(No Model.)

3 Sheets—Sheet 1.

A. WHITNEY.

REAMER RELIEVING MACHINE.

No. 323,006. Patented July 28, 1885.

Fig. 1.

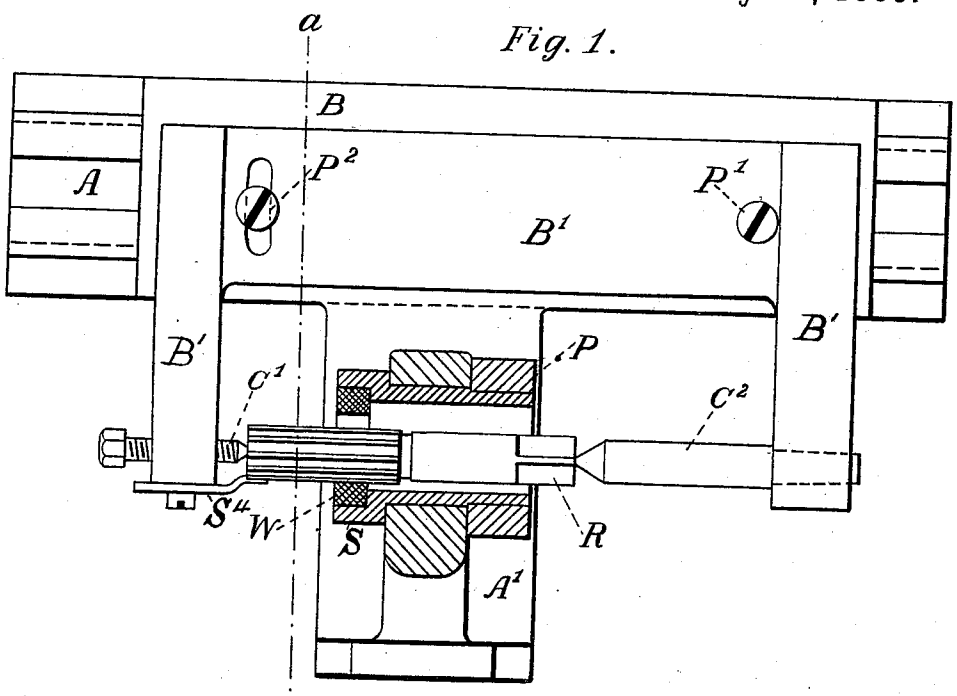
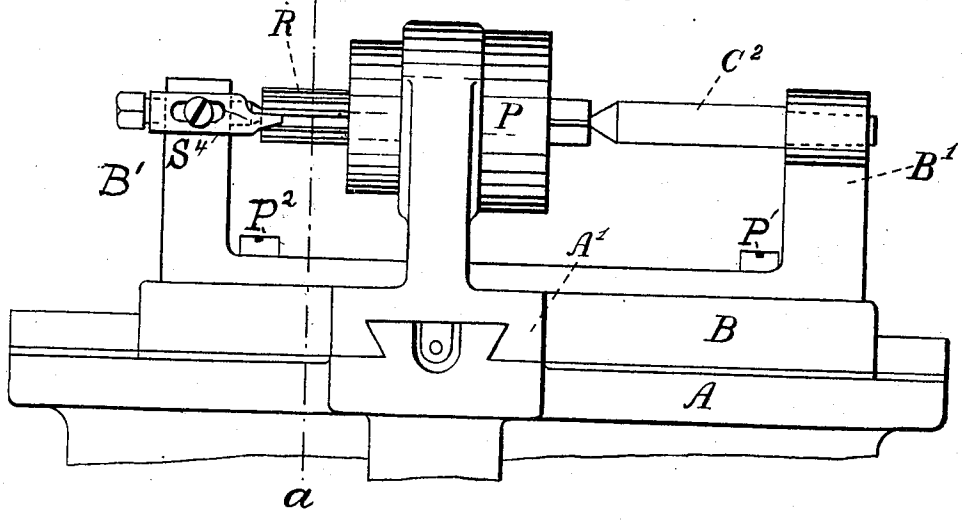


Fig. 2.



Witnesses;

C. O. Palmer.

H. W. Faulkner.

Inventor;

Amos Whitney, By his Atty

F. W. Richards

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 3 Sheets—Sheet 2.

A. WHITNEY.

REAMER RELIEVING MACHINE.

No. 323,006. Patented July 28, 1885.

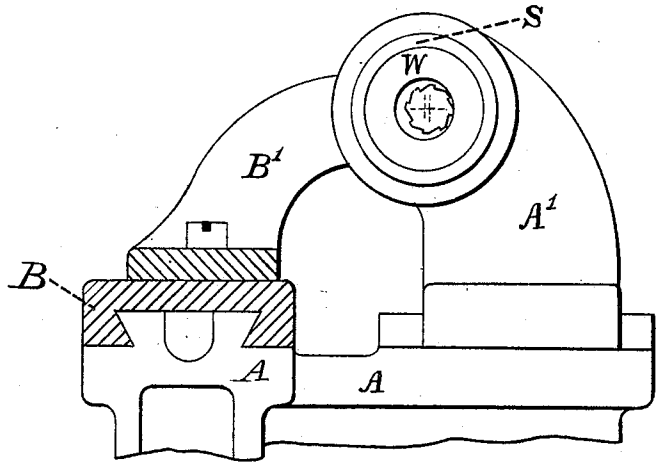


Fig. 3.

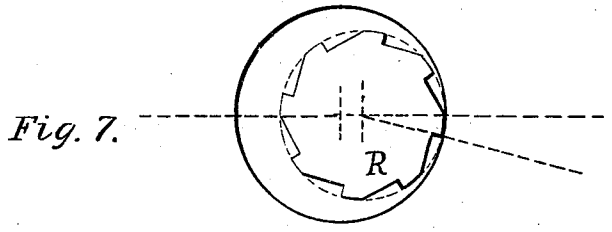


Fig. 7.

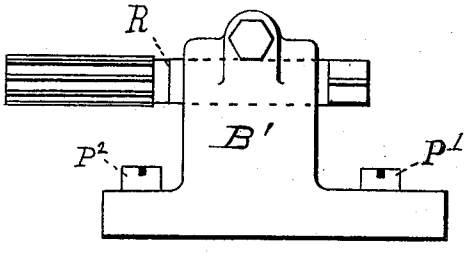


Fig. 8.

Witnesses;
C. O. Palmer.
H. W. Faulkner

Inventor;
Amos Whitney, By his Atty.
F. H. Richards.

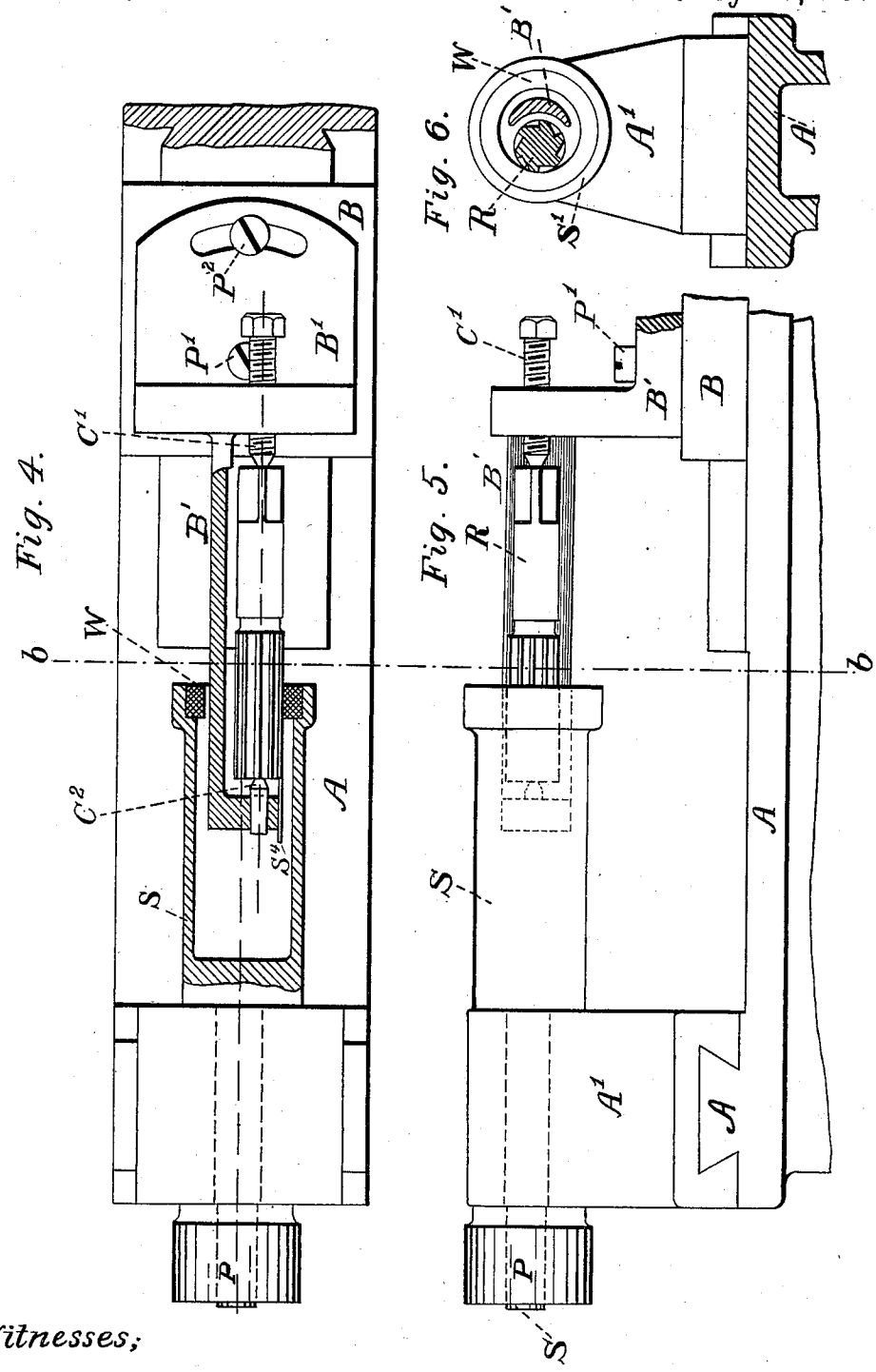
N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 3 Sheets—Sheet 3.

A. WHITNEY.

REAMER RELIEVING MACHINE.

No. 323,006. Patented July 28, 1885.



Witnesses;

C. O. Palmer.

H. W. Faulkner.

Inventor;

Amos Whitney, By his Atty

F. A. Richards.

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

AMOS WHITNEY, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE PRATT & WHITNEY COMPANY, OF SAME PLACE.

REAMER-RELIEVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 323,006, dated July 28, 1885.

Application filed March 10, 1884. (No model.)

To all whom it may concern:

Be it known that I, AMOS WHITNEY, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Reamer-Relieving Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to machines for relieving the cutting-edges of reamers or those of other similar tools, either before or after hardening, by means of suitable grinding devices.

It has for its object to furnish such a machine of simple construction and easily operated, adapted to relieve the cutting-edges of a tool by reducing each land or surface between the grooves of the same to an arc of a circle that is slightly eccentric to the circle of the cutting-edges.

For the attainment of that object it consists in certain combinations of mechanism, hereinafter first described in connection with the drawings, and afterward pointed out in the claims.

Referring to the drawings, Figure 1 is a plan view of one form of a machine embodying my invention. Fig. 2 is a front elevation of the same. Fig. 3 is a vertical cross-section in line *a a*, Fig. 1. Fig. 4 is a plan view of another form of the same machine, partially in section. Fig. 5 is a front elevation of that form of the machine shown in Fig. 4. Fig. 6 is a vertical cross-section of the same in line *b b*, Fig. 4. Fig. 7 is a diagram to illustrate the form of relief given to the cutting-edges of the tool. Fig. 8 shows a modification of the tool-holding device.

Similar letters refer to similar parts throughout the several views.

The frame or bed A of the machine, which may be of any suitable construction, has ways (see Figs. 3 and 5) whereon a suitable sliding table, B, is adapted to be moved by some convenient means, as a screw and nut or a rack and pinion movement, both of which are well-known appliances adapted to be used for that purpose. This frame A has also suitable ways for supporting an adjustable head, A′, which is shown as a sliding one, but which may be a swinging one, with suitable bearings for supporting the spindle S, which carries the hollow cutter or grinding-wheel W, and which is driven by means of the pulley P.

The sliding head may be moved upon its ways by similar means as provided to move the table B, described above.

Upon the table B a bracket, B′, is adjustably secured by means of pivot-screw P′ and binding-screw P^2. This bracket is provided with two centers, C′ and C^2, of which either one or both may be adjustable, for carrying the reamer R or other similar tool to be operated upon.

A suitable stop, S^4, is provided to hold the tool in proper position during the relieving operation.

The bracket B′ may be made in two parts, one adjustable relative to or upon the other, to facilitate the holding of tools of different lengths. When it is made as shown in Fig. 1, one of the centers, preferably C^2, is made longer than the opposite one, so as to reach nearly through the hollow spindle S, for the purpose of facilitating the placing and the removing of the tool R; but when it is made as shown in Fig. 4, that extra length is no longer desirable. When said bracket B′ is made as in this figure, (Fig. 4,) it consists of an angle-piece, into which the center C′ is fitted, having a horizontal extension reaching out alongside of the reamer within the wheel W, for carrying center C^2. This arm is shown in section in Fig. 6, and mostly in section in Fig. 4. In Fig. 5 it is mostly hidden by the reamer R.

When the tool has a cylindrical shank that is sufficiently accurate, the centers C′ and C^2 may be dispensed with, and the tool held by its shank within a collet or other suitable chuck, as illustrated in Fig. 8. In this figure, R is a reamer held by its shank in a tool-holding bracket, B′, which bracket is, when being used, placed on slide B in place of B′, Figs. 1 and 2, being adjustably fixed thereon by screws P′ and P^2. I do not recommend that means, except it may be in special cases—as, for instance, where the shank of the tool is of unusual length.

The spindle may be formed and supported in a variety of ways; but as those constitute no essential part of my present invention, ex-

cept as to the single requirement that it shall be hollow a sufficient distance to receive or pass over the reamer, I have only described it in a general way.

When very long tools are to be relieved, that form of spindle shown in Fig. 1 may be used; but for relieving short tools I prefer the form shown in Fig. 4. This preference applies also to the form of the machine as a whole, as shown, respectively, in those two figures.

The operation of my improved relieving-machine is very simple, as will be understood from the drawings and the preceding description.

I prefer to use a grinding-wheel of as small an internal diameter, relative to the diameter of the tool being relieved, as the construction of the machine used will conveniently allow.

The diagram, Fig. 7, shows the relative positions of a tool—in this instance a fluted reamer—and the grinding-wheel, preferably an emery or corundum one, when the former is set ready for the relieving of one of its cutting-edges.

The tool having been set as described, the bracket B′ is adjusted to give the proper taper, if any is required, to the finished tool. The grinding-wheel is then made to revolve rapidly, and the slide A′ is moved so as to bring it against the tool. The table B is next moved to and fro upon its ways to allow the wheel to act upon the whole length of the part to be relieved, the wheel being gradually fed to the tool during that operation until the relieving of that cutting-edge is completed. The other edges are of course successively relieved by the repetition of the same operations.

It will be seen that the form of the cutting-edges, after being relieved, is that of a circular arc, corresponding in radius to the grinding-wheel used to make the same.

I claim as my invention—

1. In a relieving-machine, the combination of a frame or bed, a sliding table arranged to slide on said frame, a spindle-head, a hollow spindle supported in said head and carrying a hollow grinding-wheel, and a tool-holding bracket, substantially as described, on said slide, for holding a tool against the inner surface of said wheel, substantially as described.

2. In a relieving-machine, the combination of bed A, a table, B, a bracket, B′, pivotally secured to that table and having centers C and C′ for supporting a tool, a sliding head, A′, a spindle, S, and a ring-shaped wheel, W, substantially as described.

AMOS WHITNEY.

Witnesses:
F. H. RICHARDS,
C. O. PALMER.