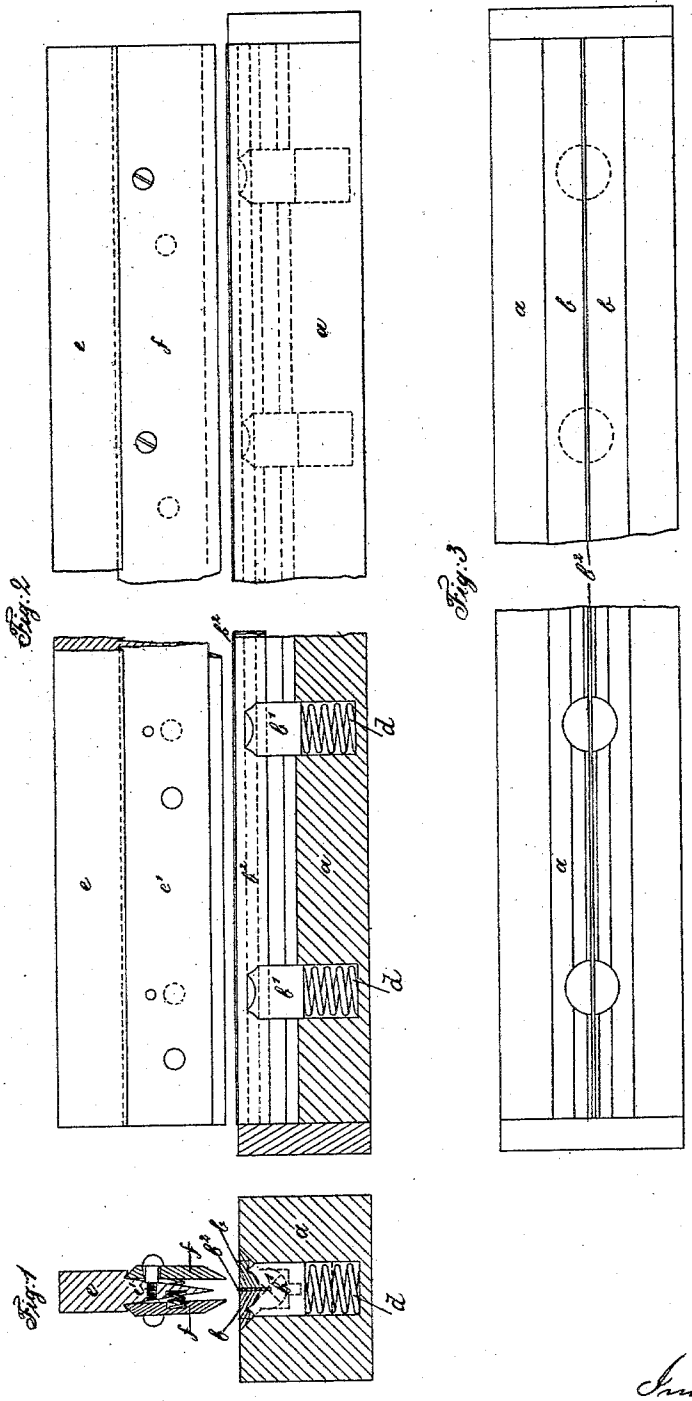
(No Model.) 3 Sheets—Sheet 1.

T. REMUS.

DEVICE FOR BENDING CARDBOARD.

No. 561,814. Patented June 9, 1896.



Witnesses:
Theo. G. Snell
Louis H. Mead

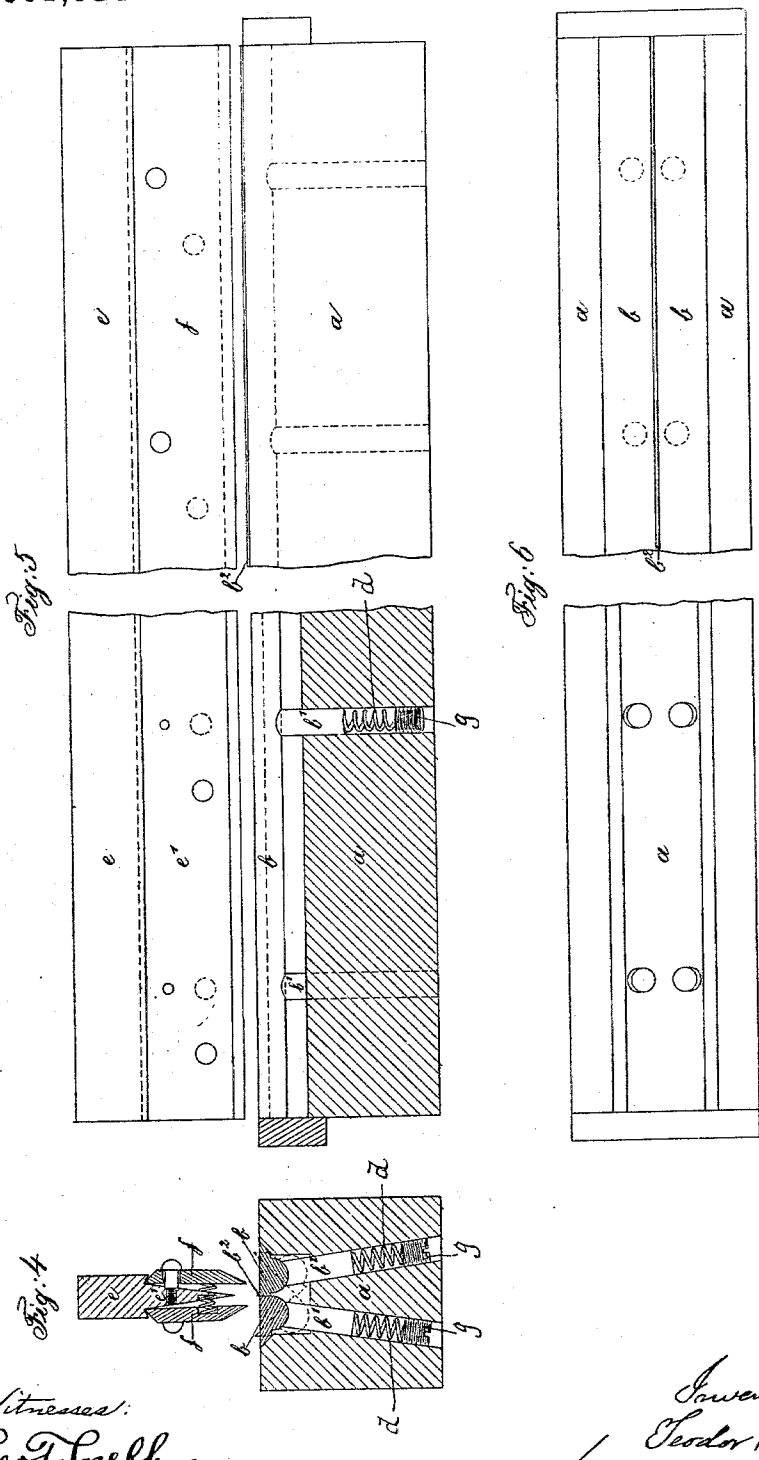
Inventor:
Teodor Remus
by Arthur O. Brown
his Attorney

(No Model.) 3 Sheets—Sheet 2.

T. REMUS.

DEVICE FOR BENDING CARDBOARD.

No. 561,814. Patented June 9, 1896.



Witnesses:
Theo. T. Snell
Samuel Merd

Inventor
Teodor Remus
by Wilkinson & Remus
his Attorney

ANDREW. B. GRAHAM, PHOTO-LITHO. WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

T. REMUS.

DEVICE FOR BENDING CARDBOARD.

No. 561,814. Patented June 9, 1896.

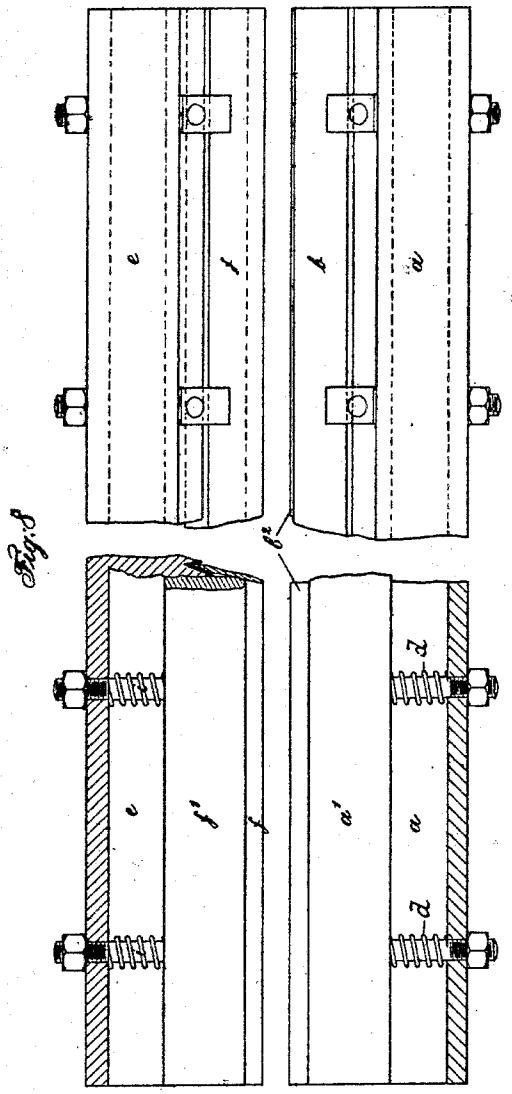


Fig. 8

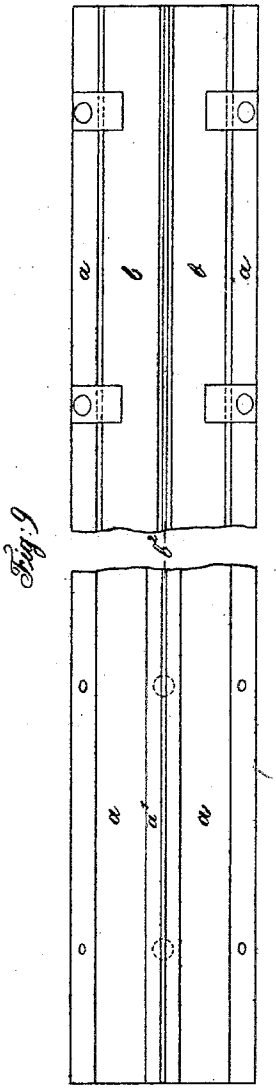


Fig. 9

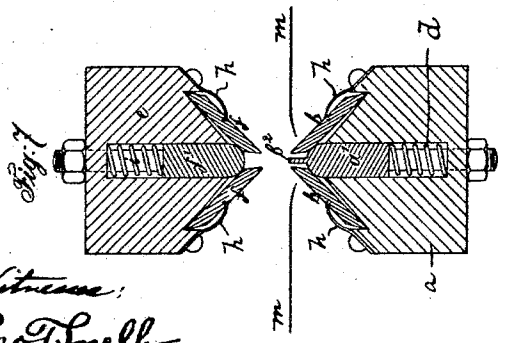


Fig. 7

Fig. 10

Witnesses:
Theo. T. Snell
Daniel W. Mead

Inventor:
Teodor Remus
by Thomas G. Brown
his Attorney

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D.C.

UNITED STATES PATENT OFFICE.

TEODOR REMUS, OF DRESDEN, GERMANY.

DEVICE FOR BENDING CARDBOARD.

SPECIFICATION forming part of Letters Patent No. 561,814, dated June 9, 1896.

Application filed December 29, 1894. Serial No. 533,369. (No model.) Patented in Belgium January 31, 1893, No. 102,863, and January 30, 1894, No. 109,538; in Germany May 1, 1893, No. 69,987, and August 24, 1894, No. 77,325; in Austria-Hungary July 4, 1894, No. 3,397/25,305, and in France July 15, 1894, No. 222,590.

To all whom it may concern:

Be it known that I, TEODOR REMUS, manufacturer, a subject of the Emperor of Russia, residing at Dresden, in the Kingdom of Saxony and Empire of Germany, have invented certain Improvements in Cardboard-Bending Apparatus, of which the following is a specification, reference being had to the accompanying drawings, wherein—

Figure 1 is a vertical cross-section of the improved machine. Fig. 2 is a side view thereof, partly in longitudinal section. Fig. 3 is a plan view of the cardboard-supporting table, the swinging plates being removed at the left-hand portion of the figure. Figs. 4, 5, and 6 are views, similar to Figs. 1, 2, and 3, respectively, of a modification of the machine. Figs. 7, 8, and 9 are views, similar to Figs. 1, 2, and 3, respectively, of a second modification of the machine. Fig. 10 is a view of a piece of cardboard "stowed" preparatory to bending.

This invention has been patented in Germany by Patent No. 69,987, dated May 1, 1893, and by Patent No. 77,325, dated August 24, 1894; in France by certificate of addition to Patent No. 222,590, dated July 15, 1894; in Austria-Hungary by Patent No. 3,397/25,305, dated July 4, 1894, and in Belgium by Patent No. 102,863, dated January 31, 1893, and No. 109,538, dated January 30, 1894.

The present invention consists in certain improvements designed to perfect the cardboard-bending apparatus described in Letters Patent of the United States No. 529,192, granted to me November 13, 1894. In the apparatus constructed according to said Patent No. 529,192 the bars or plates *b*, upon which is laid the cardboard to be bent, are connected by a hinge, so that by reason of the coöperative action of the plunger *e* they may be moved into an angular position relatively to each other from the level position.

In order to insure greater durability and to facilitate cleaning the dust from off the boards, the following improvement is applied to the bending device, referring first to Figs. 1, 2, 3, and 10 of the drawings.

As shown in Figs. 1, 2, and 3, *a* is the bed-plate, *b b* are the bending bars or plates, *d d* are the yielding springs which hold the bars or plates elevated, *e* is the plunger having angular extension or tongue *e'*, and *f f* are gathering-plates carried by the plunger, all of which parts are similar in construction and operation to the corresponding parts of said Patent No. 529,192, except as hereinafter pointed out. Instead of employing a hinge, as in said patent, open bushes are used to obtain the requisite angular motion of the bars or plates *b*. This joint is a single one, the studs on the plates *b* lying in a yielding spring-upheld support or bush *b'* common to both. The bush or support *b'* has its upper face concaved to form seats for convex faces or studs on the bottoms of the plates *b*. With such a joint the bars or plates *b* can, without any preparation, be lifted off the bush or support *b'*, the joint be cleaned, and the plates *b* replaced. All this can be done so rapidly that the loss of time to the operator is scarcely appreciable.

In bending the cardboard by means of this apparatus the cardboard must necessarily be stowed at the bend as the edges of the gathering-bars *f* on the plunger compress the portion of cardboard between them from the two sides, causing it to bulge. This bulging, which is technically called "stowing," requires by far the greatest part of the power used in bending the cardboard. This expenditure of power is lessened if the part where the stowing takes place is at the beginning of the operation bent slightly in a direction contrary to that of the bend of the cardboard. This is attained by a second improvement effected in the bending appliance. It consists in providing a projection b^2, rising slightly above the surface of the bars *b* and placed between the inner edges of the bars. This projection may be formed, as shown in Fig. 1, by the upper edge of a tongue placed between the two bars or plates *b* and secured to the yielding support *b'* or to the inner edge of one of the plates *b*, as in the modification shown in Fig. 4, as hereinafter described. This projection b^2 bears on the cardboard to be bent as soon as the same is forced upon the plates *b* by the plunger, producing a slight curvature, as shown in Fig. 10, by which the

stowing action is facilitated and consequently the power required therefor is diminished.

The modification shown in Figs. 4, 5, and 6 differs from the apparatus shown in Figs. 1, 2, and 3 in that in the modification two independent supports or bushes b' b', with independent springs d d therefor, are used for the respective bars or plates b b instead of a single bush, as in Figs. 1, 2, and 3. Each yielding bush or support has a concaved seat on its upper face in which rests the convex bottom of the corresponding plate b. The projection b^2 is on the inner edge of one of the plates b. Also, screws g are shown in this modification for adjusting the tension of the springs d. When the surfaces of cardboard remaining at either side of the bend are large, their handling during the bending operation as well as in all the other operations required for completion is inconvenient and correspondingly disadvantageous. In such cases it is preferable that the board be not bent and stowed at the curve at the same time, but that the stowing preparatory to bending be effected by itself. In this the boards retain their flatness, but are so well prepared for the subsequent bending that this may be readily effected by hand without requiring much skill.

The stowing of the cardboard without bending is the object to be attained by the modification shown in Figs. 7, 8, and 9 as applied to the bending apparatus. Here the bars or plates b b are arranged obliquely and so as to be supported on their outer edges, being forced to swing on these and to approach one another at their inner edges when pressure is exerted thereon from above when the apparatus is in use. The springs d by means of the movable block a' hold the working edges of the plates in their highest position. The block a' carries the tongue, the upper edge whereof forms the projection b^2, rising above the working edges of the plate b. In order to impart the same velocity of motion to the working edges of the gathering-plates f as to the working edges of the plates b, the former are placed at a similar angle. The plates f at their inner ends bear on a longitudinally-movable block f', acted upon by springs i and carried by the plunger e. The plates b and f are held against the blocks a' and f', respectively, by springs h. The cardboard is supported by suitable fixed plates, (indicated at m in Fig. 7.)

In this form of the apparatus the operation is as follows: When the plunger e is so far brought down upon the cardboard as to hold the latter between the upper and the lower part, both the plates b (on the bed-plate) and the plates f (on the plunger) turn on the edges which support the same and move toward one another. Hereby the cardboard between them is compressed and stowed or bulged, and then presents the appearance illustrated in Fig. 10. In order to transform this flat board into an angular one only requires the folding of one of its sides.

Having fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a cardboard-bending machine, the bed-plate having swinging plates b b, and the plunger e, having gathering-plates f, f, in combination with a bar or projection normally elevated above the plane of the plates b, b, for bending the cardboard on its under side, substantially as set forth.

2. In a cardboard-bending machine, a yielding support or bush having concave seats on its upper face, and two plates having convex faces on their bottoms which rest and turn upon said seats when depressed, said plates simply resting upon said support so as to be readily removed therefrom, in combination with a plunger adapted to press upon a sheet of cardboard above said plates, substantially as set forth.

3. In a cardboard-bending machine, a single vertically-movable yielding support having concave seats on its upper faces, and two plates having convex faces on their bottoms fitting said seats, in combination with a plunger adapted to press upon a sheet of cardboard above said plates, substantially as set forth.

4. In a cardboard-bending apparatus, two inwardly-swinging plates and a bar projecting above the upper faces of said plates along the joint between them, in combination with plunger e, having gathering-plates f, f, substantially as set forth.

5. In a cardboard-bending apparatus, a vertically-movable yielding support having concave seats on its upper end and a projecting bar secured to said support between said seats, and two plates on opposite sides of said projecting bar, the upper faces of which are below the upper end of said projecting bar, said plates having convex bottoms fitting said concave seats respectively, in combination with plunger e, having gathering-plates f, f, substantially as set forth.

TEODOR REMUS.

Witnesses:
HERNANDO DE SOTO,
C. F. ROSENCRANTZ.