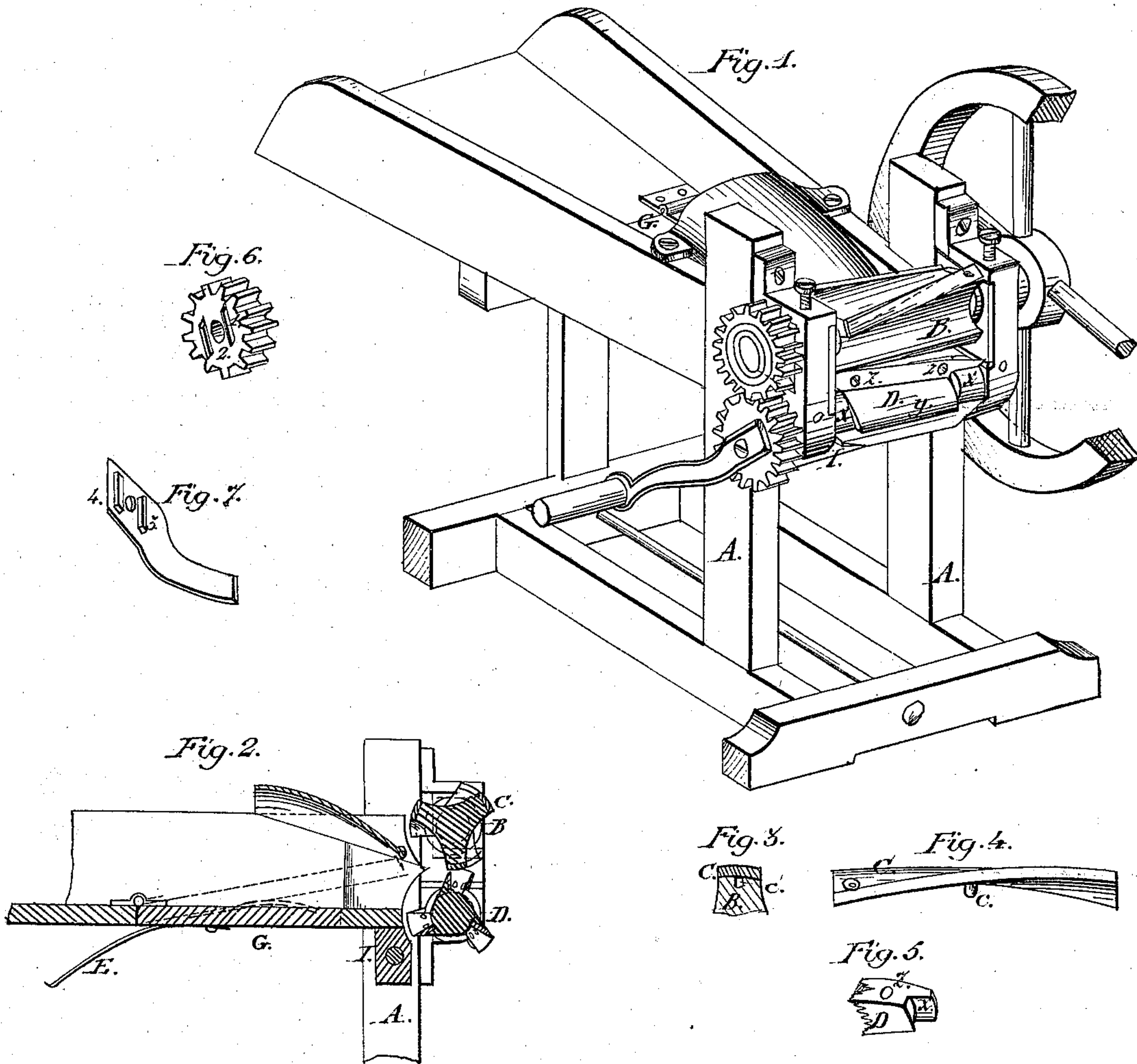


*W. Gale,  
Straw Cutter.*

*No. 90,090.*

*Patented May 18. 1869.*



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# United States Patent Office.

WARREN GALE, OF PEEKSKILL, NEW YORK.

Letters Patent No. 90,090, dated May 18, 1869.

## IMPROVEMENT IN STRAW-CUTTER.

The Schedule referred to in these Letters Patent and making part of the same.

### To all whom it may concern :

Be it known that I, WARREN GALE, of Peekskill, in the county of Westchester, and in the State of New York, have invented certain new and useful Improvements in Machines for Cutting Hay, Straw, Rags, and other substances; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification.

Figure 1 is a perspective view.

Figure 2 is a vertical section.

Figures 3 and 4 are details, showing the metal strip.

Figure 5 represents the holes in the knife, with the screw *z* in the hole, and the upper side of the knife, where the hole is, resting on the screw.

Figure 6 is a perspective view of the gearing attached to the shaft, and keyed to prevent its turning. 1 and 2 are slots let in the face of the gearing, to receive projections on the face of the crank, on each side of the hole, to receive the screw which fastens it to the shaft.

Figure 7. 3 and 4 are the lugs which enter the slots in the gear-wheel, shown in fig. 6. The crank is fastened to the shaft by inserting the lugs 3 and 4 into the slots 1 and 2, and the screw passing through the shaft is screwed into the end of the shaft, thus fastening the same securely together.

I may find it convenient to vary the form of the screw, by having the end of the shaft pass through the crank, with a screw cut on the end of the same, and using a tap, screwed on, to hold them firmly together.

When the crank is fastened in the usual way to the shaft, each crank must be different, and fitted to each individual shaft by a key; but, by my invention, all the cranks of all like-sized machines will fit each machine, which is a great advantage in putting up the same, or when a crank is broken.

The nature of my invention consists in certain improvements in feed or other cutters, and the combination of certain devices, making a more valuable machine than when used separately.

Most of these improvements are especially applicable to the feed-cutting machines patented by me, September 12, 1854, and January 29, 1867.

My first improvement relates to making and applying the metal strip, or facing used for the knife to cut against, making the strip more perfect, and more easily applied and fastened, reversed, adjusted, and interchanged.

I make this strip of any suitable metal to cut against. A strip made of copper, or of some alloy of copper, I prefer for this purpose; or, the best way to make it, is to cast it as near to the desired form as is practicable.

In the drawings—

A represents the ordinary frame-work and box of a straw, or feed-cutter.

B, the pressure-cylinder, to which the metal strip is

to be applied. I usually cast this cylinder in one piece, of cast or malleable iron. One, two, three, or more flanges of this cylinder have their faces turned true in a lathe, or otherwise made true, so that their faces may all be equidistant from the centre of the cylinder, and sufficiently uniform, so that a strip which is fitted to one flange-face will fit the other flange-faces of the same machine, or of any other machine of the same size and pattern. This construction renders the strips and flanges interchangeable, or reversible, without extra fitting or adjusting.

C represents the metal strip. I make its side, next to the flange, concave, in order to fit closely to the face of the flange, which is necessarily convex, from having been made true in a lathe. This strip is made of as near uniform thickness as possible, with its outer face convex.

Strip C is fastened to the flange by a countersunk screw, *a*, at each end, beyond the "cut" of the knife, or knives. This is a good way for fastening the strips, but other modes may be used. For instance, lugs, or ears may be cast, or formed on the strips, so as to embrace the sides of the flanges, and be secured by rivets, or screws through these lugs into the sides of the flanges.

In, or near the centre of the concave side of strip C, I cast, or form a stud, or pivot, *c*, that fits into a corresponding recess in the convex face of the flange. This helps to hold and steady the strip in place on the flange, and leaves the convex face of the strip smooth at that point against which the knife cuts most. Where the strip is long, and needs support, one or more additional studs may be used.

The knife-cylinder D is usually geared to the pressure-cylinder B, so as to bring the knife in contact with the strip, in a line a little at one side of its centre, so that, when the strip has a slit cut in it too deep to work well, the strip can be reversed, presenting a line (on the other side of the centre) for the knife to cut against, making a new slit, and working as well as a new strip.

This mode of attaching and using the metal strip is more effective and desirable than any of the previous modes.

My patent of September 12, 1854, shows a hide-strip. It is not made convexo-concave, nor is the flange made convex, nor is the mode of fastening like that now described.

My present invention, so far as the "strip" is concerned, may be considered as an improvement upon my patent of January 29, 1867. In that patent, the copper strip rested in a rebate on the flange, and was held in its place by a movable jaw.

A cylinder, or shaft so cast, cannot very well be made true on the bottom of the rebate, it being difficult, if not impossible, to centre and turn the shaft with sufficient precision to bring the bottom of each rebate, upon which the strips rest, equidistant from



the centre of the shaft; so that, when I make my cutting-machines according to the 1857 patent, the strips are first secured to the cylinder, and then turned smooth in a lathe. Thus, it will necessarily happen that the strip will be thicker in some places than in others, to compensate for the unequal casting or centring of the cylinder. The strips, for this reason, would also not be interchangeable.

Another feature of my invention consists in the construction of the knife-shaft D, and the method of applying the knife, or knives.

This knife-shaft D, I also cast in one piece, of cast-iron, or of malleable iron, when great strength is required.

I make the flange between the shoulders *x*, to which the knives are fastened, shorter than the knives, so that each end of the knives will rest upon the shoulders that are a part of the shaft. These shoulders being turned true, and that part of the knife resting on it being of equal width with all other knives, it follows that the knives also are interchangeable, and, if broken, or worn out, can be readily duplicated.

It is very desirable, in making this class of machines, to have the knives as light as is consistent with the requisite strength. In order to cut well and easily, the edges of these knives must be thin, no matter how thick the main knife is, and the edge of a thick knife is just as liable to damage, or injury as the edge of a thin one; and, as the knife, in this class of machines, cannot be much ground off at the edge, and be set up again, it becomes desirable to use a cheap knife, which, when damaged, can be easily removed, and replaced by another.

The flange *y*, to which the knife is fastened, gives it great strength. It is not found, however, to prevent the knife from yielding, or springing at the centre. It is, therefore, necessary that the middle screw or rivet *z* should fill the hole in the knife, or the upper part of the hole should rest upon the upper part of the screw or rivet. This prevents the knife from yielding at the centre, and enables me to use a very light knife. The knife-shaft and knives, so constructed and arranged, constitute this part of my invention.

Knife-shafts have been heretofore made, having all the features of mine, except having the knife at the upper part of its hole to rest upon the upper part of the screw or rivet. The device heretofore used for this purpose, has been to let the lower edge of the knife rest upon the heads or toes of set-screws in the shaft itself.

Another feature of my invention consists in a new method of working the automatic throat, or mouth used in my patent, of September 12, 1854.

My present method of using a steel, or other suitable spring, E, fastened to the under side of the hinged bottom G, near its rear end, allowing the front end of the spring to rest on the cross-bar I, is preferable.

It is sometimes desirable, in this class of machines, to dispense with the automatic throat. By simply turning the spring E on its pivot, so that its front end escapes from the cross-piece I, the bottom G will fall down and rest on the cross-piece, and the cutter be then used without the action of the automatic throat.

Having fully described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The pressure-cylinder B, having its flanges provided with convex faces, when used in combination with the concavo-convex strip C, (with or without stud *c*,) constructed and operating substantially as and for the purposes set forth.

2. The concavo-convex strip C, provided with one or more studs *c*, and constructed and operating substantially as and for the purposes set forth.

3. The flanged knife-shaft D, made with a shoulder, *x*, at each end, for the knife to rest on, when used in combination with a knife, or knives, secured by screws, or rivets, so that the knife, at the upper part of its hole, shall rest upon the upper part of its screw, the whole being geared to and used in combination with a pressure-shaft provided with metal-faced flanges, substantially as and for the purposes set forth.

4. The hinged bottom G, of the automatic mouth, in combination with spring E, constructed and operating substantially as and for the purposes set forth, when used in combination with the subject-matter of the first claim, as above set forth.

5. The combination, with the knife-shaft D, of the crank-arm *x*, when said arm is secured to the gear-wheel, on the end of the shaft, by means of the projections 3 and 4 and recesses 1 and 2, substantially as set forth.

In testimony that I claim the above-described invention, I have hereunto signed my name, this 17th day of April, 1868.

WARREN GALE.

Witnesses:

MITCHELL LAINE,  
HERBERT VAN WYCK.