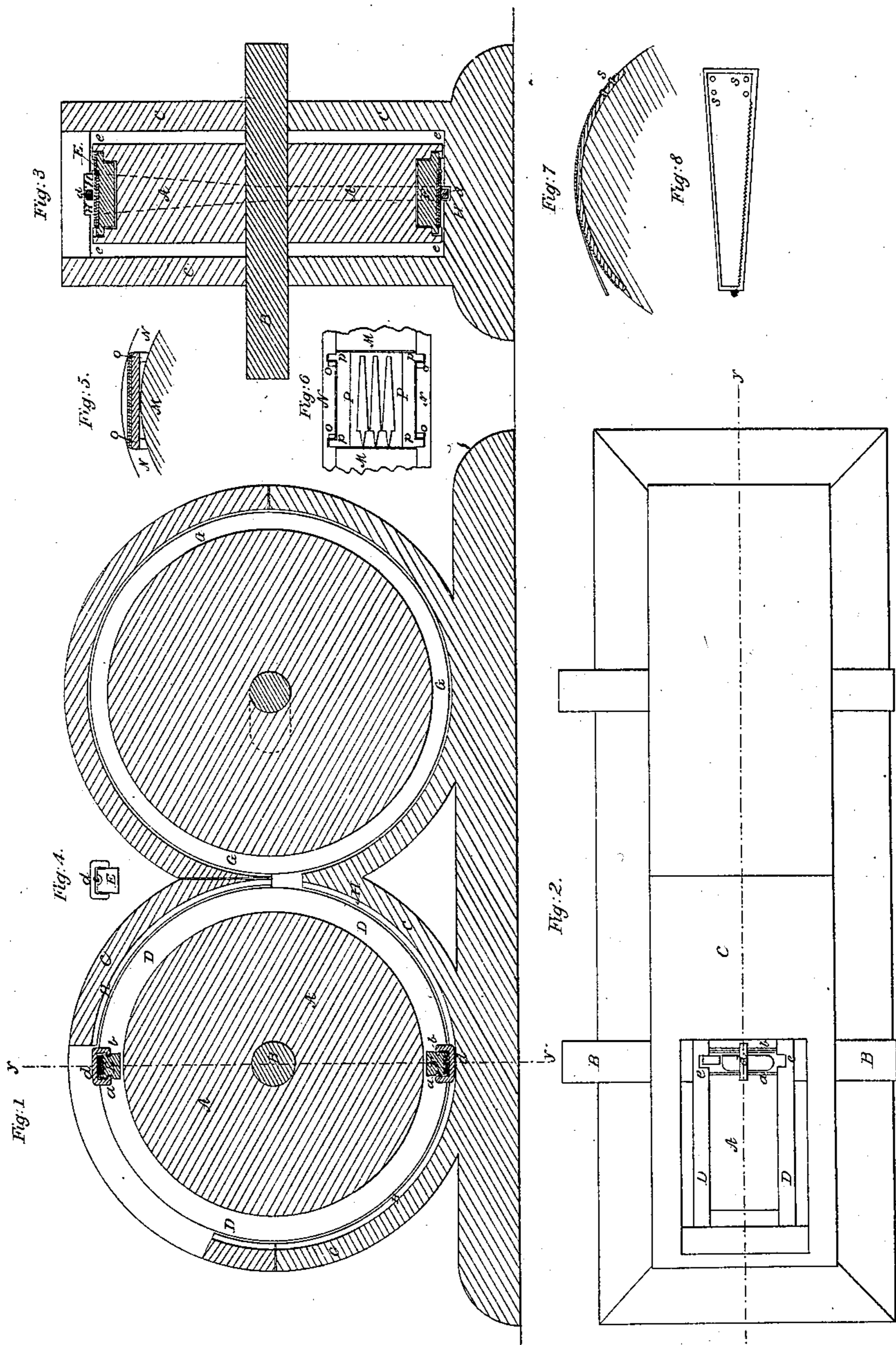


J. Dodge,
Grinding and Polishing Cutlery,
No 39,317, *Patented July 21, 1863.*



Witnesses:

Wm H. Karrison
Wm P. Brook

Inventor:

J. Dodge
Wm P. Brook

UNITED STATES PATENT OFFICE.

JAMES DODGE, OF WATERFORD, ASSIGNOR TO DODGE & BLAKE, OF COHOES, NEW YORK.

IMPROVEMENT IN MACHINES FOR GRINDING AND POLISHING CUTLERY.

Specification forming part of Letters Patent No. 39,317, dated July 21, 1863.

To all whom it may concern:

Be it known that I, JAMES DODGE, of Waterford, in the county of Saratoga and State of New York, have invented certain new and useful improvements in grinding and polishing knives, saws, files, and other articles made of metal or other analogous substance capable of being ground and polished; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional elevation of an improved apparatus embodying the principle of my invention, the section being made on line *xy* in Fig. 2, and showing the internal construction and arrangement relatively to each other of the drum and grindstone or polishing-wheel. Fig. 2 is a plan view of the same. The trap or door is removed to show the arrangement of the knives upon the drum. Fig. 3 is a transverse section of the same on line *yz* in Fig. 1. Fig. 4 is a detail end view of the knife supporting lag. Figs. 5 and 6 represent a sectional elevation and plan view, respectively, of a lag, showing, in illustration of my invention, the method of fastening file-blanks to the revolving drum; and Figs. 7 and 8 represent in vertical section and plan view the mode of securing, in conformity with my invention, a saw-blade to the revolving drum.

My present improvements relate to that class of grinding and polishing apparatus or machinery in which the articles to be ground or polished are attached to the surface of a movable or stationary bed-plate, preferably to the periphery of a revolving drum or cylinder—such, for instance, as that for which Letters Patent of the United States were granted on the 12th day of October, 1858, and reissued to me on the 31st day of May, 1859. In said machines or apparatus, by me heretofore constructed, the periphery of the drum was provided with matrices, beds, or supports for the reception therein of the articles to be ground or polished, said matrices, beds, or supports being adapted so that the articles are held against the stone to be ground to the requisite shape, also to allow of their rocking and accommodating themselves on the drum. Articles to be ground or polished, however perfectly forged or rolled, present superficial in-

equalities more or less pronounced, the effect of which, when housed or incased in a perfect matrix or simply supported on said beds, and when applied to the grindstone or polishing-wheel, is the reduction beyond the requisite or contemplated thickness of such articles. On the other hand, it has been found that the matrices, when wrought into the surface of the drum, lags, or bed-plates, made of iron or other hard and unyielding substance, as they were heretofore usually made, have a tendency to create excessive friction by the deep abrasion suddenly produced on the articles to be ground or polished, whereby heat is developed to such an extent as to injuriously affect the said articles. The main object of my invention, therefore, is to reduce with greater uniformity the thickness of the articles to be ground or to polish the same with a softer touch than this could heretofore be done by machinery, compensating, as it were, for the superficial inequalities in thickness, also to produce the desired result in less time than this could heretofore be done, and without unduly heating the articles to be ground or polished. I have accomplished this by the employment, in grinding or polishing machinery of whatever construction, and in combination with the bed-plate thereof, whether the same be stationary, revolving, or vibratory, and having upon its surface or periphery fixed or movable matrices or beds, of an elastic or yielding substance, so applied that the articles to be ground or polished, when brought in contact with the stone or polishing-wheel, shall be pressed against it with a yielding pressure, substantially in the manner hereinafter more fully explained.

To enable others skilled in the art to make and use my improvements, I shall now proceed to describe the construction, arrangement, and operation of an apparatus to which this my invention is adapted.

In the accompanying drawings my improvements are shown applied to a grinding and polishing machine for which Letters Patent were issued to me on the 12th day of October, 1858. A revolving drum, A, hung in a casing, C, upon a horizontal axis or shaft, B, and capable of a reciprocating movement in direction of its supporting shaft, is so arranged in relation to a revolving grindstone or polishing-wheel as that the different objects carried by

the drum and which are to be ground or polished are brought into frictional contact with the grindstone or wheel.

The method of attachment of the articles may vary according to the shape and size of the article. The articles may thus be attached or held to the periphery of the revolving drum or cylinder so as to project from its general surface, or they may be held in matrices sunk below the surface of the drum or cylinder, or, again, the matrices for the articles may be separate and distinct from the drum or cylinder and simply be attached thereto, for greater convenience and dispatch in the operation; and, lastly, the matrices, if constituting separate pieces from the drum, may be so attached to the drum as to be capable of vibratory or rocking motion, and thereby adapt or accommodate themselves to the configuration, diameter, or shape of the stone.

To either and all these methods of attaching I adapt my improvement, the subject of this patent—*i. e.*, I provide for an elastic or yielding substance which shall be interposed between the article to be ground or polished and the supporting matrix or bed. The manner of adaptation must necessarily vary with the method of attachment used, as well as with the form and size of the article to be ground or polished, also to suit the convenience of the operator.

In Figs. 1, 2, and 3 I have shown, to illustrate my said invention, the method employed by me for the polishing or grinding table knives. The drum A is shown provided with a flange, D, projecting from and bordering each side of the periphery of the drum or cylinder. These flanges are indented to form the bearings in which the matrix-lags E of the knife are hung, and upon which the matrix has a swinging vibratory motion. These lags are wooden or iron prismatical blocks, of a length nearly to occupy the distance between the two flanges, and of a depth somewhat less than that of the flanges. They are provided at their ends with the rounded studs or axles *e*, upon which they are hung and capable of a rocking motion. Along the sides *a* and *b* the lags are grooved to admit of the hooked ends of a clamp, *d*, being secured to and sliding along the lag, as hereinafter explained. The matrix, which is of the reverse form of the knife to be polished, is lined with a sheet of india-rubber or leather or thick flannel cloth or other yielding or elastic material. This yielding or elastic sheet may be glued to the matrix or may be simply laid into it so as to come between the knife and the matrix. The knife, it will be understood, is held in its place in the matrix by means of the clamp before referred to. In order to enable the polishing or grinding of the whole surface of the blade, I form in the face of the grindstone or polishing-wheel a groove, G, but little wider than the thickness of the clamp, or I form the stone or wheel of two separate stones or wheels, so mounted upon a shaft as to leave a space be-

tween them for the passage of the clamp. I also form a groove, H, in the casing of the drum, which confines the clamp and so guides it in its rotary travel along the casing as to come opposite the groove G in the stone at or immediately before the point of contact of the knife and stone or wheel.

In the accompanying drawings the groove H is shown wider in the upper side of the casing and narrowing toward the point of contact with the grindstone, where it is of the same width and in the same vertical plane as that of the groove G. The object of this arrangement is to dispense, on the part of the operator, with nice adjustment of the clamp in the casing and on the lag. It will be readily understood that on revolving the drum while a reciprocating movement is imparted to it along the axis of rotation, the clamp, which is placed in any position within the expanded part of the groove H, will be guided by the converging sides and actuated to occupy the proper position in relation to the groove G.

The operation of the machine is substantially the same as that described in my patent of October 12, 1858; but the result due to the interposition of a sheet of an elastic or yielding substance is highly important and essential. By actual experiment and comparative trials I have ascertained that the machine can do more work, and do it better, by placing the articles to be ground on a soft bed, so that the bumps or inequalities on the reverse side, or that side of the article which is in contact with the matrix bed or support, due to imperfect forging or rolling, may sink out of the way. Another great advantage consists in the ability of guiding two or more articles of varying thicknesses upon one and the same bed, the thicker yielding back, while it, together with others of less thickness, is being ground. The principal advantage, however, is that the articles are not liable to heat when ground upon a soft bed.

In Figs. 5 and 6 I have shown my invention applied to lags adapted for the grinding of file blanks. In these figures, M represents a portion of the drum provided with a flange, N, on each side. The lag P is here shown made in the form of a square plate occupying nearly the whole width of the drum within the flanges and forming a plane tangent on the periphery of the drum, so as to rock thereon and readily adapt itself to the form of the grindstone. The lag is maintained in place upon the drum by means of projecting studs or pins at each corner fitting guides or channels cut in the sides of the flange of such form as to admit of the rocking motion before referred to. The beds in this case are lined with leather, in like manner and with like effect as in the example before cited.

For grinding saw-blades I use no lags, but bend them around the cylinder or drum, as shown in Figs. 7 and 8. They are held to the matrix by means of pins S, passing through the holes which are provided in the blade for

the attachment of the handle. I use, in addition to the cloth, rubber, or leather sheet, interposed between it and the saw-blade, a very thin and, of course, very flexible sheet of steel for the purpose of combining the yield or elasticity of the leather, rubber, or other equivalent substance, with a certain rigidity and durability of surface, whereby the saw-blade is prevented from undulating, and thus have its different parts unequally reduced. The blade, it will also be seen, is only attached at one end, the other being free to spring and to adapt itself to the matrix or drum, as induced by the pressure of the stone or wheel upon it.

From the above it will be seen that my improvements, although particularly shown as applied to and combined with the improvements for which I obtained Letters Patent, as hereinbefore referred to, may be adapted to any other kind or variety of grinding or polishing machinery. I therefore desire to be understood as not confining myself to any particular arrangement of mechanism, nor yet to any of the elastic or yielding substances hereinbefore specified. My improvements may be combined with any grinding or polishing machine, whether the same have stationary, revolving, oscillating, or vibratory drum, bed, or plate, having or not upon its surface or periphery matrices, beds, or supports for the reception therein or thereon of the articles to be ground or polished, and whether said matrices, beds, or supports are themselves movable or fixed.

I shall therefore state my claim as follows:

1. The employment, in grinding or polish-

ing machinery of whatsoever construction, and in combination with the bed-plate thereof, whether the same be stationary, revolving, or vibratory, of an elastic or yielding substance, so applied between the matrix, bed, or support and the articles to be ground or polished that when the latter are brought in contact with the stone or polishing-wheel they shall be pressed against it with a yielding pressure, substantially in the manner hereinbefore described.

2. The combination, with the matrix, bed, or other equivalent device for supporting the articles to be ground or polished, of a clamp to hold the said articles in place, as described, such clamp being actuated so as to expose the whole surface of the articles to the action of the grindstone or polishing-wheel, substantially in the manner hereinbefore set forth.

3. In combination with the clamp, operating substantially as hereinbefore described, the employment of a grooved grindstone or polishing-wheel, or of two grindstones or polishing wheels, having an intermediate space to allow that portion of the clamp which projects from above the surface of the article to be ground or polished to sink below the surface of the grindstone or polishing-wheel, substantially as herein described.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

JAMES DODGE.

Witnesses:

DAVID BLAKE,
GEO. W. EDDY.