

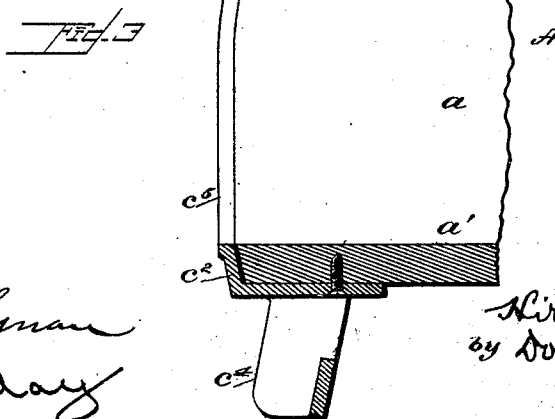
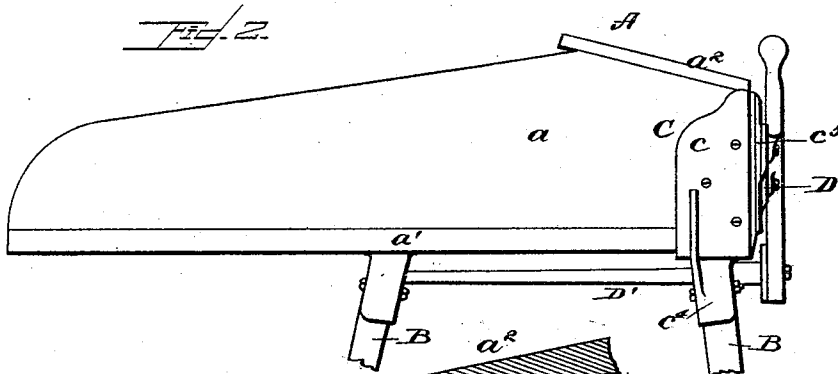
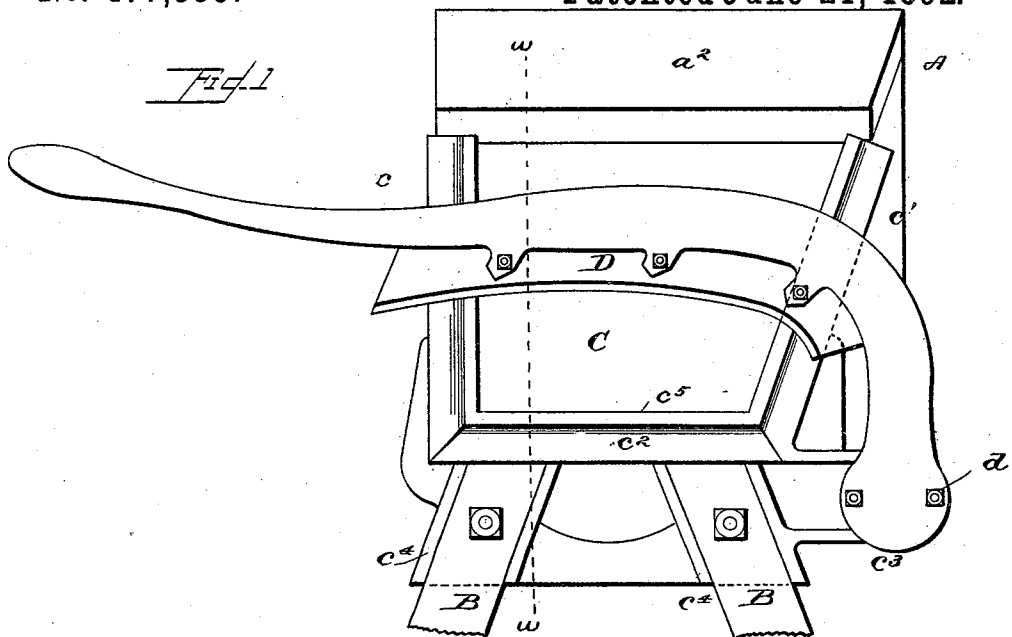
(No Model.)

3 Sheets—Sheet 1.

H. M. SMITH.
STRAW OR FEED CUTTER.

No. 477,339.

Patented June 21, 1892.



Witnesses.

J. P. Coleman
M. B. May

Inventor

Hiram M. Smith
by *Douglas & Bliss*

Att'ys

(No Model.)

3 Sheets—Sheet 2.

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FIG. 4

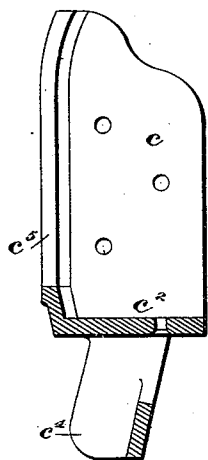


FIG. 5

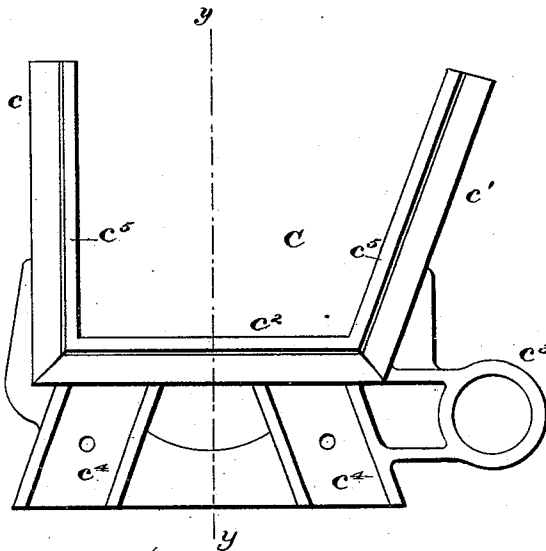


FIG. 7

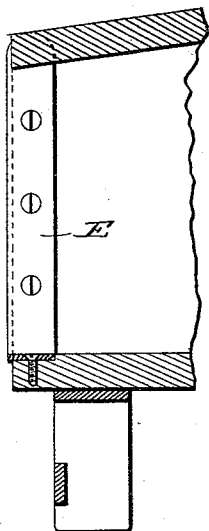


FIG. 8

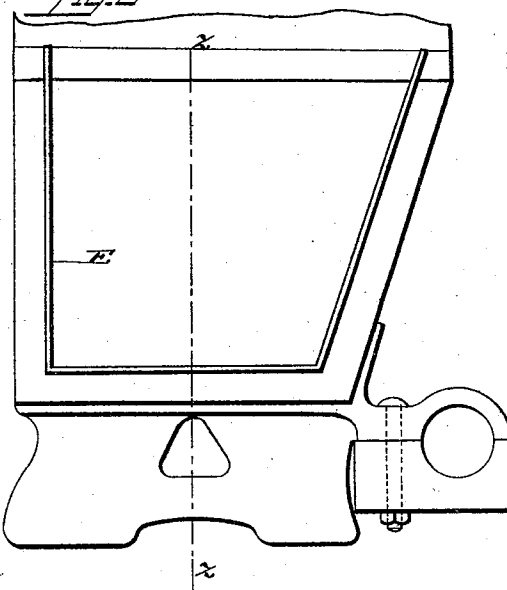
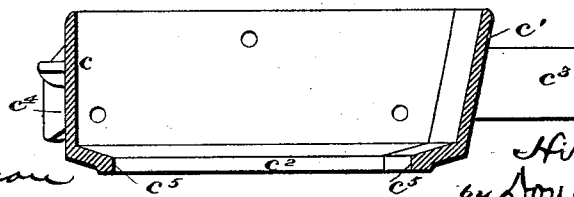


FIG. 9



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3 Sheets—Sheet 3.

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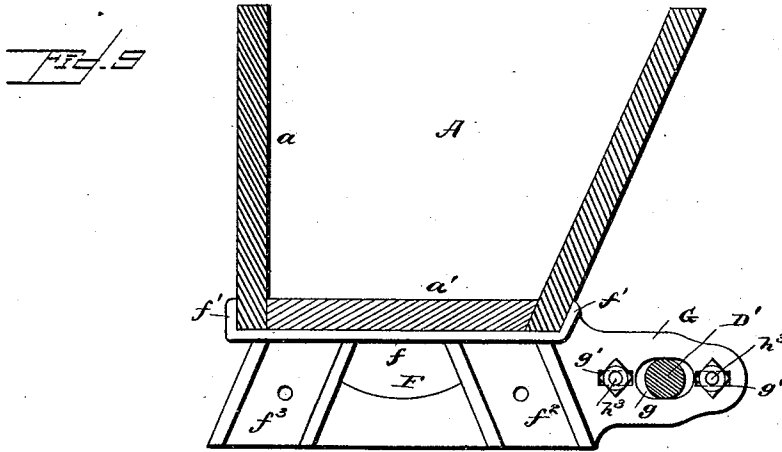
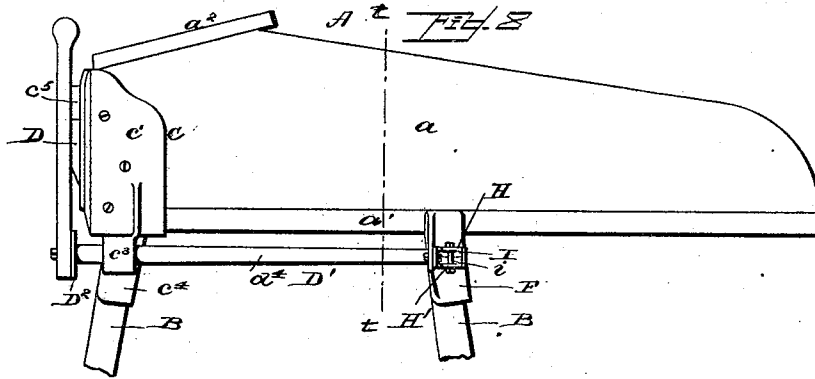


FIG. 10

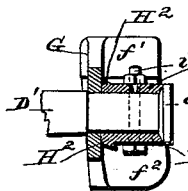


FIG. 11

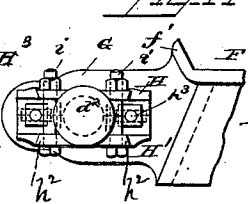


FIG. 12

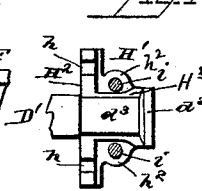
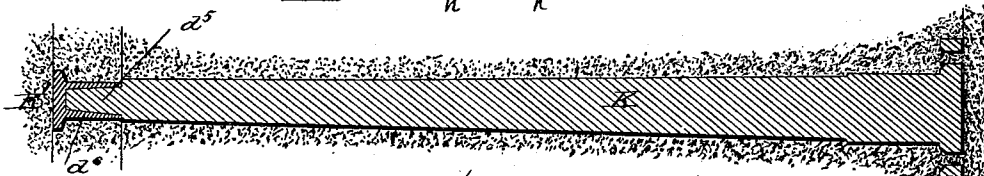
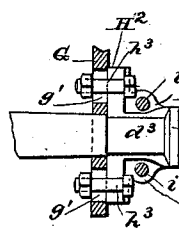
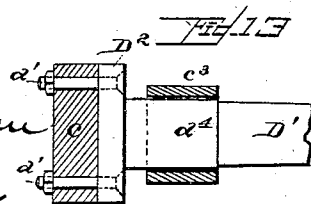


FIG. 14



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W. B. May



Inventor
Hiram M. Smith
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Atty's.

UNITED STATES PATENT OFFICE.

HIRAM MOORE SMITH, OF RICHMOND, VIRGINIA, ASSIGNOR TO ELIZABETH LOUISE SMITH, OF SAME PLACE.

STRAW OR FEED CUTTER.

SPECIFICATION forming part of Letters Patent No. 477,339, dated June 21, 1892.

Application filed February 20, 1892. Serial No. 422,281. (No model.)

To all whom it may concern:

Be it known that I, HIRAM MOORE SMITH, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Straw or Feed Cutters, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to improvements in straw and hay cutters having feed-hoppers of wood—that is to say, hoppers each formed with a bottom and side walls of wood—and having axles or shafts parallel to the hoppers, each axle or shaft having an arm attached, with suitable projections for receiving the cutting-blade. This arm is oscillated by hand or rotated by power, the effects in both cases being the same, except that in the latter more work can be accomplished. Heretofore in constructing these machines the hopper had to be shod with steel at the front edge or provided with a mouthpiece presenting a steel face for the oscillating knife to bear against while the material is being cut. The making of this mouthpiece or ledger, the carving of the wood so as to shape it properly to receive the mouthpiece, and the fastening of the latter in place by the screws have made the machine very expensive. To obviate this and to reduce the expense in making these machines to the minimum, I (instead of making the ordinary simple bracket attached to the bottom of the hopper with flanges for the legs and a projection for the axle or knife-shaft) make a bracket which has the side walls or wings to receive the wooden parts, which walls give great strength to the hopper and resist all lateral pressure, and at the same time form at the front edge a lip extending forwardly around the ends of the sides and up in front of the bottom of the hopper, so as to provide a face corresponding to or lying in the plane in which the knife oscillates when it is cutting.

Figure 1 is a front end view of cutter containing my improvements. Fig. 2 is a side elevation. Fig. 3 is a partial section. Fig. 4 is a section on line *ww*, Fig. 1, of the mouthpiece-casting detached from the wooden parts, taken on the line *yy*, Fig. 5. Fig. 5 is a front ele-

vation, and Fig. 5^a is a cross-section, of the said casting. Fig. 6 shows in front view the end of one of the machines which I have constructed heretofore and upon which the present is an improvement. Fig. 7 is a vertical section of the part shown in Fig. 6, taken on the line *zz*. Fig. 8 is an elevation from the side opposite to that in Fig. 2. Fig. 9 is a section on line *zz*, Fig. 8. Figs. 10, 11, and 12 are a vertical section, an end view, and a top view of the rear cutter-shaft bearing. Fig. 13 is a top plan view, partly in section, of the cutter-shaft and both bearings. Fig. 14 shows the axle pattern and mold.

In the drawings, A represents the hopper, it having side walls *a a*, bottom *a'*, and a top piece *a''*.

B B indicate legs or supports on which the machine stands.

The casting for the mouthpiece or bracket which I provide is indicated at C as a whole, it having side parts *c c'* and the bottom *c''* all formed integrally. These parts *c c'* are comparatively wide backwardly-extending walls or wings adapted to lie outside of the side pieces of the wooden hopper, and the part *c''* is a similar wall or wing lying below and extending back from the front end of the wooden bottom piece. With these parts there is also formed the bearing *c'''*, extending out laterally, and the downwardly-projecting sockets or flanges *c'''' c''''*, the former being utilized to support the shaft or axle which carries the oscillating knife and the latter for receiving the legs B B.

The stationary ledger-knife is represented by *c''''*, it also being integral with the above-described casting and projecting from the side and bottom walls *c c'*. The knife part is "chilled" and subsequently ground and polished, so as to present no hinderance to the movements of the oscillating knife. The last said knife or cutter is indicated by D, it being secured, as aforesaid, to the shaft or axle *D'*, mounted in the bearing *c'''*. This movable knife is preferably of the sort shown, it having a shank or handle part and a cutter-plate secured thereto.

The uses to which my improvement are put and the advantages incident to it will be understood by a comparison thereof with the

construction which I have heretofore used and which is partially illustrated in Figs. 6 and 7. Heretofore a steel forging E was required at the front end of the box or hopper, the wooden pieces of the latter being carved out or rabbeted to receive the forging, and the front edge of this forging was depended on to receive the wear and bearing of the swinging knife. It will be seen that I do away with this entirely, and that with the single casting above described I not only provide a stationary or ledger knife, but also provide a strong holder or brace for firmly holding together the several parts of the wooden hopper and prevent them from being forced apart when the machine is being subjected to strain while in use.

By examination of Figs. 1 and 5 it will be seen that one of the side walls of the casting (that at c) is at right angles practically to the bottom part, but that the other side is inclined at an angle thereto, the relations of the parts in that respect being such as to give the proper amount of "draw" for the knives when cutting, and from Figs. 3 and 4 it will be seen that the parts c , c' , and c^2 of the mouthpiece are countersunk, so that the wooden parts shall be flush with the ledger-knife, and thus no obstruction is offered to the material as it is pushed through the box or hopper, and at the same time I obviate the necessity of carving or cutting the wood. The earlier machines were not only much more expensive in these respects, but were much less durable and strong, so many separate parts being required and being fastened together practically only by the screws. In them a special casting was necessary for receiving the legs, while in the present machine the wooden and other parts are relieved from strain from the legs or supports, as the latter are also carried by the casting. The earlier machines referred to are those which are known widely as "Smith's hay and straw cutters," and it is for these that the present invention is more particularly intended. In another important respect the machine herein differs from those heretofore made which were of the same general class. The axle or shaft D' is mounted in two boxes or bearings, one being, as aforesaid, situated at about the place indicated by c^3 . The other is farther back and by the side of the hopper. The drawings illustrate the manner of constructing and arranging this rear bearing and support for the shaft. At F there is a casting having the bottom plate f and the side wings f' , together with the downwardly-extending leg-sockets $f^2 f^3$. With the socket-piece f^2 and the side wing f' there is formed a vertically-arranged web or plate G , it being integral with the parts above mentioned. It has an aperture at g somewhat larger than the diameter of the axle D' , so that the latter shall be somewhat loose therein to permit it to be adjusted. At the sides of this aperture g there are slots g' . The bearing proper

is indicated by $H H'$, there being duplicate parts—an upper and a lower one—each having a vertical plate H^2 and a horizontal processed part $H^3 H^3$. $h^2 h^2$ are perforated ears for bolts i , which fasten the parts $H H'$ together, and $h h$ are passages for bolts h^3 , which clamp the bearing as a whole to the wing G . By constructing and arranging these parts in the way described all of the necessary adjustments are readily provided for.

It will be readily understood that from any one of several causes the relations of the oscillating knife to the stationary or ledger knife will be varied so that the cutting-edges will not be in proper contact throughout their length. Sometimes that end of the knife D which is the nearest to the shaft will be closer to or farther from the plane of the chilled ledger-knife than the other end—that is to say, the two knives will not be in parallel planes—and therefore the cutting action will be impeded. At such time in order to provide the proper adjustment it is only necessary to loosen the bolts h^3 and move the bearing $H H'$ in one direction or the other, and thereby bring the oscillating knife perfectly parallel to the face of the ledger-knife. If at such time or at any other it is found necessary to draw the oscillating knife back toward the face of the stationary knife, a liner or washer of suitable thickness can be inserted between the web or plate G and either or each end of the bearing-plate H^2 .

The length of the axle D' is such that the looseness of its fit in the bearing c^3 , which is practically as tight as is ordinarily obtained with castings, is sufficient to allow the adjustment of the rear end above described. Whatever looseness is necessary can be provided without impairing the effective operation of the cutting parts.

Heretofore these machines have been so constructed as to require much more expensive parts in order to attain the ends which I have described, including malleable-iron clips with threaded stems and bolts, the stems passing through the bearing-arm and being adapted to draw in one direction or the other. By the present improvement I am enabled to connect and support all of the parts and to provide for their relative adjustment by means of four cheaply-constructed castings. The axle or shaft itself D' is made much more cheaply than those heretofore in use. It will be seen that it has at one end an expanded head D^2 for the attachment of the knife-arm, and at the other end a smaller head d^2 , which lies in the rear of and is held in place by the bearing-piece at $H H'$, the journal portions of this axle being indicated by $d^3 d^4$. Heretofore in order to have the oscillating knife accurately related to the ledger-knife it has been necessary to center these axles in a lathe after casting and turn down the journal parts, because of the manner in which the bearings were constructed and fitted and the axle was cast.

By making these parts in the way described I avoid the necessity of machine work upon the axle, as it can be introduced into the machine in the state in which it is cast and yet can be so adjusted as to place it the same as if it had been accurately shaped in a lathe or other machine. In order to cast it without requiring the usual numerous cores and in such a way as to make it with the utmost cheapness, I provide a two-part pattern, one part K corresponding to the head D^2 and the main part d^4 of the axle and having a tapering extension at d^5 , and the other part K' having a head like that at d^2 and a tubular sleeve part at d^6 . By means of a three-part flask it will be seen that I can form a mold without the necessity of cores, as the longer part of the pattern can be readily drawn from the sand in one direction and the shorter part as readily in the opposite direction. The metal axle when drawn from the sand, however, is of the shape shown in Figs. 8 and 14.

What I claim is—

1. In a hay or feed cutter, the combination of the front bracket having the side walls which inclose the wooden side pieces of the hopper and the front bearing c^3 , the rear bracket having the sockets $f^2 f^3$ for the legs, the oscillating knife, the shaft or axle D' , supported on said brackets, and the laterally-adjustable bearing for the rear end of the knife-axle, substantially as set forth.

2. The combination of the hopper, the front bracket, the separate rear bracket having the web G formed with the slots g' and aperture g , the vibrating knife D, the rocking axle D' , passed loosely through the aperture g and having the enlarged end d^2 , and the bodily-adjustable bearing, substantially as set forth.

3. The combination of the rear bracket having the side and bottom walls $c c' c^2$, the leg-sockets c^4 , and the bearing c^3 , the rear bracket having the leg-sockets, the oscillating knife, the axle D, having the head or flange d^2 , and the laterally-adjustable bearing for the rear end of the axle, substantially as set forth.

4. The combination of the adjustable bearing H H', the rear bracket F, cast with an integral web G, having an aperture g , the front bracket C, having a permanently-closed bearing c^3 , the oscillating knife, and the axle mounted in the two said bearings and passing loosely through the rear bracket, substantially as set forth.

5. The combination, with the oscillating knife and the axle, of a front bracket, and a separate rear bracket supporting the rear legs, and the adjustable bearing formed in two similar parts, substantially as set forth.

6. The combination of the oscillating knife, the rocking axle having its rear end mounted on the support for the rear legs, the front bracket or mouthpiece having the walls $c c' c^2$ outside of the wooden parts of the hopper, the leg-supports $c^4 c^4$, the chilled ledger-knife c^5 , and bearings c^3 , all integral, all of said parts being constructed and arranged substantially as set forth, whereby the said brackets hold the axle and the oscillating knife properly relatively to the hopper, substantially as set forth.

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

HIRAM MOORE SMITH.

Witnesses:

H. T. RICHESON,
HENRY H. BLISS.