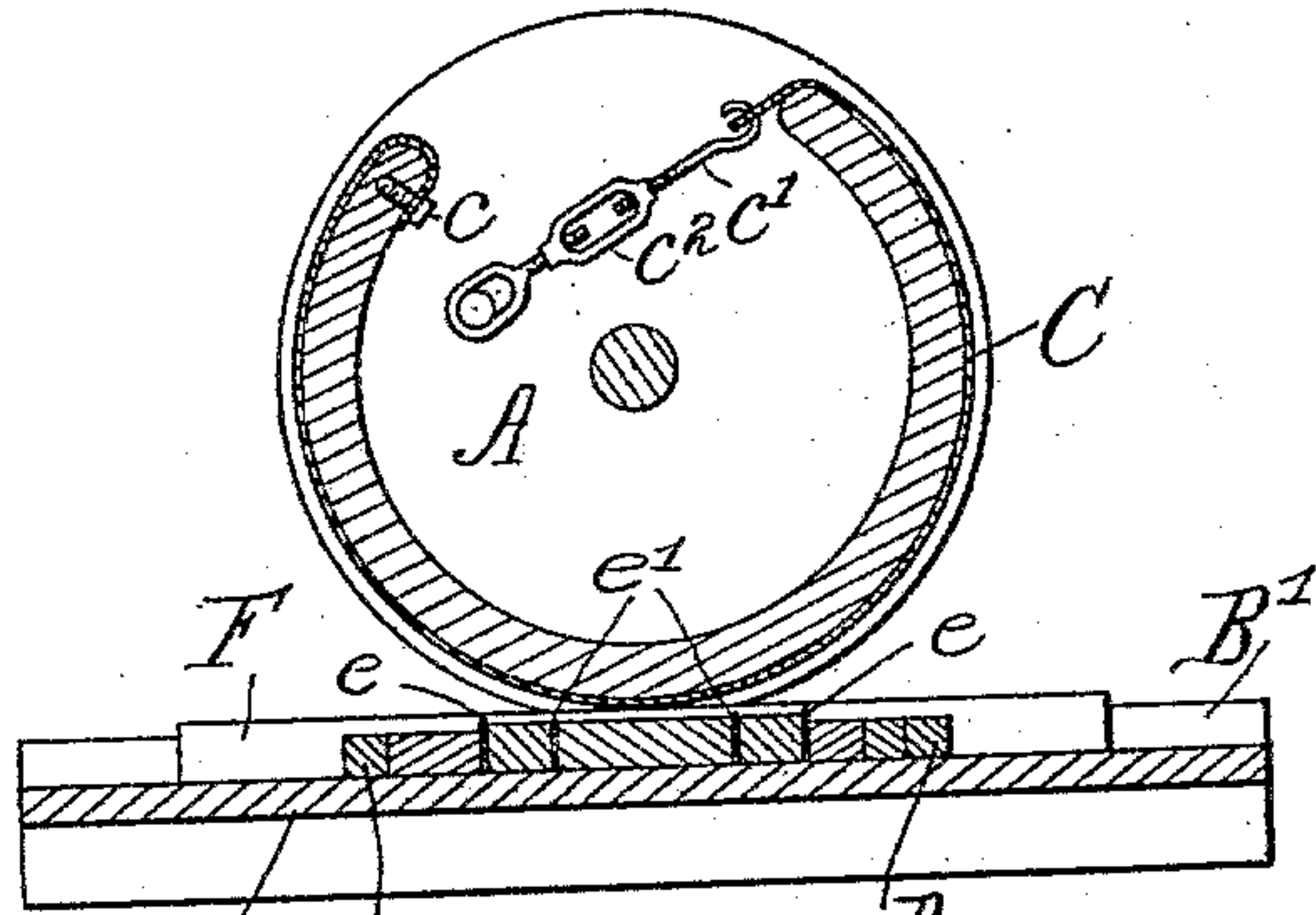


Fig. 2.

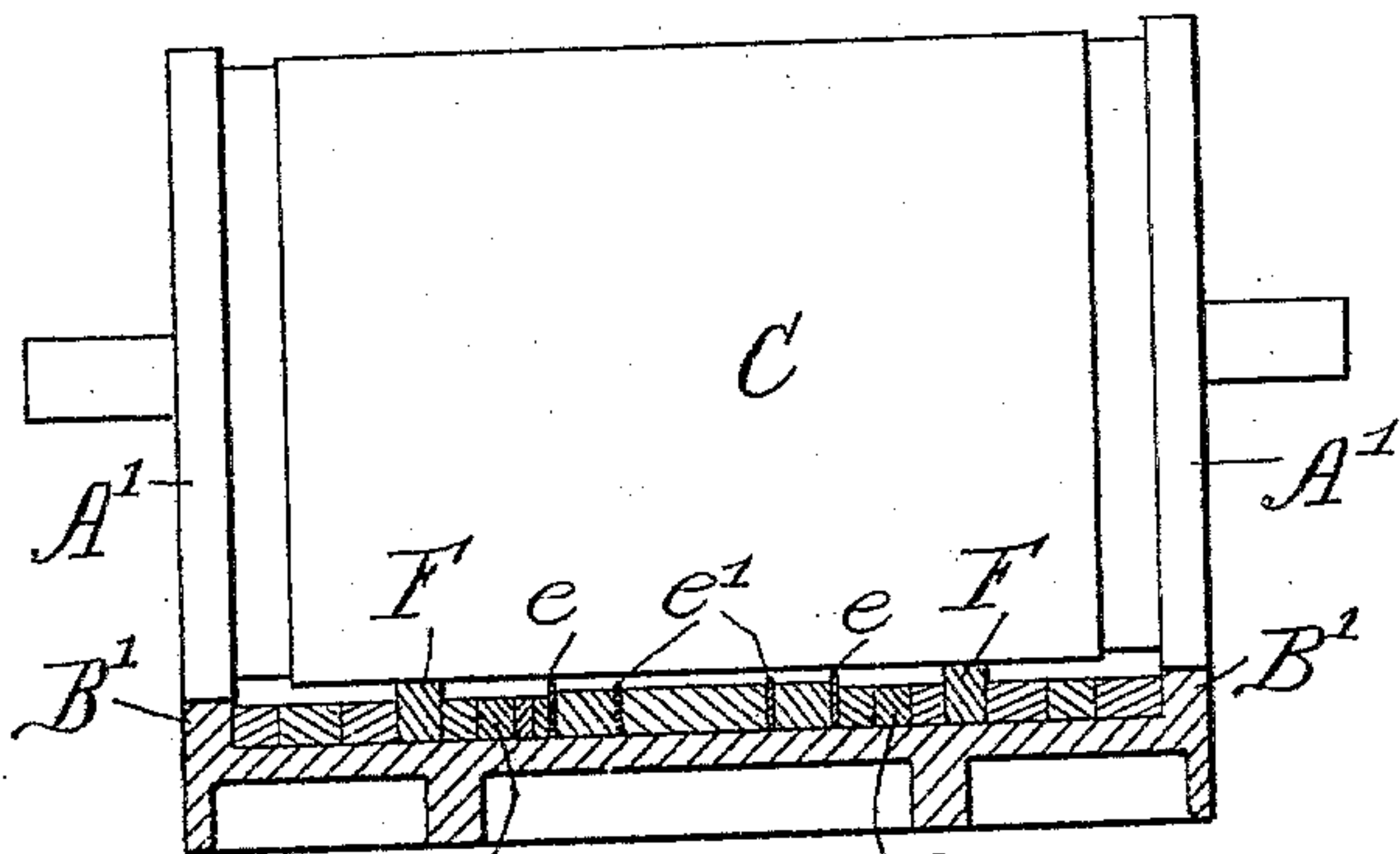
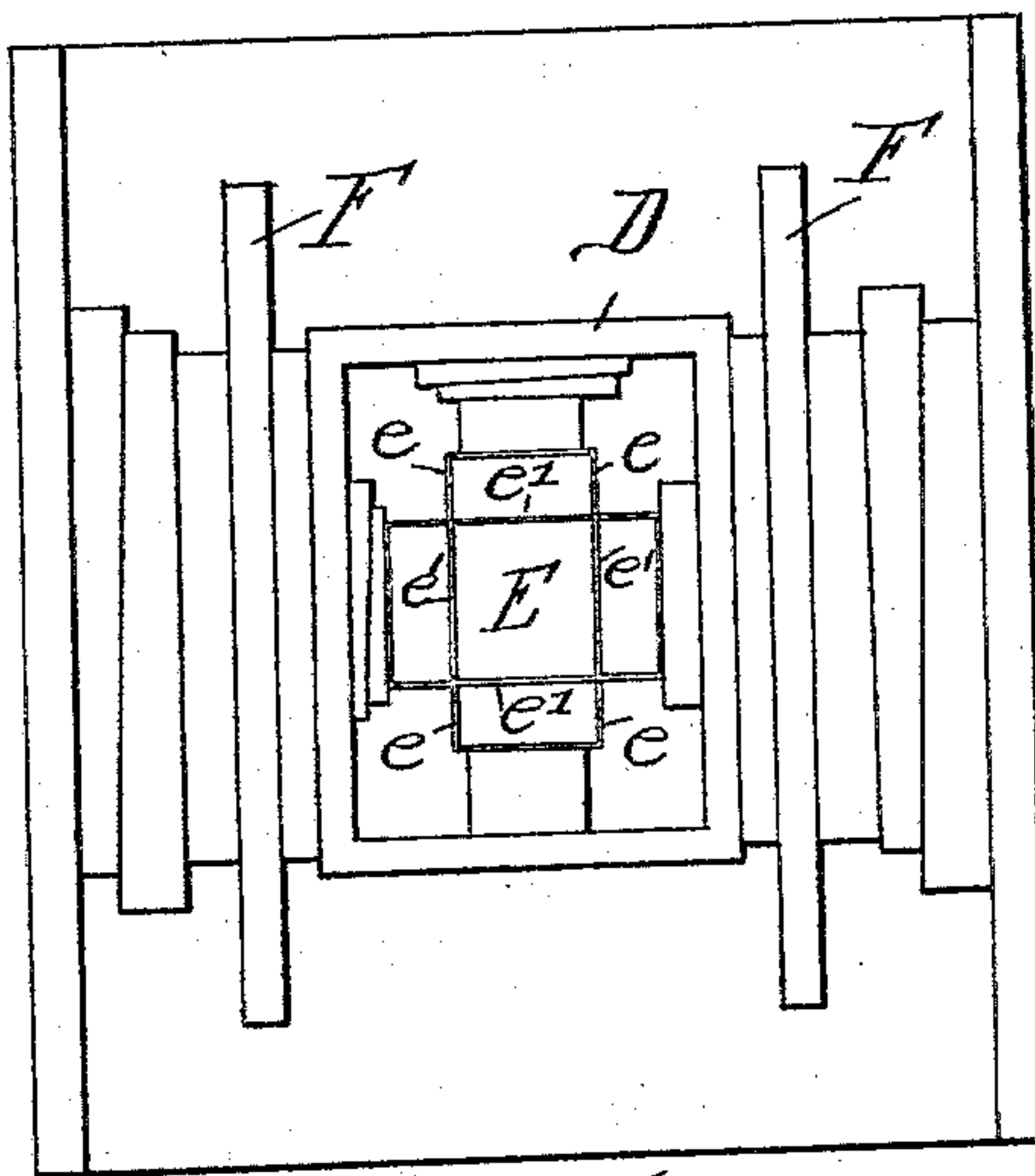


Fig. 3.



Witnesses
S^r M. R. Rhen:
Chas. H. Haulik

Inventor:
Warren B. Howe.

by Dayton, Poole & Brown Attys

UNITED STATES PATENT OFFICE.

WARREN B. HOWE, OF CHICAGO, ILLINOIS.

MACHINE FOR CUTTING AND SCORING PAPER.

SPECIFICATION forming part of Letters Patent No. 569,873, dated October 20, 1896.

Application filed June 17, 1895. Serial No. 553,038. (No model.)

To all whom it may concern:

Be it known that I, WARREN B. HOWE, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Cutting and Scoring Paper; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in apparatus employed in cutting and scoring strawboard or paper for making paper boxes and the like.

The invention consists in the matters hereinafter described, and pointed out in the appended claim.

In the cutting or scoring of paper or strawboard for making folding paper boxes and shells or bodies for strawboard boxes a printing-press is commonly used of that kind embracing a revolving impression-cylinder and a reciprocating horizontal bed, which passes beneath the cylinder and in which is placed a form containing cutting and scoring knives, against which form the paper or strawboard is pressed by the action of the impression-cylinder as the reciprocating bed passes beneath the same, the impression-cylinder being lifted free from the form at each back stroke of the latter in a familiar manner. The cutting or scoring has commonly been accomplished heretofore by the use of metal strips or rules, preferably of soft steel, which are arranged within a chase similar to those used by printers for holding a form of type, and held in place therein by blocks or strips of wood, the rules used for scoring being like those used for cutting, but somewhat lower or narrower, so that they will indent or crease the paper without cutting it, at the same time that the cutting-rules are operating to sever the same.

The impression-cylinders and bed of the machines employed are commonly provided with bearing-surfaces to maintain the surface of the cylinder at a proper distance from the top surface of the bed in printing, the cylinder usually being provided at its ends with marginal flanges and the bed with raised ribs or flanges at its side edges adapted for contact

with the end flanges on the cylinder. In this construction the raised ribs or flanges on the bed afford the required ledges or shoulders between which the form is clamped in securing it to the bed.

In carrying out my invention I employ in addition to the apparatus above described devices constructed as follows: I cover the entire working part of the impression-cylinder with a layer or covering of sheet-steel of uniform thickness and of soft quality. I also attach to the top surface of the bed adjacent to the form and at opposite sides thereof supplemental bearing-bars made of approximately the same height as the cutting-knives, and therefore very slightly higher than the scoring-knives. Said bearing-bars are made of metal and are adapted to act on the sheet-metal covering of the impression-cylinder adjacent to the form with a pressure greater than is required to do the cutting at any part of the form, so as to take all spring or lost motion from the parts, it being of course understood that the impression-cylinder is held down to its work with such pressure that it cannot rise or yield when the heaviest cutting is being done.

The advantages of the construction described may be understood from the following: The employment of a sheet-metal covering for the impression-cylinder is highly desirable, for the reason that the same affords a surface against which the cutters may act without injury to the latter, while at the same time it preserves the surface of the cylinder from injury by the action of the cutters, and may be easily renewed when it is itself cut or scored by the action of the cutters to such extent as to make it too rough for further use. The bearers arranged at opposite sides of the form act to press or hold the sheet-metal covering of the impression-cylinder closely and firmly against the surface of said cylinder at the part of said covering between the bars and at the place where the cutting and scoring is being done. This function of the bars is highly important, because it is found in practice to be practically impossible to draw or hold the covering so tightly around the cylinder as to entirely avoid springing or yielding of the covering under the pressure of the form thereon. Ob-

viously the bearers arranged as described press the said covering against the cylinder and thereby take up all spring or lost motion therein which in the absence of said bearers would give inequality or unevenness of action.

It will be readily seen that the covering will be held tightly against the cylinder and prevented from springing between the bearing-bars by reason of the fact that the covering is bent into cylindric form, which gives it such rigidity or capacity of resisting flexure between the bearing-bars as to prevent any appreciable springing or yielding thereof along the line of contact with the form.

Aside from their function of holding the sheet-metal covering tightly against the cylinder said bearing-bars also act to take up all lost motion due to the springing or yielding of the bed and other parts of the press during the cutting and scoring operation. By the employment of said bearing-bars therefor the action of the cutting and scoring knives is made absolutely uniform and equal throughout.

The advantages gained by the employment of said bearing-bars in connection with the sheet-metal covering described will be better understood from consideration of the fact that any unevenness of action or pressure upon the cutters will result in the parts of the cutters subjected to the greatest pressure being forced to a considerable distance into the sheet-metal covering, while the parts subjected to a less pressure may fail to make contact with the cylinder or will act so lightly thereon as to cut or score insufficiently.

The best results will obviously be obtained when the edges of the cutters are brought in contact with the sheet-metal covering, so as to properly accomplish the cutting, without any possibility of any yielding or springing of the parts, and at the same time without any excess of pressure on the cutters which would tend to force the same into the sheet-metal covering and thus dull or destroy the knives and injure the covering. This desirable result is secured by employment of the bearing-bars arranged as described, for the reason that such bearing-bars in themselves take the pressure of the impression-cylinder, instead of the same being allowed to come upon the cutting edges of the knives which, as will be readily seen, are not adapted to sustain such pressure. In other words, the pressure coming on the said bearing-bars is greater than that required to do the cutting and scoring at any part of the form, so that the cutting and scoring knives at no time act upon the impression-roller in a manner to raise or lift the same away from the bearing-bars, while at the same time said bars prevent any outward springing or advance of the covering of the impression-cylinder when the latter is acting on the parts of the form where the cutting or scoring may be accomplished with slight pressure.

It follows from the above that the bearing-

bars are necessarily made of such height or thickness as to take all spring or lost motion from the parts, and at the same time relieve the cutting and scoring knives from pressure in excess of that required for their work.

The invention may be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a view in central section of the impression-cylinder and reciprocating bed of a machine embodying my invention. Fig. 2 is a cross-section of the bed, showing the cylinder in side elevation. Fig. 3 is a plan of the bed, showing a cutting and scoring form thereon.

As shown in said drawings, A indicates the impression-cylinder, and B the reciprocating bed, of an ordinary printing-press. The cylinder A instead of being provided with an ordinary blanket has a sheet-metal layer or covering C, which is attached to the working surface of the cylinder in any suitable manner. In the particular construction illustrated the sheet-metal covering C is turned inwardly at one end through a lateral slot of the cylinder, and secured to the cylinder by tap-bolts *c*, while at its opposite end its free edge is extended past the edge of the bearing-surface of the cylinder into the said slot, and is engaged by a series of hooked bars *c'*, the inner ends of which engage a suitable supporting-bar within the cylinder, and which are provided with turnbuckles *c''*, by which the sheet or metal layer may be drawn tightly over the surface of the cylinder.

The bed B is provided with the usual raised ribs or flanges B' at its side edges, which flanges are adapted for contact with the flanges A' on the ends of the cylinder A. D indicates a chase resting on the bed B and containing a form E, such, for instance, as that used for making a strawboard box-body, the same having cutting strips, rules, or knives *e e* and scoring rules or knives *e' e' e'*. The cutting-rules are arranged in a familiar manner to sever the blank from the surrounding sheet, while the scoring-rules are arranged to make creases or scores along which the projecting parts or flaps of the blanks are folded in setting up the boxes. Secured upon the table outside of and adjacent to the chase D are two bearing-bars F F, which are made of about the same height as the cutting-knives, but of greater length than the form, so that the impression-cylinder will rest or bear against said bearing-bars before the form reaches or leaves the cylinder as the said form passes beneath the same. Said bars F act in a manner hereinbefore described to hold the surface of the bed accurately parallel with the surface of the impression-cylinder notwithstanding the springing or yielding of the parts which, in the absence of the bars, would occur in the passage of the form beneath the cylinder, but which, when said bars are present, takes place as soon as the bars engage the cylinder, the said bars maintaining all

the parts under such tension or pressure that practically no further yielding can take place when the form itself reaches and is acted upon by the cylinder.

5 While I have shown in the accompanying drawings a device for straining or drawing the sheet-metal covering tightly around the cylinder, yet it is to be understood that such devices are not themselves sufficient to hold
10 the said covering in such close or intimate contact with the cylinder as to prevent some springing or yielding under the pressure required for the operation of the cutting and scoring knives, it being found in practice that
15 unless the bearing-bars be so arranged as to act on said sheet-metal covering the same will spring or yield to an extent sufficient to greatly affect the accuracy of the action of said cutting and scoring knives, and that very minute
20 differences in the position of the edges of the cutting or scoring knives with respect to the opposing surface against which they act will produce a great difference in the action of the knives, especially in acting on relatively
25 thin paper, such as the partially-flexible pulp-board or thick paper used for making the finer qualities of folding boxes or cartons.

As hereinbefore set forth, the construction described has advantages over devices previously used in two important respects, namely:
30 The bearing-bars act on the metal covering to hold the same against the cylinder in a manner to prevent any springing or yielding of said covering in its part between said bearing-bars, while at the same time said bearing-bars take or receive the pressure of the
35 impression-cylinder, so as to relieve the cutting and scoring knives of any pressure greatly in excess of that required for doing the cutting and scoring, and to thereby avoid
40 injury to the knives which would result from excess of pressure thereon. In other words, the pressure of the impression-cylinder upon the bearing-bars is so much in excess of the
45 resistance offered by the cutting and scoring knives that such resistance will be relatively

so slight as to be practically of no importance, the greater part of the pressure coming upon or being carried by said bearing-bars, as above described. As a result of this
50 construction there will be no yielding whatever of the sheet-metal covering away from the bed during the heaviest cutting, and no approach of said covering toward the bed when no cutting is being done at all. 55

It is an important feature that the bearing-bars afford the sole support for the cylinder during its operation, and the cutting and scoring form is not relied upon to sustain the cylinder at all, the result being that the work
60 is at all times accurate and uniform, while the durability of the cutting and scoring knives is greatly increased.

I claim as my invention—

A machine for cutting and scoring paper 65 blanks comprising an impression-cylinder, a separate sheet-metal layer or covering of uniform thickness applied to cover the entire working surface of the cylinder, a reciprocating bed provided with bearing-flanges
70 at its side margins which engage the ends of the cylinder, a cutting or scoring form resting on the bed and acting against said sheet-metal covering, and bearing-bars also resting on the bed at opposite sides of the form, said
75 bars being adapted to act upon the sheet-metal covering of the impression-cylinder and operating to hold or press the same against the cylinder at the time the form is acting on said sheet-metal covering, said bars being
80 constructed to take the pressure of the impression-cylinder in excess of that required for the operation of the cutting or scoring form.

In testimony that I claim the foregoing as 85 my invention I affix my signature, in presence of two witnesses, this 14th day of June, A. D. 1895.

WARREN B. HOWE.

Witnesses:

C. CLARENCE POOLE,
ALBERT H. GRAVES.