C. G. OLSON.

TOOL DRESSING DEVICE.

APPLICATION FILED MAR. 8, 1919.

1,323,486.

Patented Dec. 2, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

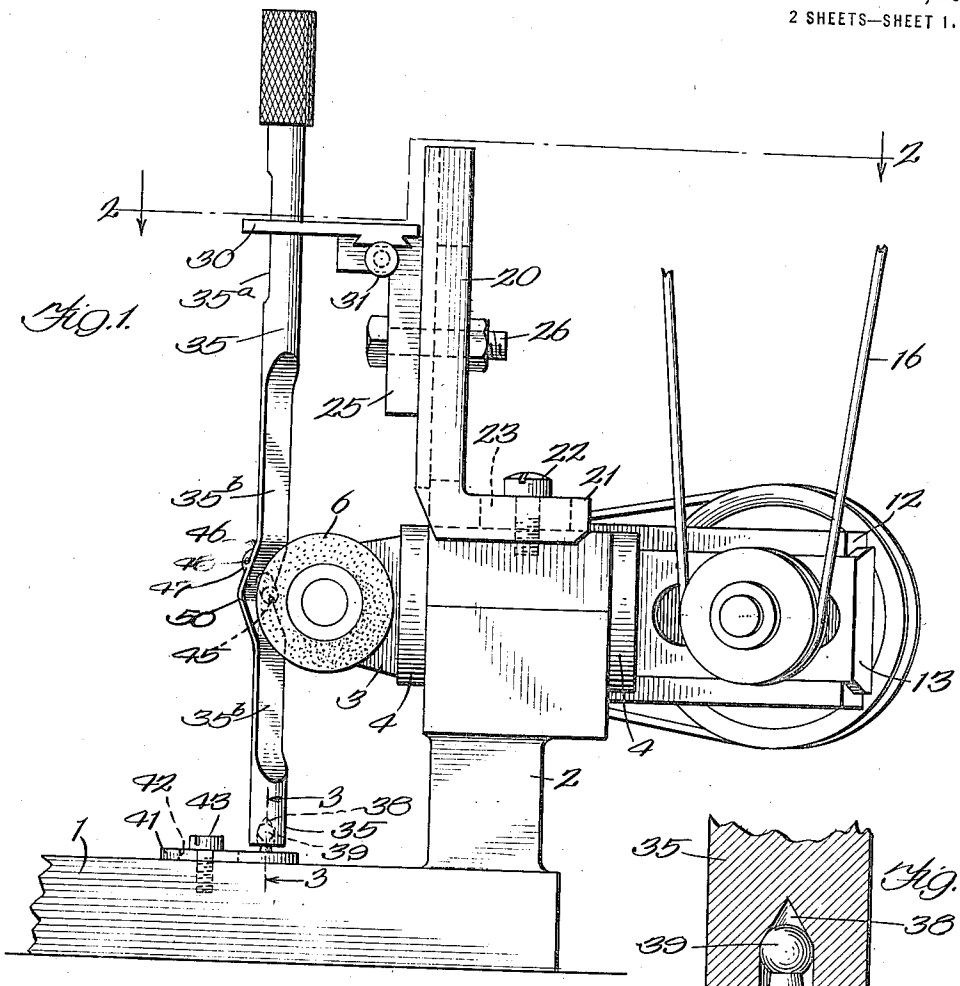
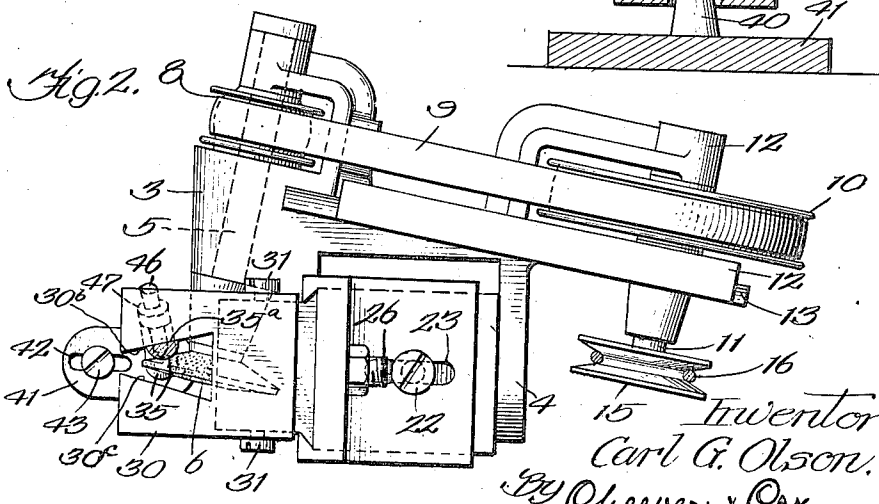


Fig. 3.

Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 4.

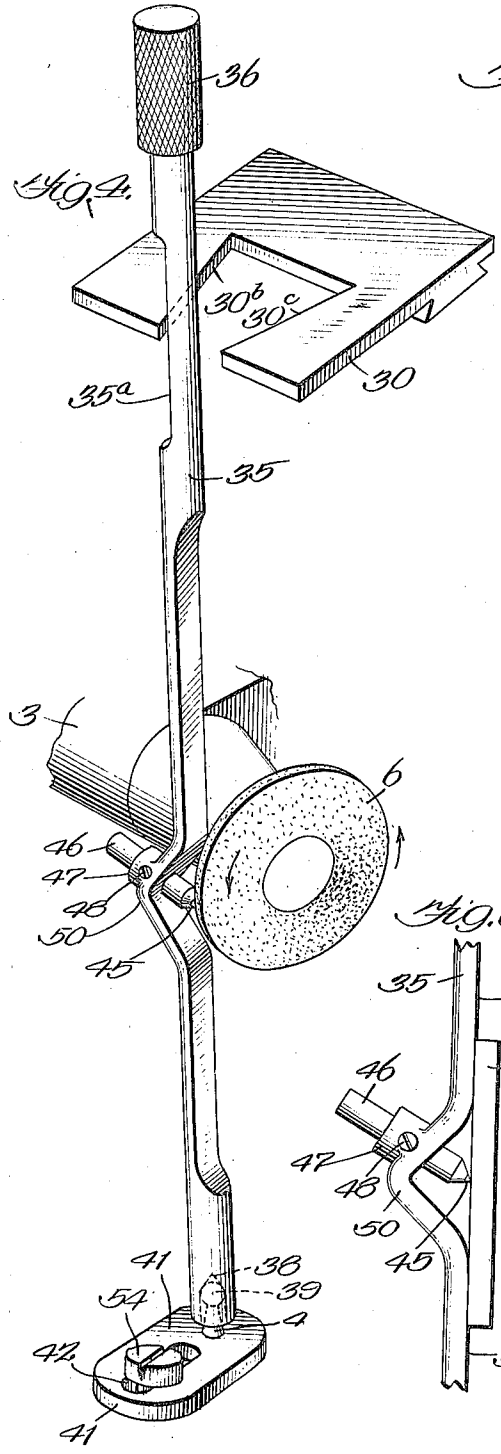


Fig. 5.

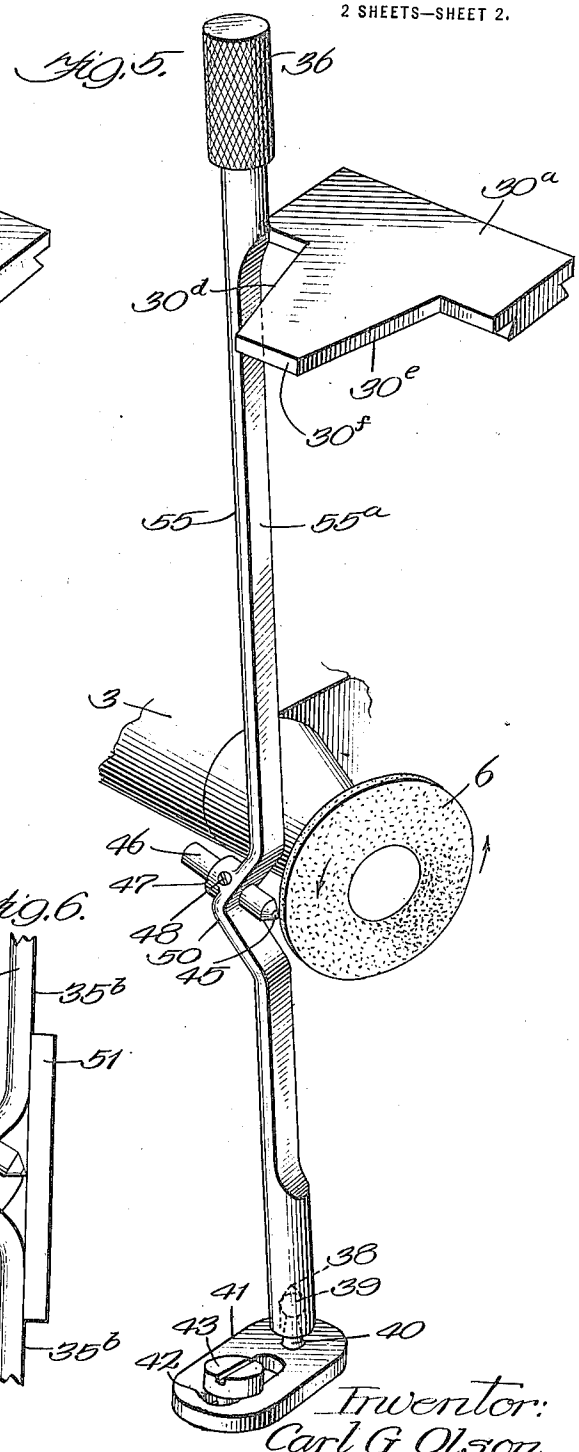


Fig. 6.

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UNITED STATES PATENT OFFICE.

CARL G. OLSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO ILLINOIS TOOL WORKS, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

TOOL-DRESSING DEVICE.

1,323,486. Specification of Letters Patent. Patented Dec. 2, 1919.

Application filed March 8, 1919. Serial No. 281,332.

To all whom it may concern:

Be it known that I, CARL G. OLSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Tool-Dressing Devices, of which the following is a specification.

My invention relates to dressing devices, more particularly for bodies of revolution such for example as grinding wheels. It will be understood that it is frequently a matter of great importance that grinding wheels be accurately configurated. To illustrate, grinding wheels are sometimes employed for correcting the teeth or hobs after the latter have been subjected to heat treatment. For this purpose the grinding wheels must be kept accurately configurated and my present machine is well adapted to accomplish this end. The general object of the invention is to provide organized mechanism by which grinding tools and the like may be trued. Contributory to this general object it is my purpose to provide advantageous means for supporting the handle which carries the dressing tool; to provide advantageous means for supporting the dressing tool in the handle; to provide advantageous means for guiding the handle; and to provide adjusting devices whereby the character and shape of the work may be varied and whereby wear may be compensated.

I obtain my objects by the mechanism illustrated in the accompanying drawings in which—

Figure 1 is a side elevation of a machine embodying my invention.

Fig. 2 is a top plan view on the line 2—2, Fig. 1, the handle being shown in section.

Fig. 3 is a view showing a sectional elevation on the line 3—3, Fig. 1.

Fig. 4 is a perspective view of the handle and the other chief operating parts of the machine, illustrating the manner of use when an internal templet is employed.

Fig. 5 is similar to Fig. 4, but illustrates the manner of use when an external templet is employed.

Fig. 6 is a side elevation of the portion of the handle which carries the dressing tool, the purpose being to show that the point of the dressing tool lies in the plane of the acting edge of the handle—that is, the part which coöperates with the templet.

Like numerals denote like parts throughout the several views.

In the form of machine selected to illustrate the invention, there is a main frame having a platform 1 and a column 2 which rises from it. An auxiliary frame 3 is located at the upper end of the column, said frame having two arms 4, 4 which are pivotally connected to the column so as to permit the frame to rotate about a horizontal axis and to be swung over from one side of the column to the other for reversing the position of the tool to be dressed. The auxiliary frame has a spindle 5 journaled within it as indicated in dotted lines in Fig. 2. The tool to be dressed is here shown in the form of a grinding wheel 6 and will be referred to as such.

The spindle is rotated by means of a pulley 8 driven by a belt 9. Said belt is driven by a pulley 10 secured to a spindle 11 journaled in a frame 12 which slides upon a guide 13 formed in the auxiliary frame 3. Spindle 11 is driven by a sheave 15 rotated by a belt 16. The advantage in thus making the frame 12 slidable upon the guide 13 is to provide adjustment so that the belt may be kept tight. The "on" side of the sheave 15 is substantially in line with the axis of the auxiliary frame so that by throwing off the belt 16 the auxiliary frame may be thrown over to reverse the position and the belt 16 subsequently replaced upon the sheave. This construction of the auxiliary frame and spindle driving mechanism is not herein claimed as it is shown and claimed in my co-pending application, filed February 7, 1919, Serial Number 275,537.

Rising from column 2 is a post 20 which has a foot 21 which rests upon the top of column 2 and is fastened to it by means of a stud 22 or other suitable device. Said foot has a slot 23 which enables the post to be adjusted horizontally in a direction parallel to the axis of rotation of the auxiliary frame 3. A bracket 25 slides vertically upon post 20 and is secured in proper position by means of a bolt 26. Slidably mounted upon the bracket is a templet 30. It is slidable horizontally in a direction transverse to the

line of adjustment of the foot 21 on column 2. Hence said templet may be adjusted vertically, and in any direction horizontally. The position of the templet on the bracket is controlled by an adjusting screw 31. The templets are interchangeable, a templet of the internal type being shown in Figs. 1 to 4 of the drawings, and a templet 30[a] of the external type being shown in Fig. 5. Referring to the internal type, the templet has two acting edges 30[b] and 30[c]. These form guides for the acting surface 35[a] of the handle 35. Said handle has a grip portion 36 at the upper or free end and a universal joint at the bottom. In the form of joint shown, the handle has a socket 38 at the lower end which fits over a ball 39 mounted at the upper end of a post 40 rising from the plate 41 as shown in section in Fig. 3. By preference the upper end of socket 38 is conical, the result being that any wear either in the ball or the socket is automatically compensated for and the joint always remains tight and the handle always remains accurately centered. Thus the parts just described constitute a self-tightening universal joint for the handle. Plate 41 has a slot 42 for accommodating the set screw 43 which screws into platform 1. This permits the lower end of the handle to be adjusted horizontally in any direction.

At a convenient point between its upper and lower ends the handle 35 carries a dressing tool which in the present case consists of a diamond point 45 mounted at the inner end of a shank 46. The shank is slidable within a hub 47 formed in the handle and the shank is held in proper position in the hub by means of a set screw 48. By preference the hub holds the dressing tool obliquely with respect to the surface it is dressing. The result is that as the diamond point wears on one side a fresh cutting edge may be presented to the work by rotating the shank in the hub a partial revolution about its longitudinal axis.

The handle has a return bend 50 in it adjacent to the dressing tool for clearance—that is, for avoiding interference between the handle and the grinding wheel, and for permitting the diamond point to lie in the acting or median plane of the handle. To illustrate this latter characteristic, I have in Fig. 6 shown a straight edge 51 which lies against the surfaces 35[b] of the handle. In adjusting the dressing tool in the handle, the straight edge is first laid up against the surfaces 35[b] and then the dressing tool is moved toward it until the diamond point touches it. This makes a simple but accurate method of insuring that the diamond point will occupy its correct position in the handle. In the best form of the invention the surfaces 35[a] and 35[b] of the handle lie in a common plane which also passes through the center of the ball 39. This plane, which I have termed the "median plane", once being recognized, renders it easy to calculate the proper configuration and dimensions of the templet to produce a given configuration in the grinding wheel 6. As the templet is farther from the ball and socket joint than the dressing tool is, it is evident that the dimensions of the templet will be greater than the dimensions required for the dressing tool. As the latter are frequently small, this expedient makes it easier to accurately configurate the templet, for the artisan is enabled to lay out the templet on a larger scale. The expedient has another advantage in that it is easier for an operator to work with a machine having a large templet than a small one. Another advantage is that a larger templet is easier to keep in condition and the effect of wear upon it is less.

The operation will now be readily understood. In making ready, a templet is selected which will give the grinding wheel or other rotating body the configuration required. The diamond point 45 is brought exactly to the median plane of the handle with the assistance of a straight edge 51 as previously explained. When this is accomplished the set screw 48 is tightened so as to hold the dressing tool in place. The operator then turns on the power causing the belt 16 to rotate the sheave 15 and thus drive the spindle 5 and the grinding wheel 6 at a high rate of speed. The operator then moves the acting surface 35[a] of the handle along the acting edge 30[b] of the templet and thus causes the diamond point to dress one side of the grinding wheel. When this side is finished, the handle is brought to the other side, with its acting surface 35[a] in contact with the acting edge 30[c] of the templet. This causes the diamond point to dress the other side of the wheel.

It will be understood that in grinding a hob or other toothed object it is usual to grind only one side of the tooth at a time. In such case, only one side of the grinding wheel will be used at a time. Consequently, the thickness of the grinding wheel is not a matter of special concern so long as it is thin enough to come between two adjacent teeth on the hob. So grinding wheels of different thicknesses may be employed. My device may be used on grinding wheels of different thicknesses by adjusting the templet down or up—that is, toward or from the universal joint at the bottom of the handle. It will be evident that by adjusting the templet down nearer to the universal joint, a thicker wheel may be dressed and conversely, by adjusting the templet upward, farther from the universal joint, a thinner wheel may be dressed.

One of the advantages of forming a flat side 35[a] on the handle is that it prevents rotation of the handle about its longitudinal

axis when the handle is in engagement with the templet. This insures that the grinding tool shall aways be presented to the grinding wheel at the proper angle. Furthermore, by having the acting surface 35[a] and the point of the grinding tool and the pivotal point of the handle all occur in a common plane (which I have termed the "median plane") it is much easier to calculate the proper outline of the templet.

Referring to Fig. 5 which shows a slight modification: the templet 30[a] is similar to templet 30 except that its acting edges 30[d] and 30[e] are external instead of internal. This external form makes it possible to use the end surface 30[f] as a working edge to dress the perimeter of the grinding wheel. The handle 55, which is analogous to the handle 35, is made like it in all respects except that the acting surface 55[f] faces the same way that the dressing tool does instead of in the opposite direction as in the type shown in Fig. 4.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. A tool dressing device having a spindle for supporting and rotating the tool to be dressed, an arm having a universal joint at one end and a handle at the other, a dressing tool located between the ends of the arm, and a templet for guiding the arm.

2. A tool dressing device having a spindle for supporting and rotating the tool to be dressed, an arm having a ball and socket joint at one end and a handle at the other, a dressing tool mounted on the other between the ends thereof, a templet for guiding the arm, and means for supporting the templet at a point located between the dressing tool and the handle whereby the templet may be constructed on greater dimensions than required for the tool to be dressed.

3. A device for dressing grinding wheels having a spindle for rotating the grinding wheel, a rod having a ball and socket joint at one end and a handle at the other, a dressing tool carried by said rod between its ends for engaging the rotating grinding wheel, and a templet for guiding the rod, the rod having a flat surface adapted to engage the templet for assisting the operator to prevent the rod from rotating about its longitudinal axis.

4. A device for dressing grinding wheels having a spindle for rotating the grinding wheel, a rod having a ball and socket joint at one end and a handle at the other, a dressing tool carried by said rod between its ends for engaging the rotating grinding wheel, said rod being offset at one point whereby the acting point of the dressing tool may come substantially in line with the central longitudinal axis of the rod, and a templet for guiding the rod, the rod having a flat surface extending approximately through the longitudinal axis of the rod for engaging the templet.

5. In a machine for dressing bodies of rotation, a spindle for rotating the work, an arm adjacent to the work and having a universal joint at one end and a handle at the other, a templet for guiding the arm, the arm having a concavity facing the work for non-interference therewith, and a dressing tool mounted in said arm at the concavity thereof.

6. In a machine for dressing bodies of rotation, a spindle for rotating the work, an arm adjacent to the work and having a universal joint at one end and a handle at the other, a templet for guiding the arm, and a dressing tool mounted in the arm, the arm having a flat surface for engaging the acting surface of the templet and said flat surface and the point of the dressing tool lying in a common plane.

7. In a machine for dressing bodies of rotation, a spindle for rotating the work, an arm adjacent to the work and having a universal joint at one end and a handle at the other, a templet for guiding the arm, and a dressing tool mounted in the arm, the arm having a flat surface for engaging the acting surface of the templet and said flat surface and the center of the universal joint lying in a common plane.

8. In a machine for dressing bodies of rotation, a spindle for rotating the work, an arm adjacent to the work and having a universal joint at one end and a handle at the other, a templet for guiding the arm, and a dressing tool mounted in the arm, the arm having a flat surface for engaging the acting surface of the templet; said flat surface and the point of the dressing tool and the center of the universal joint lying in a common plane.

9. In a machine for dressing grinding wheels a spindle for rotating the wheel, a stationary ball, a rod having a handle at one end and a socket at the other end fitting over said ball, whereby the rod is rotatable about its longitudinal axis and the handle is free to move laterally in all directions, a dressing tool carried by said rod between its ends for dressing the grinding wheel, and a stationary templet, the rod having a flat surface adapted to engage and follow the working edge of the templet whereby the lateral movement of the rod is guided and the operator is assisted in preventing the rod from rotating about its longitudinal axis.

10. A dressing machine having a spindle for rotating the work to be dressed, an arm passing adjacent to the work, said arm having a universal joint at one end, a templet for guiding the arm, and a dressing tool

mounted in the arm and adjustable transversely thereto, the arm having a flat surface lying in the median plane of the arm and there being a concavity in the arm adjacent to the dressing tool, said flat surface in the arm affording a bearing for a straight edge to enable the operator to readily bring the acting end of the dressing tool to the median plane of the arm.

11. In a machine for dressing bodies of rotation, a spindle for rotating the work, a dressing tool, an arm for supporting the dressing tool, a templet for guiding the arm, and a ball and socket joint for supporting the arm, the socket of the joint having tapered sides for automatically keeping the joint tight.

12. In a machine for dressing bodies of rotation, a spindle for rotating the work, a dressing tool, a vertically arranged arm for carrying the dressing tool, said arm having a universal joint at the lower end, and a templet near the upper end of the arm for guiding it, the templet being vertically adjustable for producing adjustment of the dressing tool in a horizontal direction.

In witness whereof I have hereunto subscribed my name.

CARL G. OLSON.