J. M. SMITH.

MILLING TOOLS.

No. 183,272. Patented Oct. 17, 1876.

Fig. 1.

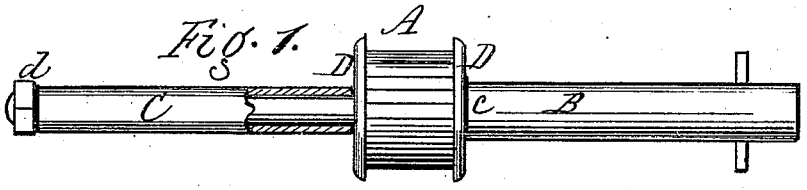


Fig. 2.

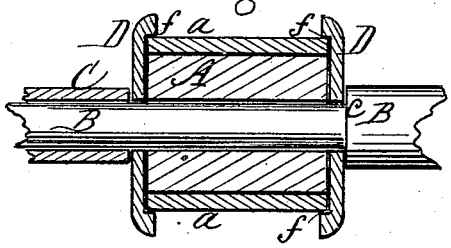


Fig. 3.

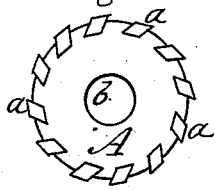


Fig. 4.

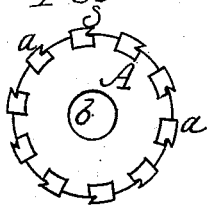


Fig. 5.

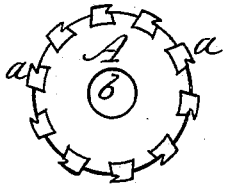


Fig. 6.

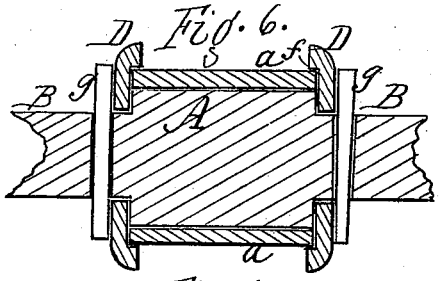


Fig. 7.

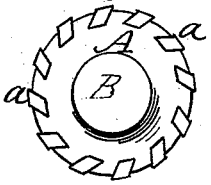


Fig. 8.

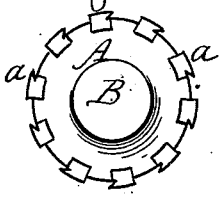


Fig. 9.

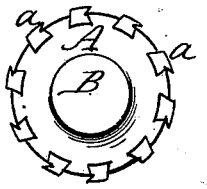
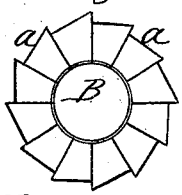


Fig. 10.



Witnesses.
E. B. Scott.
Louis Spahn

Inventor.
Joseph M. Smith.
per R. F. Osgood,
Atty.

UNITED STATES PATENT OFFICE.

JOSEPH M. SMITH, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN MILLING TOOLS.

Specification forming part of Letters Patent No. **183,272**, dated October 17, 1876; application filed March 21, 1876.

To all whom it may concern:

Be it known that I, JOSEPH M. SMITH, of the city of Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Milling-Tools; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a plan, partially in section, showing the removable milling-tool attached to the shaft. Fig. 2 is a central section of the same on an enlarged scale. Figs. 3, 4, and 5 are end elevations of the milling-head, showing various forms of the cutters. Fig. 6 is a view similar to Fig. 2, but showing a solid head. Figs. 7, 8, 9, and 10 are end elevations of the solid head, showing various forms of the cutters.

My invention consists, essentially, in combining, with a milling-head, insertible cutters fitting in grooves, with flanges or rims for holding the cutters in place, as hereinafter more fully described.

This tool may be used for any purpose for which it is adapted; but I design it more particularly for gumming saws.

A is the milling-head. It is constructed with longitudinal grooves, in which are fitted the removable cutters *a a*. These cutters are made of hardened steel. In Fig. 3 they are shown of diamond shape in cross-section, the opposite sides being counterparts, and having two cutting-edges. This form enables them to be used either side out.

When one edge becomes dulled or worn the cutter may be reversed by simply slipping it out and inserting it the other way. Double the wear is thus obtained over a one-edged cutter. In Fig. 4 square cutters are shown. In Fig. 5 dovetailed cutters are shown. The cutting-edges are the same in both instances last named, the difference consisting simply in the form of the body.

In Fig. 4 the cutters can be inserted and removed bodily at the face of the milling-head, while in Fig. 5 they have to be slipped endwise into or out of the grooves.

In Figs. 1 and 2 the milling-head is shown as removable from its shaft B, being constructed with a central eye, *b*, for passing over the shaft. The shaft has a shoulder, *c*, against which one end of the milling-head abuts. The opposite end of the shaft is made of smaller diameter, and on this rests a sleeve or collar, C, which is forced up to place against the end of the milling-head by a nut, *d*.

The nut may be applied close up to the head, if desired. By this means the milling-head is clamped securely in place on the shaft, so as to retain its place without slipping, and yet it can be removed from the shaft at any time for applying a larger or smaller one, or for any other purpose.

At each end of the milling-head are circular flanges or rims D D. The inner faces of these rims are grooved out, so as to form shoulders *f*, which fit over the ends of the inserted cutters, as shown in Fig. 2. By this means the cutters are prevented from end movement, and are also clamped down tightly in their grooves. They are, in fact, as tight and immovable as if formed solid with the head.

If desired, the shoulders *f*, which shut over the ends of the cutters, may, one or both, be made slightly beveling to bind the cutters down as they are pressed inward. These flanges have central eyes or holes which slide over the shaft. These flanges can be taken off for the purpose of inserting or removing the cutters.

In Fig. 6 the milling-head is shown solid with the shaft. Figs. 7, 8, and 9 show the cutters of the same kind before described, attached to the solid head. The flanges or rims D D are also used; but in this case pins *g g* pass through the shaft on each side of the flanges to hold the latter in place. One of these pins is slightly wedging, to produce the tightening action. Fig. 10 shows cutters of angular or wedging form, which center to the head or shaft. They are held by the flanges D D, as before described. Other forms of insertible cutters may be used in the same manner.

The advantage of this invention is that, if one cutter becomes broken or injured, it can be replaced by another without discarding the whole milling-head, which must be done where the cutters are formed solid with the head. The device is more easily and cheaply

formed than a solid head, since the head has simply to be grooved, and the teeth can be cut from a bar formed for the purpose, whereas, in the old form of solid teeth, the teeth are difficult to form, having to be cut out from the head.

Another advantage arises from the employment of the shouldered flanges or rims D D, which serve to prevent end movement of the teeth, and to clamp them firmly in place.

Another advantage consists in the construction of the shaft with the shoulder *c* and sleeve C, by which the milling-head may be applied or removed at pleasure.

What I claim as new is—

1. In a milling-tool, the insertible cutters *a*, constructed of diamond shape in cross-section, with opposite cutting-edges, whereby the cutters may be reversed, as and for the purpose specified.

2. The combination, with the milling-head A, constructed with grooves and with insertible cutters *a a* fitting in the grooves, of the shouldered flanges or rims D D, clamping the cutters in place in the head, as and for the purpose specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

J. M. SMITH.

Witnesses:

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R. F. OSGOOD.