No. 745,101 PATENTED NOV. 24, 1903.

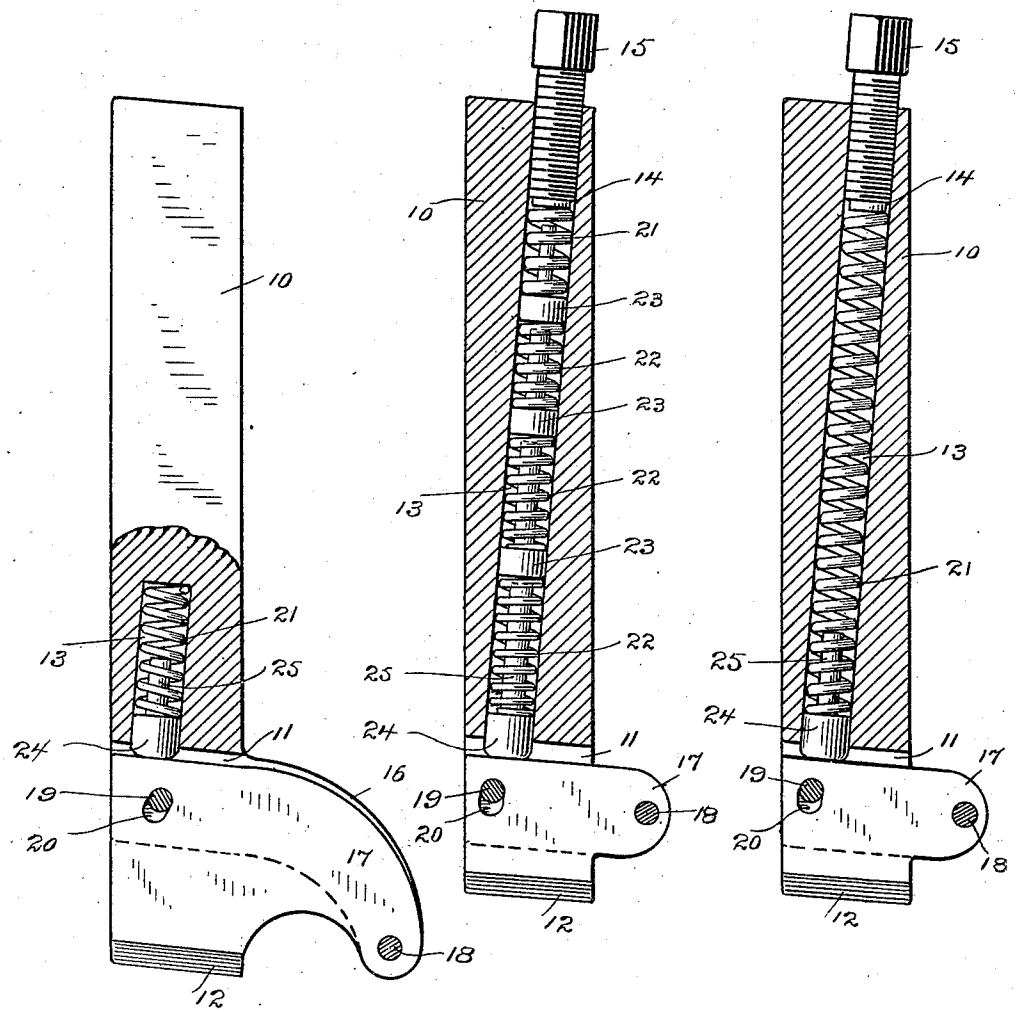
L. W. GATES.

YIELDING CUTTING TOOL.

APPLICATION FILED MAR. 25, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1. Fig. 2. Fig. 3.



WITNESSES.

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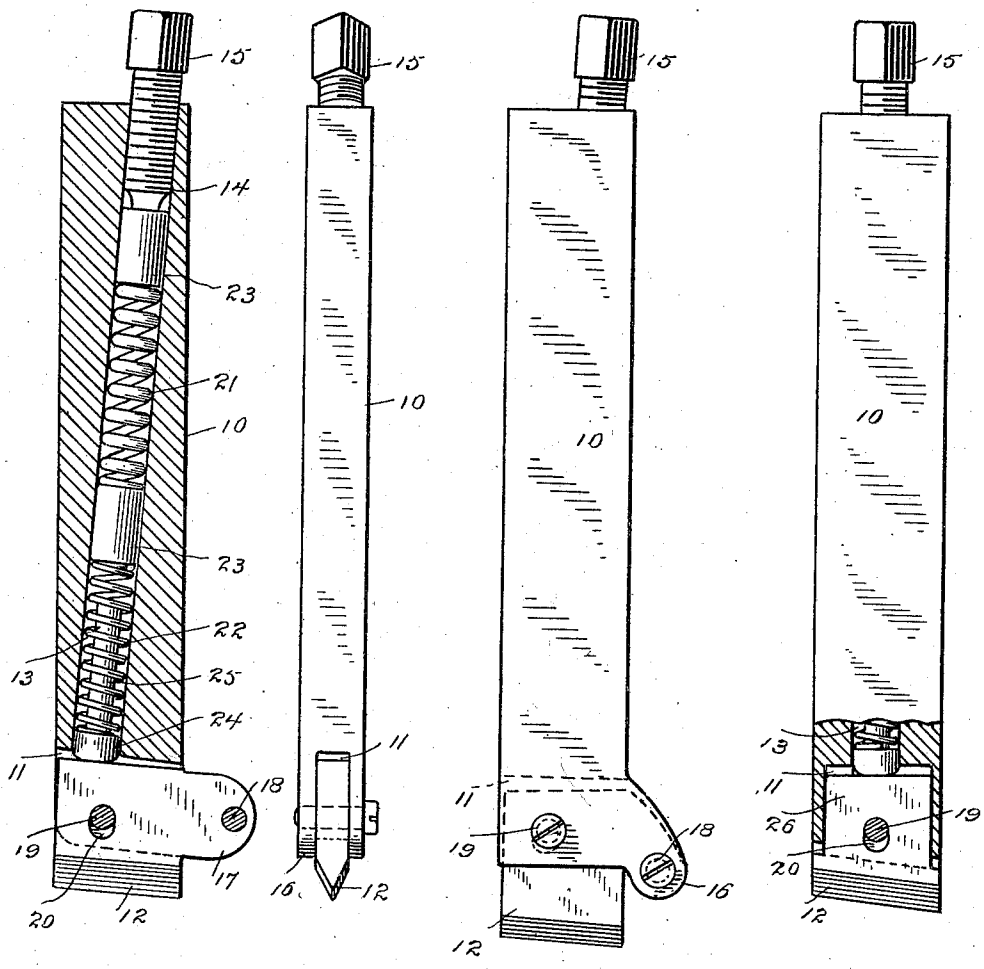
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Fig. 4. Fig. 5. Fig. 6. Fig. 7.



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UNITED STATES PATENT OFFICE.

LOUIS W. GATES, OF WESTHAVEN, CONNECTICUT.

YIELDING CUTTING-TOOL.

SPECIFICATION forming part of Letters Patent No. 745,101, dated November 24, 1903.

Application filed March 25, 1903. Serial No. 149,518. (No model.)

To all whom it may concern:

Be it known that I, LOUIS W. GATES, a citizen of the United States, residing at Westhaven, county of New Haven, State of Connecticut, have invented a new and useful Yielding Cutting-Tool, of which the following is a specification.

This invention relates to tools for cutting metal—as, for example, thread cutting and cutting-off tools.

It is one of the objects of this invention to provide a tool of this character which shall be relatively inexpensive to produce, will do the work required of it both faster and better than ordinary tools, will wear much longer than other tools of like character, as breaking of the point of the cutter is prevented, and which can be run by an apprentice, as little skill is required in its use, thus doing away with the necessity for a skilled workman, as is required in operating an ordinary rigid tool.

A further object of the invention is to provide a tool of the character described in which the strain in use shall be taken up by one or more springs lying back of the cutter, so that overloading of the cutter is prevented.

A further object of the invention is to provide a tool of the character described which shall be supported in use by a spring or springs placed tandem whose resistance to pressure upon the tool may be conveniently regulated by the operator.

A further object of the invention is to provide a tool of the character described which shall swing from a pivot placed above the cutting edge and shall rest against a spring or springs placed tandem.

It is of course well understood that workmen of more than ordinary skill are required for the successful general use of ordinary rigid metal-cutting tools. When a cutter is "overloaded," as it is termed in use, the tendency is to tear out metal in irregular pieces, leaving a rough thread. If the metal is soft, the tool frequently clogs and if hard or if there are hard spots it breaks out the metal irregularly. There is likewise great danger when a cutting-tool is overloaded of breaking the point of the cutter. In using my novel yielding cutting-tool the operator can tell by the chip if there is enough or too much tension upon the spring or springs and can readily adjust the tension by the sense of touch without moving the tool or the carrier therefor, so as to cut a clean smooth thread and avoid danger of breaking the point of the cutter.

With these and other objects in view the invention consists in certain parts, improvements, and combinations, which will be hereinafter described and then specifically pointed out in the claims hereunto appended.

In the accompanying drawings, forming part of this specification, Figures 1, 2, 3, 4, 6, and 7 are views illustrating variant forms in which I have carried out the principle of the invention, and Fig. 5 is an inverted plan view corresponding with Fig. 4.

10 denotes the body, which is provided at its forward end with a recess 11 to receive the cutter 12 and with a longitudinal hole 13. the rear end of which may or may not be threaded, as at 14, to receive an adjusting-screw 15. In Figs. 2 to 6, inclusive, this hole is shown as drilled obliquely in the body, the rear end of the hole being highest and near the top of the body and the front end lowest and near the bottom of the body, so that the lower end of the cutter—that is, the end farthest from the pivotal point—will bear against the spring or springs, as will presently be explained. In Figs. 1 to 6, inclusive, the body is provided at its forward end on opposite sides with ears 16, which may extend upward nearly vertically, as in Figs. 2, 3, and 4, or may project forward beyond the end of the body, as in Figs. 1 and 6, and the cutter is provided with an arm 17, which is pivoted between the ears, as at 18. The oscillation of the cutter in one form and the reciprocation of the cutter in the other form are limited by a screw-pin 19, which passes through both sides of the body and through a slot 20 in the cutter. It will of course be obvious that the special shape of either body or cutter is not of the essence of the invention and that the shape of both bodies and cutters may be varied to an almost unlimited extent without departing from the principle thereof. This pivoting of the cutter above the cutting edge I consider an important feature of the preferred form of the invention and find that cutters suspended in that manner work admirably in use.

Another and vital feature of the invention is the interposition between the cutter and the body of a spring or springs of varying strength where more than one spring is used. One, two, or more springs may be used, depending upon the judgment of the maker and the special use for which the tool is intended, the strongest spring, where more than one is used, being ordinarily placed farthest from the cutter.

In Figs. 1 and 3 I have illustrated forms of the invention in which one spring only is used. This spring I have indicated by 21. In Fig. 1, which is the simplest form of all, the adjusting-screw is dispensed with, and the spring bears against the bottom of the hole 13 in the body and against a bearing-plug 24, lying in the outer end of the hole, the forward end of which is rounded and against which the back of the cutter bears, as clearly shown in the drawings. This bearing-plug is shown as provided with a shank 25, which lies loosely within the coils of the spring and is adapted to engage the bottom of the hole when the spring is compressed. In Figs. 2 and 4 I have illustrated the use of a plurality of springs. In these forms I have indicated the stronger spring by 21 and the relatively weaker spring or springs by 22. I have also shown plugs 23 as interposed between the springs and in Fig. 4 have shown a plug as interposed between the adjusting-screw and the stronger spring. The plugs all slide freely in opening 13.

In Fig. 7 I have illustrated a form of the invention in which the cutter reciprocates instead of oscillates. In this form the cutter is provided with a shank 26, and the recess 11 in the body is made of suitable shape and size to receive said shank and permit it to slide freely, but without looseness. The slot and retaining-screw and the bearing-plug and springs are in this form placed centrally to the cutter, as clearly shown in the drawings, the reason for which will be obvious.

When the cutter is doing light work, the pressure is taken up entirely by spring or springs 22, if used, spring 21 remaining practically rigid. In doing heavy work spring 22 will be compressed until the shank of the bearing-plug engages the plug between the two springs, after which additional pressure will be taken up by spring 21. Should the work be very light and the pressure of the springs stronger than is desired, the operator relieves the pressure by turning out the adjusting-screw. In very heavy work, where additional resistance is required, the operator obtains it by turning in the adjusting-screw and compressing-spring 21.

For heavy work it is desirable to use a tool having a plurality of springs in order to avoid the possibility of a single spring becoming set under heavy tension. Where more than one spring is used, the plugs prevent the springs from setting, as the resistance to backward movement of the cutter consists of a plurality of tensions instead of a single tension.

Having thus described my invention, I claim—

1. A yielding cutting-tool consisting essentially of a body, a cutter, and a spring socketed in the body and lying back in position to receive the working thrust of the cutter.

2. A yielding cutting-tool consisting essentially of a body, a cutter pivoted above the body and a spring socketed in the body and lying back in position to receive the working thrust of the cutter.

3. A yielding cutting-tool consisting essentially of a body, a cutter, and a plurality of springs of different strength placed tandem, against which the cutter rests.

4. A yielding cutting-tool comprising a body, a cutter, an adjusting-screw and a plurality of springs of different strength placed tandem intermediate the adjusting-screw and the cutter, the strongest spring being placed farthest from the cutter.

5. A yielding cutting-tool comprising a body, a cutter, an adjusting-screw, a plurality of springs of different strength placed tandem intermediate the adjusting-screw and the cutter, plugs between the adjusting-screw and the first spring and between the springs, and a bearing-plug engaging the cutter and having a shank inclosed within the coils of the inner spring and adapted to engage the plug between the inner spring and the contiguous spring when the inner spring is compressed.

6. A yielding cutting-tool comprising a body having a recess at its outer end, a cutter adapted to have movement in said recess and having a slot lying in the direction of its movement, a pin passing through said slot whereby the movement is limited and a plurality of springs of different strength placed tandem, against which the cutter rests.

7. A yielding cutting-tool comprising a body, a cutter pivoted above the body and a plurality of springs of different strength placed tandem, against which the cutter rests.

8. A yielding cutting-tool comprising a body having ears, a cutter having an arm pivoted between said ears and a plurality of springs of different strength placed tandem, against which the cutter rests.

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

LOUIS W. GATES.

Witnesses:
FRANCIS J. DUFFY,
BENJAMIN SLADE.