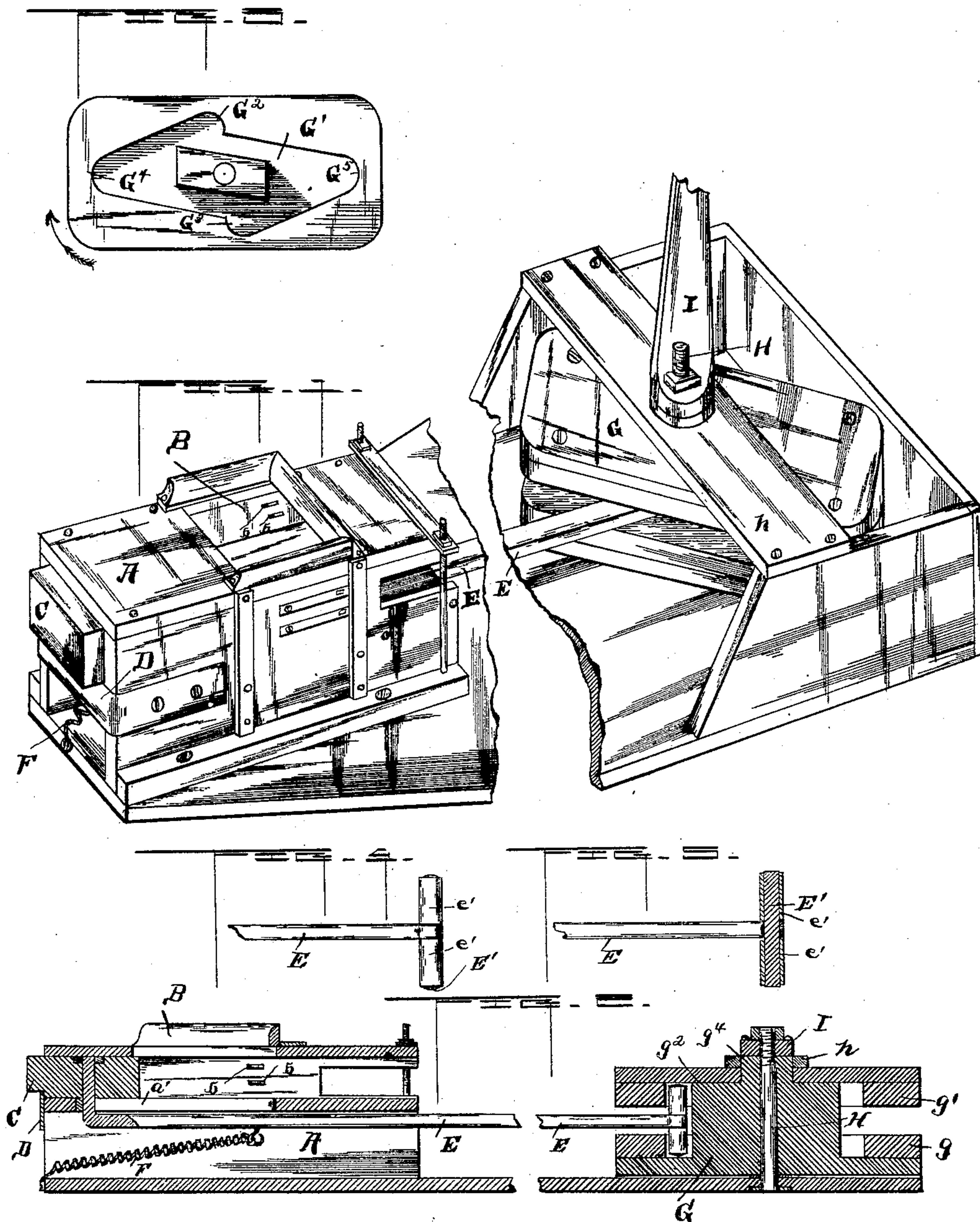


(No Model.)

H. COPELAND.
HAY PRESS.

No. 480,917.

Patented Aug. 16, 1892.



Witnesses
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UNITED STATES PATENT OFFICE.

HENRY COPELAND, OF CHATTANOOGA, TENNESSEE.

HAY-PRESS.

SPECIFICATION forming part of Letters Patent No. 480,917, dated August 16, 1892.

Application filed February 25, 1892. Serial No. 422,816. (No model.)

To all whom it may concern:

Be it known that I, HENRY COPELAND, of Chattanooga, Hamilton county, State of Tennessee, have invented certain new and useful
5 Improvements in Hay-Presses; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, by letters of reference
10 marked thereon.

My invention is an improvement in rebounding-plunger hay-presses; and its objects are to improve the mechanism for actuating the plunger so that a gradually-increasing pressure is first exerted by the plunger upon the
15 material being compressed, and then a positive and more powerful pressure; to intermittently operate the reciprocating plunger from a continuously and steadily-revolving
20 cam or catch-block so that there will be time to fill the press-box with material in front of the plunger without stopping or retarding the motive power; to increase the durability of parts by actuating the plunger by a pulled
25 pitman instead of by a pushed piston, and finally to improve the construction of the baling-box.

The invention therefore consists in the novel construction and combinations of parts hereinafter fully described, and concisely stated
30 in the claims.

Referring to the drawings, Figure 1 is a perspective view of the baling-box and mechanism for operating the plunger, the pitman and
35 base being transversely broken. Fig. 2 is a longitudinal vertical section through the baling-box and plunger-actuating mechanism. Fig. 3 is a detail view of the plunger-actuating mechanism, showing the cam-groove; and
40 Figs. 4 and 5 are detail side and sectional views of the pitman.

The baling-box A is of general ordinary construction, having vertical sides braced by uprights which may be connected by transverse
45 bolts above and below the plunger and baling-chamber. This box is mounted upon a solid base and its bottom is elevated to allow the pitman, hereinafter described, to work thereunder. The box has a central feed opening or hopper B in its top, and at its inner
50 end the usual side slots, for facilitating tying the bales, which in my press are delivered

from the inner end of baling-box or end nearest the power mechanism. The box also has the usual catch-springs *bb* in its sides. 55

C designates the plunger, of any suitable construction, fitted in the box, and retained therein by an end bar or metal strap D, which also forms a lateral brace for the box. The outer end of plunger is reduced in thickness
60 so that it can project over strap D, and thus enable me to shorten the box, as the inner end of plunger must pass beyond the outer edge of the feed-opening. One end of pitman E extends beneath the pressing-chamber of
65 the box, is upturned, passes through a longitudinal slot *a'* in the bottom of the box, and is firmly connected to the plunger, as indicated.

F is a helical spring, (one end of which is 70 fast to the pitman, the other to the base,) which operates to draw the pitman and plunger outward to the position shown in Fig. 2. Slot *a'* serves both as a guide for the pitman and to regulate and limit the forward and
75 backward movements thereof.

The means for operating the pitman consist of a double-grooved cam-block G, which is centrally journaled upon a vertical post or shaft H, the lower end of which is secured in
80 the base and its upper end in a cross-piece *h*, mounted upon suitable supports at each side of the block. Preferably the block is made in two parts *g g'*, the upper part *g'* being supported upon a central boss *g²* of the lower part, 85 so that the opposed faces of the parts are slightly separated sufficiently to freely receive the end of pitman E. (See Fig. 2.) In each part *g g'* is made a channel or cam-groove *G'*, of the contour indicated in Fig. 3, being approximately diamond-shaped, the longest and
90 shortest diameters of the groove being respectively parallel with the longest and shortest diameters of the block. A diamond would more accurately illustrate the shape of the
95 groove if it were cut in half on its shortest diameter and one part thereof shifted a little to one side, so that the lines of the diamond do not meet to form the obtuse angles. This leaves oppositely-facing lateral shoulders at
100 the points where would ordinarily be the obtuse angles of a diamond, and these shoulders are recessed to form catch-notches *G² G³*, as shown, which open in opposite directions to-

ward the opposite points of the diamond. At what would be the acute angles of a diamond the groove is rounded, as at G^4 G^5 .

The rear end of the pitman passes between the parts g g' of the block and is provided with a vertical cross-shaft E' , on which are friction-rollers e' e' , that respectively engage the grooves G' in the parts g g' . The grooves in said parts when they are united exactly correspond.

The block G may be rotated by any suitable means. For this purpose a sweep I may be made fast to a boss g^4 , projecting from the block through the cross-piece h or secured to the block in any proper manner, so that a horse may be hitched to the end of the sweep for the purpose of rotating the block, the direction of rotation being as indicated by the arrow in Fig. 3. In starting the press the block is turned until the longest axis of the groove is parallel with the longest axis of the baling-box or with the pitman. This brings one end, as G^4 , of the groove nearest the box and allows spring F to draw the pitman and plunger outward to the utmost limit. At this time the baling-box may be filled with the material to be compressed. As the block rotates rollers e' on the end of pitman are forced to travel along the incline of the groove between points G^4 and G^5 , which causes the pitman to move gradually toward the block. This continues until the rollers catch in recess G^3 , when they are arrested; but as the block continues to revolve the pitman is forcibly drawn toward the block until recess G^3 reaches the point first occupied by recess G^4 , diametrically opposite the point where recess G^3 was when the baling operation commenced. Just as the recess G^3 passes back of the shaft H , the rollers e' slip out of said recess and the spring F , aided by the reaction of the compressed material, quickly throws the plunger and pitman back to first position, causing rollers e' to travel from recess G^3 to point G^5 , where the operation is commenced anew. The incline between point G^5 and recess G^2 and said recess now cause the operation of the pitman in the manner described.

It will be noted that by the peculiar construction of the groove the plunger rebounds rapidly, but is drawn inward at first very slowly and with little power until the rollers catch in the recesses; then it is positively actuated. It is released just after the most powerful leverage of the cam-groove has been exerted thereon. There are no violent shocks. The plunger has a long reciprocation, and it is pulled by the pitman, not pushed, thereby enabling the pitman to be much lighter than in the ordinary push-pitman presses, and to do as much and heavier work than the old

presses, wherein the pitmen are apt to bow and break under pressure. I am also enabled to set the baling-box close to the power, which is a great advantage where the press is driven by gearing or shafting instead of by sweep, and at the same time to protect all the working parts, yet have them readily accessible for repairs. The pitman, being pulled, is also relieved of much of the lateral or torsional strain incident to the push-presses.

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

1. The baling-box having a longitudinal slot in its bottom at one end thereof, a plunger in said box, arranged over said slot, and a retaining-bar for limiting the movement of said plunger, in combination with a rotating cam-block having a cam-groove therein and a pulling pitman having one end engaged with the groove of said block and the other end extending under the pressing-chamber of the baling-box and connected to the plunger through said slot, substantially as described.

2. The combination, with the baling-box and plunger, of a rotating block having a diamond-shaped cam-groove G' , rounded at the acute angles and formed with catch-recesses G^2 G^3 at the obtuse angles, and a pitman-rod connecting said plunger and block, substantially as described.

3. The combination, with a block having an approximately-diamond-shaped cam-groove rounded at its acute angles and provided with lateral recesses at its obtuse angles and mechanism for rotating said block, of the baling-box and plunger, the pitman connected to said plunger at one end, and the friction-rollers on the other end of said pitman engaging the cam-groove of the block, substantially as described.

4. The combination of the baling-box having a slotted bottom, the plunger, the pitman-rod connected to said plunger through the slot in the bottom, and a spring for retracting said pitman and plunger, with the rotating cam-block formed of an upper and lower part, each having an approximately-diamond-shaped cam-groove, rounded at the acute angles and recessed at the obtuse angles, substantially as described, and the friction-rollers secured to the end of the pitman-rod and respectively engaging the grooves of the parts, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY COPELAND.

Witnesses:

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J. D. EAGAR.