

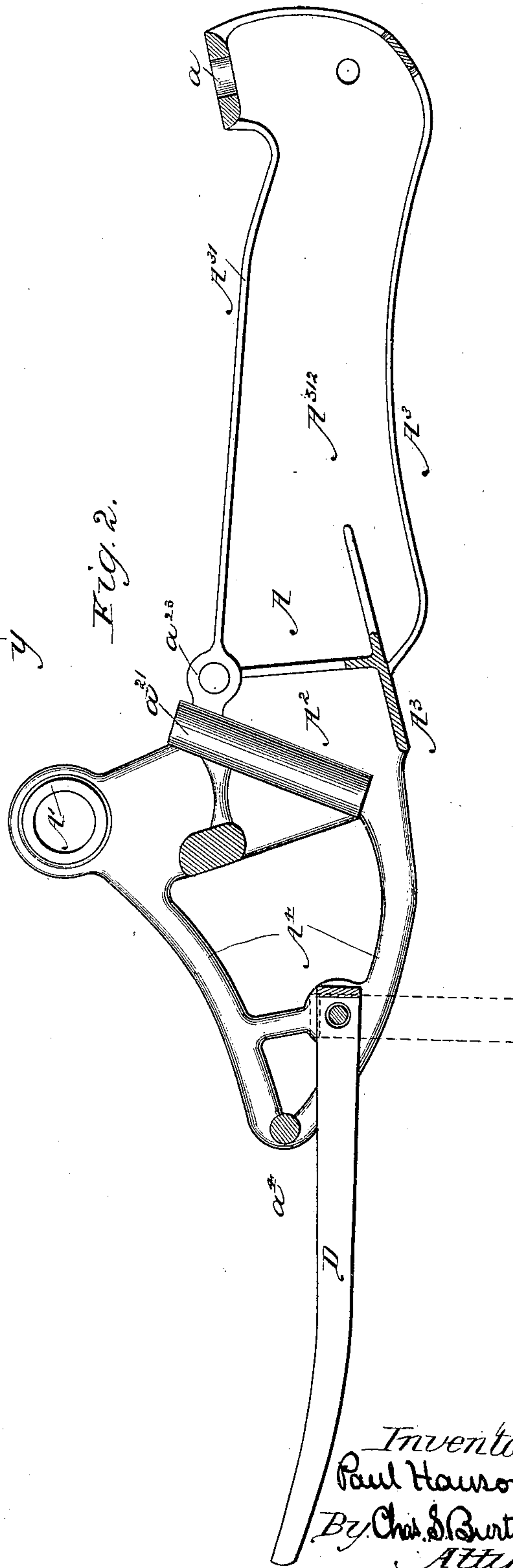
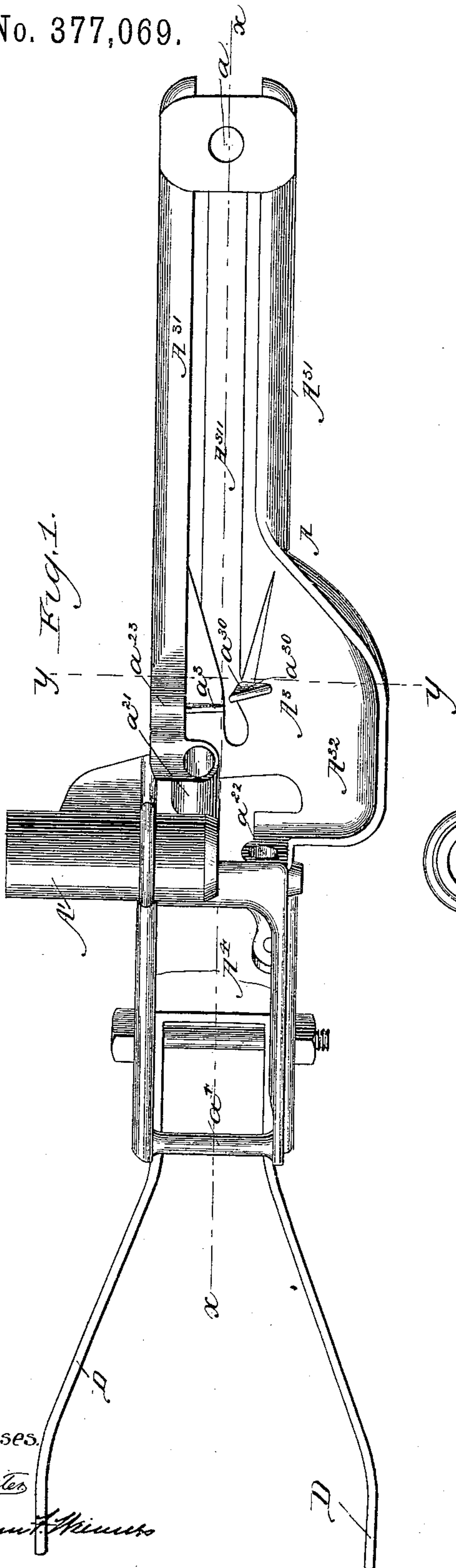
(No Model.)

2 Sheets—Sheet 1.

P. HANSON.  
GRAIN BINDER.

No. 377,069.

Patented Jan. 31, 1888.



Witnesses.  
*W. Cassin*  
*William H. Himes*

Inventor.  
*Paul Hanson.*  
By *Chas. S. Burton*  
*Atty.*

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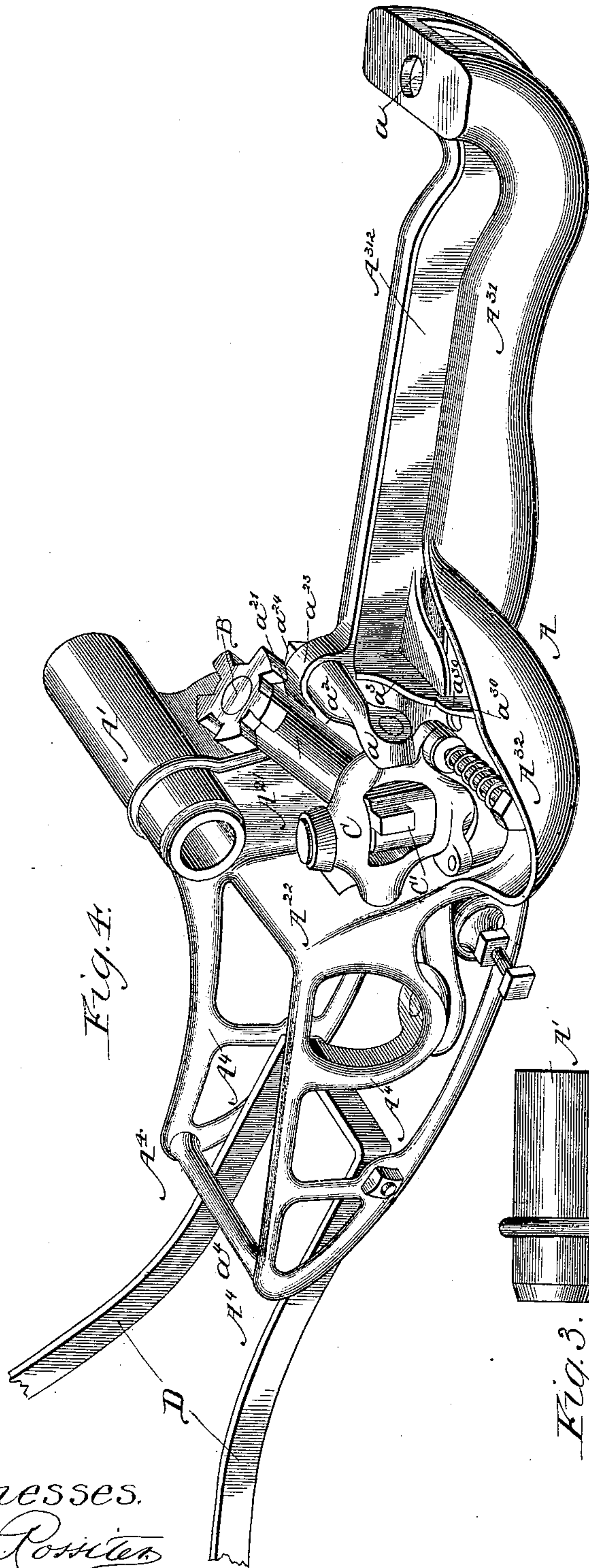


Fig. 4.

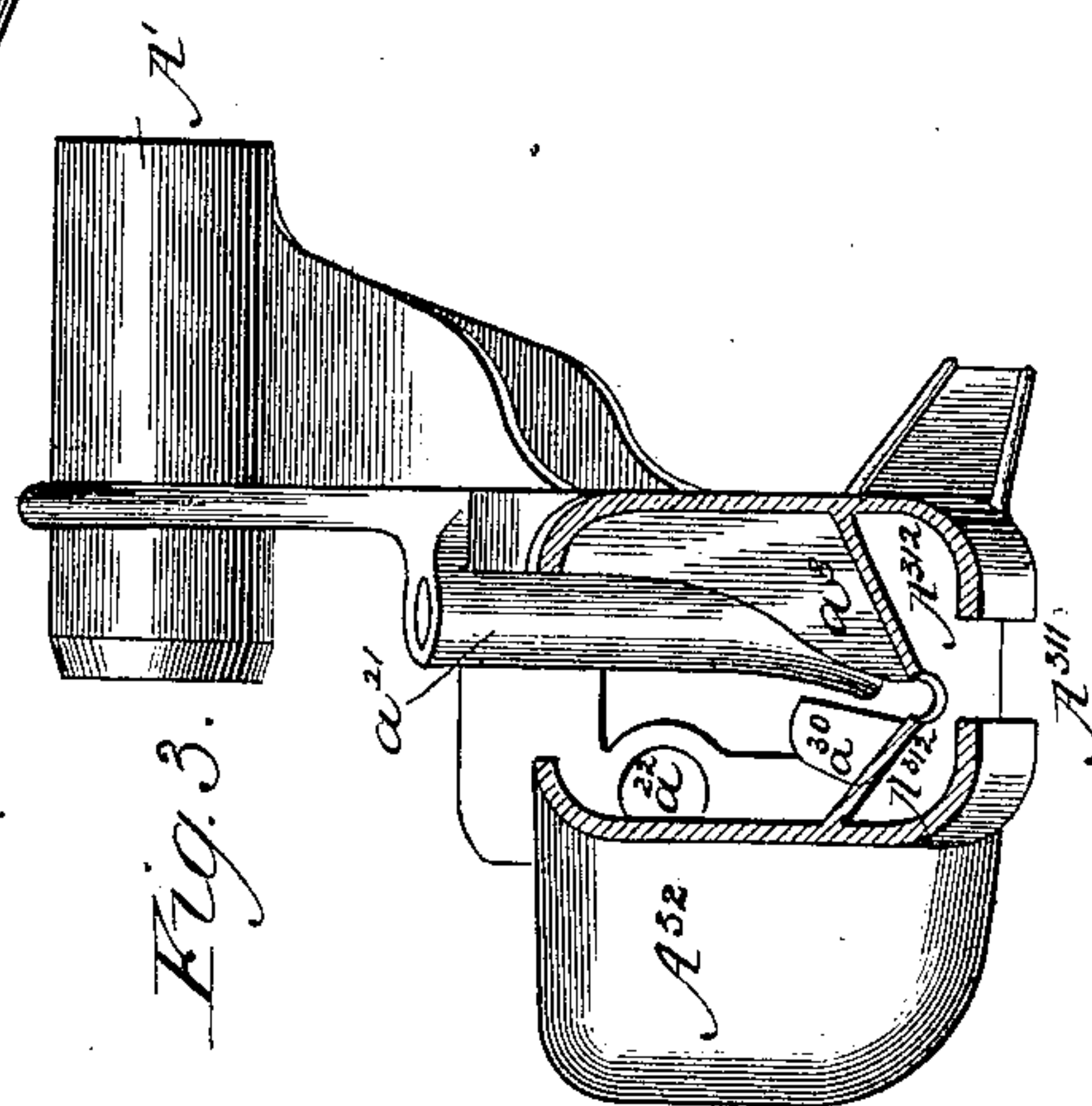


Fig. 3.

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# UNITED STATES PATENT OFFICE.

PAUL HANSON, OF ST. PAUL, MINNESOTA.

## GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 377,069, dated January 31, 1888.

Application filed August 13, 1885. Serial No. 174,275. (No model.)

*To all whom it may concern:*

Be it known that I, PAUL HANSON, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Grain-Binders, which are fully described in the annexed and following specification.

This invention has for one of its purposes the simplification of the frame-work of the cord-knotter of a grain-binder by consolidating the breast-plate and frame proper, thereby diminishing the number of parts and the number of junctions and the liability to displacement and the weight and strain upon the working parts.

A further purpose is to afford a shield for the working parts, partly or wholly inclosing them by the frame which supports them and preventing the entanglement of the straw therewith.

A further purpose is to provide more simple means than have heretofore been used, whereby the bundle-stripper—the extension of the breast-plate which strips the bundle off the discharger—may be folded to diminish the lateral compass of the machine and allow it to pass through narrower openings than otherwise would be required.

It consists, prominently, in making the knotter-frame proper integral with the breast-plate, and forming such integral frame with a pocket-like appendage on the upper side of the breast-plate to shield the operating parts, and in hinging the bundle-stripper to such frame, so that it may fold toward the deck and be stopped by a suitable stop on the frame to prevent it folding in the opposite direction.

In the drawings, Figure 1 is a plan view of the knotter-frame. Fig. 2 is a longitudinal sectional elevation of the outer or rear half of said frame, the section being taken at the line  $x x$ , Fig. 1. Fig. 3 is a transverse vertical section through the line  $y y$ , Fig. 1. Fig. 4 is a perspective of the frame with the operating parts in position.

The detail structure of the knotter shown in Fig. 4 is that of the knotter shown and claimed in my pending applications—viz., No. 119,227, filed January 30, 1884, and No. 157,582, filed March 2, 1885—and I do not herein claim any of those details, having fully claimed them in those applications, and have shown them

herein only for the purpose of more fully illustrating the operation of the improvements of the frame which constitute this invention.

A is the combined knotter-frame and breast-plate. It comprises, first, the journal-box  $A'$ , by which it is adapted to be hung upon the shaft of the knotter-actuating cam-wheel in the usual manner; second, the vertical web  $A^2$ , which connects the journal-box to and merges in the horizontal web  $A^3$ , which is the breast-plate, and will be so referred to hereinafter in this description, and which extends inward and at its inner extremity has the bolt-hole  $a$ , by means of which it is adapted to be secured to the binder-frame in the usual manner. By means of these two sustaining-connections the knotter-frame is adapted to be stably retained in proper relation to the knotter-actuating wheel and binder-deck and needle.

The vertical web  $A^2$  has formed integrally protruding from its longitudinal portion  $A^{21}$  the oblique bearing  $a^{21}$  for the cord-holder shaft B, and has in its transverse portion  $A^{22}$  the bearing  $a^{22}$  for the swinging knotter-frame C, the other bearing,  $a$ , of said swinging frame being provided in the bracket  $a^2$ , which is secured to the lug  $a^{23}$  on the vertical web  $A^2$  by means of the nut  $a^{24}$ . The horizontal web  $A^3$ —i. e., the breast-plate—has its inward extension  $A^{31}$  provided with the slot  $A^{311}$  for the passage of the needle and cord, and is formed with the cavity  $A^{312}$ , in which the needle plays, being shielded therein in the usual manner. It has also the projections  $a^3$  and  $a^{30}$ , which serve as cord-deflectors. The function of these projections is not herein claimed, being fully described and claimed in my application No. 157,582, filed March 2, 1885, above referred to. The breast-plate or web  $A^3$  is expanded to form the shell or pocket  $A^{32}$ , which partly surrounds and incloses the knotter C and its swinging frame C, and protects them from the straw which might otherwise become entangled with them and impede their action. The cord-deflecting projection  $a^3$  is extended, as seen in Figs. 2 and 4, so that it forms a rib on the interior of the cavity  $A^{312}$ , whereby it is stiffened and strengthened.

The frame A is extended beyond the box  $A'$  and the vertical web  $A^2$  in two branches,  $A^4$  and  $A^4$ , united by the cross-neck  $a^4$ . They are



made of considerable breadth vertically for stiffness and strength, and for the sake of lightness are preferably made of "open-work," as illustrated. The lower edges of these arms 5 are flush with the lower surface of the web  $A^3$ , and they constitute, in effect, a continuation of the breast-plate, and are given the usual upward curve of that outer part of the breast-plate. Near the outer end of these arms  $A^4$ , in 10 position to form a further continuation of the breast-plate—that is, so that its lower edges are flush with the lower edges of the arms  $A^4$ —is pivoted or hinged the bundle-stripper D. The pivot or hinge of said stripper is inward 15 from the cross-neck  $a^4$ , and it is pivoted to the arms  $A^4$  between them and extends out below the neck  $a^4$ , so that it can fold downward only, and is stopped by the cross-neck  $a^4$  against folding upward.

20 The stripper may fit so closely between the arms  $A^4$  or its hinge-pivot as to be held up by the friction against said parts; or it may be so loosely fitted that it shall fall after the discharge of each bundle to the position shown 25 in dotted lines in Fig. 2 and be lifted by the next.

I am aware that folding bundle-strippers have heretofore been made; but so far as I am aware they have always been made to fold up- 30 ward away from the deck, and they have therefore required a brace extended from their upper side to the upper part of the binder-frame to hold them in operative position, such brace being shortened or its connection changed or 35 shifted when the stripper is to be folded up. By making the stripper fold down I dispense with such brace.

The advantages of making the frame and the breast-plate integral are that greater rigidity 40 is obtained, and the frame may therefore safely be made lighter, and by reason of this increased rigidity it is rendered practicable to construct the folding stripper without other brace than the frame itself. The advantage 45 of forming the pocket or shell  $A^{32}$  integral with the frame and breast-plate is of the same nature that the rigidity of the frame is thereby increased without increase of its weight.

50 The advantage of forming such a shell or pocket, instead of protecting the mechanism, as has heretofore been customary, by giving the breast-plate sufficient width to keep the

straw away from the operating parts, is that the vertical wall of such pocket gives greater stiffness to the breast-plate and frame than 55 would be afforded by the same amount of material added to the width of the breast-plate, and, chiefly, that by thus removing the necessity for a wide breast-plate and making it correspondingly narrower the resistance of 60 ferred to compacting the bundle within and by means of the binding-cord is diminished and a more compact bundle may therefore be obtained with the same or less strain applied to the cord in binding, and consequently with 65 less strain on the knotting and cord-holding parts, and therefore with less application of power to the binding mechanism.

I claim—

1. In a cord-knotter, the frame which supports the knot-tying mechanism, formed integrally with the shell or pocket  $A^{32}$  to shield said mechanism. 70

2. In a cord-knotter, the shell or pocket  $A^{32}$ , formed integrally with the breast-plate. 75

3. In a cord-knotter, the knotter-frame, breast-plate, and pocket  $A^{32}$ , all formed integrally.

4. In combination with the knotter-frame and breast-plate, a bundle-stripper pivoted to 80 the frame and depending from its pivot in advance of the bundle in the direction of discharge, and adapted to be folded upward by the discharging movement of the bundle, the frame being provided with a stop to limit 85 such upward folding when the said stripper extends substantially in the direction and as a continuation of the breast-plate, substantially as and for the purpose set forth.

5. In a cord-knotter, the frame and breast- 90 plate formed integrally and having the cavity  $A^{312}$  for the needle's path, and having the cord-deflecting spur  $a^3$  extended within said cavity in a plane transverse to the path of the needle, to form a strengthening-rib for the shell in- 95 closing said cavity, substantially as set forth.

In testimony whereof I have hereunto set my hand, at St. Paul, Minnesota, this 3d day of August, A. D. 1885, in the presence of two witnesses.

PAUL HANSON.

Witnesses:

S. P. CROSBY,  
W. P. CURTIS.