May 25, 1926. 1,585,705

B. M. W. HANSON

TRUING DEVICE

Original Filed Nov. 1, 1919 2 Sheets-Sheet 1

Fig. 1.

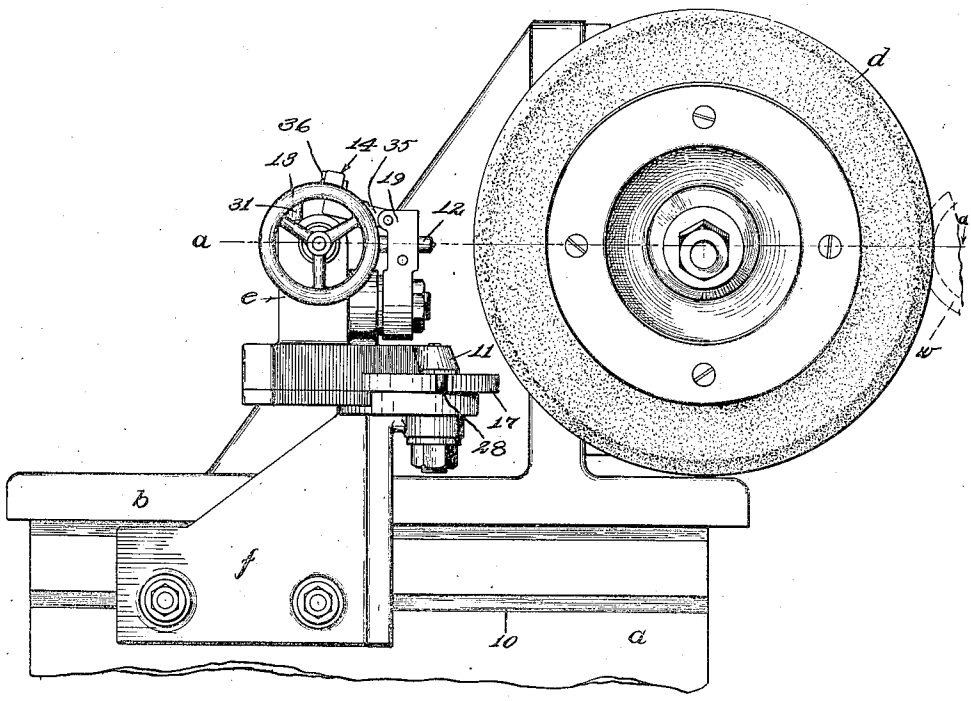
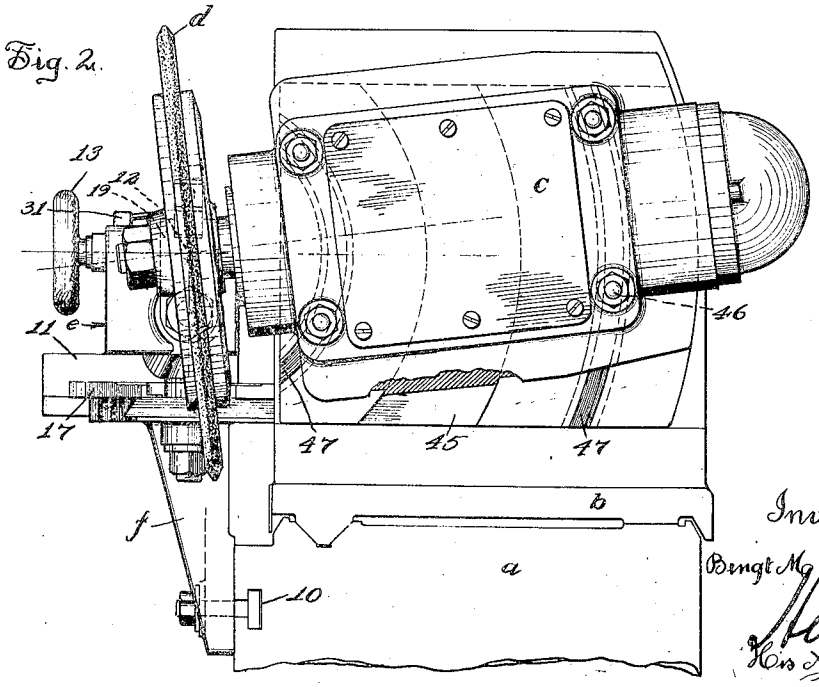


Fig. 2.



Inventor.
Bingt M. W. Hanson
His Attorney

May 25, 1926. 1,585,705

B. M. W. HANSON

TRUING DEVICE

Original Filed Nov. 1, 1919 2 Sheets-Sheet 2

Fig. 3.

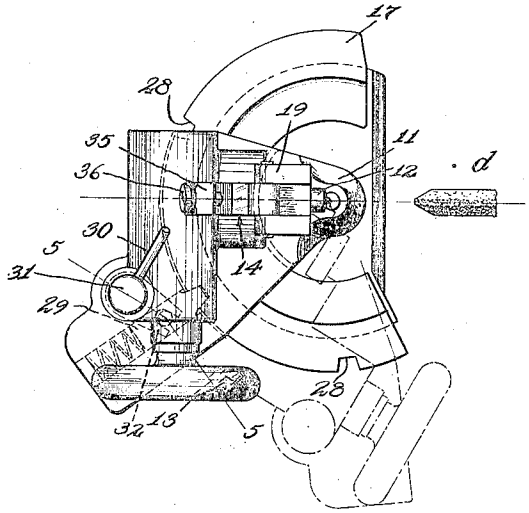


Fig. 5.

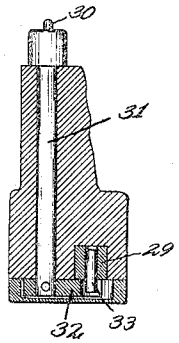


Fig. 4.

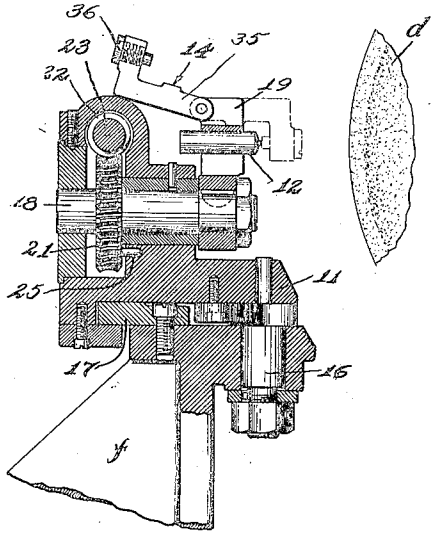
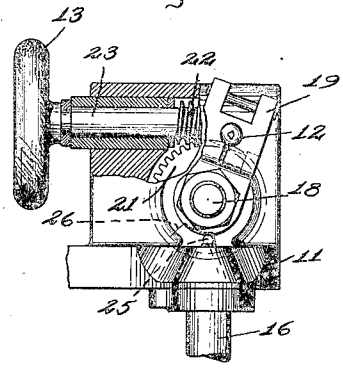


Fig. 6.



Inventor
Bengt M. W. Hanson
Hartwell
His Attorney

Patented May 25, 1926. 1,585,705

UNITED STATES PATENT OFFICE.

BENGT M. W. HANSON, DECEASED, OF HARTFORD, CONNECTICUT; EINAR A. HANSON AND CLARENCE E. WHITNEY EXECUTORS OF SAID BENGT M. W. HANSON, DECEASED.

TRUING DEVICE.

Original application filed November 1, 1919, Serial No. 334,952. Divided and this application filed June 23, 1920. Serial No. 391,013.

This application is a division of my original application Serial No. 334,952, filed November 1st, 1919, for metal working machines.

The present invention relates to a device for reshaping or re-sharpening a tool. The embodiment of the invention herein selected for purpose of illustration will be described with reference to its use for truing a grinding wheel employed in the final finishing operation on a thread and to which use the present device is peculiarly adapted, but it is to be understood that the present disclosure is by way of exemplification only and the invention is not limited to this particular use and the device is susceptible of other embodiments than that herein shown.

The object of the invention is to provide a truing device for efficiently generating on a tool a cutting edge which accurately conforms in shape and size to the cut to be taken in the work, in the present instance this cut being a thread.

In the accompanying drawings:

Fig. 1 is an assembly view of the truing device and grinding wheel, the truing device being in side elevation.

Fig. 2 is an elevational view looking at the right end of Fig. 1.

Fig. 3 is a top plan view of the truing device.

Fig. 4 is a sectional view taken centrally and vertically through the truing device.

Fig. 5 is a sectional view taken on line 5—5 of Fig. 3.

Fig. 6 is a front view of the truing device with parts thereof in section.

Referring now to Figs. 1 and 2, the general arrangement of the truing device and grinding wheel and the mountings therefor may be readily seen. *a* denotes a pedestal or fixed bed on which is mounted a slide *b* carrying a journal box *c* supporting the tool *d* herein shown as a grinding wheel. *e* denotes generally the truing device mounted on a bracket *f* which is adjustably mounted in a T-slot 10 of the base *a* and is provided with means for securely locking it in position.

The construction of the truing device will first be described and then its relation to the grinding wheel will be pointed out.

Referring particularly to Figs. 3 to 6 inclusive, 11 is an indexible carriage mounted on top of the bracket *f*; 12 is the sharpening tool; for instance, a diamond point which is adapted to be reciprocated by oscillating the hand wheel 13, and 14 indicates generally a gauge for correctly setting the diamond point. The indexible carriage 11 is pivoted on a vertical pin 16 upstanding from the bracket and this carriage moves in a vertical plane over a segmental plate 17 fixed to the top of the bracket *f*. 18 is a horizontal shaft journalled in the carriage with its axis at right angles to that of the vertical pin 16, in other words, the vertical plane which includes the axis of the shaft 18 also includes the axis of the pin 16. Mounted on the forward end of the shaft 18 is an arm 19 within which is positioned, subject to longitudinal adjustment on a line parallel to the axis of the shaft 18, the diamond point 12 which is well adapted for resurfacing such a tool as herein shown, namely the grinding wheel *d*. In certain of the appended claims, this arm 19 is referred to, for convenience, as a tool carrying part. On the shaft 18 is a worm wheel 21 with which meshes a worm 22 on the shaft 23 mounted in the carriage and carrying the hand wheel 13. It will be noted that the gearing is enclosed within the carriage so that grit and the like cannot gain access thereto and interfere with the accuracy of the device. The extent of rotation of the hand wheel 13 is limited by means of a fixed pin 25 extending into a notch 26 in the periphery of the worm wheel 21. Upon turning the hand wheel in opposite directions, the shaft 18 is turned and the diamond point will be oscillated back and forth across a face or edge of the grinding wheel which is being resurfaced. The whole carriage may be swung about the pivotal pin 16 in order to bring the diamond point into operative relation with any one of the faces of the grinding wheel and for the purpose of indexing it to the proper position and holding it there, the segmental plate 17 is notched as

at 28 to receive a spring pressed plunger 29 carried by the carriage. The plunger may be withdrawn from the notches by an operating handle handle 30 fixed to a rod 31 having on its lower end a finger 32 engageable with a pin 33 carried by the plunger. The position of the notches 28 will, of course, vary in accordance with the angle of the thread to be cut. If a United States standard thread is being cut, in which instance the faces of the thread are at an angle of 60° and the thread is truncated, the notches 28 will be three in number and spaced 60° apart. Of course, the segmental plate can have two or more series of corresponding notches to make it usable in connection with threads of various types or sizes. When the parts are in the full line position shown in Fig. 3, the diamond point will operate upon the truncated part of the wheel and when in the dotted line position, the diamond point is in position to resurface one side face of the wheel. To resurface the other side face, the carriage will be thrown to its extreme opposite position.

It is, of course, understood that during the final resurfacing operation the grinding wheel has a fixed relation to the center about which the diamond point is indexed. In the present instance, the center about which the resurfacing tool is indexed lies in a plane passing through the center of the edge of the grinding wheel. It is evident that because of the roughness of the grinding wheel and extremely fine adjustments to give the grinding edge thereof the precise shape of the thread, it is practically impossible to properly true the wheel by using a separate resurfacing tool for each surface thereof or employing a single resurfacing tool requiring a separate setting for each face. Certainly, such adjustments would require the greatest care and patience on the part of the operator and necessitate a great waste of time without any assurance that the grinding wheel as resurfaced was absolutely true. This is particularly the case when a truncated thread is to be ground for the flat of the thread has a definite relation to the pitch, under the United States standard it being one-eighth of the pitch, and it is obvious that after the two side faces of the grinding wheel are resurfaced, there would be the greatest difficulty in then so adjusting the resurfacing tool that the flat would be the precise size required.

With the device herein described, the objection to the arrangements just noted are entirely eliminated for, as the diamond point is indexible about a fixed axis, a single diamond point may be used and a single setting, which may be obtained with the gauge hereinafter described, is necessary to resurface both faces of the grinding wheel where a V-shaped thread is cut, and all three faces of the wheel where a truncated thread is to be ground, with the assurance that in the latter case the flat will have the proper size in relation to the pitch of the thread. It will be evident that the angular disposition of the side faces of the grinding wheel will accord with the angular disposition of the thread which is being cut, depending upon what type of thread it is. If it is a United States standard, the side walls of the thread are at an angle of 60° and consequently the side cutting faces of the wheel will be disposed at an angle of 60° to one another, for the reason that the carriage is so indexed and furthermore this angle will, at all times, and no matter to what extent the wall is resurfaced or resharpened, be bisected by the center line of the grinding wheel. When the diamond point is indexed to mid-position for resurfacing the flat or truncated part of the wheel, and because of the fixed relation of the wheel to the center about which the carriage is indexed and the fixed relation of the diamond point to that center, the extent of truncation will be correct.

For the purpose of making certain that the extent of the flat of the wheel shall be correct for any given pitch of thread, the gauge 14 is provided for setting the diamond point so far as its longitudinal adjustment in the arm 19 is concerned. This gauge comprises an arm 35 pivoted on the arm 19 so as to be thrown over in front of the diamond point as indicated in dotted lines Fig. 4. The end of this pivoted member is threaded to receive gauge plugs 36. A gauge plug will be provided to correspond to the various thread pitches. It will be seen that the gauge arm 35 has a fixed or definite relation to the tool carrying member or arm 19 in that it is pivoted for swinging movement only thereon, and as the arm 19 is fixed against longitudinal movement on the shaft 18, it has a definite relation to the axis about which the carriage is indexed. It, therefore, follows that by screwing home a gauge plug of proper length into the gauge arm and then bringing the diamond point into engagement with the end of this plug, the diamond point must be properly adjusted relative to the fixed axis about which it is indexed. That gauge plug is selected which corresponds to the pitch of the thread which is being operated upon, it is screwed home into the arm 35, thrown down in front of the diamond point, and the diamond point is moved through the arm 19 until it reaches the end of this plug when it is clamped into position. The gauge is then thrown back out of position as shown in full lines Fig. 4. By indexing the carriage, the active faces of the wheel are roughed out to substantially final form, the wheel being fed up to the diamond point for this purpose and then fastened in position so that its rela-

tion to the indexible carriage is fixed. Then by making a final cut on all three faces of the wheel, the side faces will be properly shaped and properly sized and at the proper angular relation with respect to one another and the flat will be accurately finished to correspond in extent to precisely what it should be for the pitch of the thread being cut.

It is, of course, well understood that it is necessary to angularly adjust the grinding wheel in accordance with the lead of the thread to be ground. To accomplish this, I have shown, for illustrative purposes, the journal box *c* in which the shaft on which the grinding wheel *d* is mounted, as being movable in a way 45, the center of curvature of which is the center of the wheel *d* by which is meant a point at the axis of the wheel which is included in a plane bisecting the angle of the cutting edge of the wheel. The line on which the wheel may be angularly adjusted is indicated by *a*—*a*, Fig. 1, and this line intersects the axis of the work. The work is shown in dotted lines, Fig. 1, and is designated by the letter *w*. The journal box is locked in adjusted position by means of bolts 46, the heads of which work in undercut grooves 47. To properly shape the edge of the grinding wheel so that it will correspond to the shape of the tooth to be cut, it is necessary that the resurfacing or reshaping operation be carried out on a line lying in a plane which includes the axis of the work and the line about which the wheel is angularly adjustable, this latter line, as stated, being the line *a*—*a* of Fig. 1. In the present instance, the diamond point is diametrically opposite to the point of contact between the work and the tool, and when the diamond point is indexed, and also when it is reciprocated for resurfacing, it moves substantially in a plane which includes the line *a*—*a* and the axis of the work. It is obvious that the grinding faces of the wheel have a line contact with the corresponding faces of the thread operated upon and the plane in which this line of contact lies is the plane in which the diamond point is indexed. Thus it will be seen that the angular adjustment of the grinding wheel is not disturbed in any particular during the resurfacing operation. As the diamond point oscillates about the axis of the shaft 18, it moves slightly out of the horizontal plane but for practical purposes the arc of movement is so small as to be negligible.

The ways for the slide *b* carrying the grinding wheel *d*, are so arranged that the wheel, when brought up to the diamond point, moves in the plane in which it rotates, that is, it moves on the line *a*—*a*. The bracket *f* upon which the truing device is carried, though adjustable, is, for practical purposes, fixed to the pedestal *a* of the machine. Thus the alinement of the truing device and the wheel is never changed and the wheel may be resurfaced as many times as may be necessary and it is always certain that when it is brought back into contact with the work its shape and relationship thereto is unchanged from the original setting.

I claim as my invention:

1. A truing device including a pivoted carriage, means for holding the same against pivotal movement in either direction in each indexed position, a resurfacing tool on said carriage, and means for moving said tool in each indexed position back and forth substantially in a plane substantially parallel to that in which said carriage is indexed.

2. In combination with a rotatable grinding wheel, a truing device having a single resurfacing tool, means for positioning and holding said truing tool in contact with the peripheral face of said wheel and in contact with each side face thereof, and means for moving said tool back and forth when in contact with each face and while said truing tool is held in position by said first mentioned means.

3. A truing device including a resurfacing tool, means for holding the same in a plurality of positions relative to a normally fixed center, said tool being adjustable on a line passing substantially through said center, and means for moving said tool back and forth in each indexed position on a line which extends generally in the same direction as the plane in which the tool is indexed.

4. A truing device including a pivoted carriage indexible about a normally fixed axis, a shaft mounted on said carriage and arranged at substantially right angles to the axis about which said carriage is indexed, an arm fixed on said shaft, and a resurfacing tool on said arm longitudinally adjustable on a line generally parallel to the axis of said shaft.

5. A resurfacing tool including a pivoted carriage, indexible about a fixed axis, means for holding same in each indexed position, a shaft mounted on said carriage and arranged at right angles to the axis on which said carriage is pivoted, a resurfacing tool fixedly mounted on said shaft, and means for turning said shaft in opposite directions to repeatedly move said resurfacing tool back and forth in each indexed position.

6. A truing device including a pivoted carriage, a shaft on said carriage, an arm on said shaft, a resurfacing tool carried by said arm, a worm wheel on said shaft, and a worm meshing with said worm wheel.

7. In combination, a truing device including a resurfacing tool indexible about a fixed axis, means for moving said tool back

nd forth in each indexed position substantially in a plane substantially parallel to that in which the tool is indexed, and a grinding wheel adjustable to and from said tool on a line passing angularly through said fixed center and substantially lying in a plane in which said tool is indexed.

8. In combination, a grinding wheel having angular adjustment about a diametrical line passing through its center and included in a plane bisecting the angle of the cuttting edge of said grinding wheel, and a truing device including a resurfacing tool indexible in a plane substantially parallel to said diametrical line and about an axis intersecting said line.

9. In combination, a grinding wheel movable on and angularly adjustable about a diametrical line passing through its center and included in a plane bisecting the angle of the cutting edge of said grinding wheel, and a truing device including a resurfacing tool indexible in a plane substantially parallel to said diametrical line and about an axis intersecting said line.

10. In combination with a rotatable grinding wheel having beveled faces and a flat peripheral face therebetween, a truing device indexible about a fixed axis, means for holding said truing device in contact with and at right angles to each of said faces, and means for moving said truing device back and forth in each indexed position.

11. In combination, a grinding wheel having bevelled faces and a flat peripheral face therebetween, a truing device including a carriage indexible about a fixed axis, a resurfacing tool mounted on said carriage, means for indexing said carriage with said tool in contact with each of said faces, said tool being carried by said carriage for movement on lines which extend substantially in the same direction as the plane in which the tool is indexed, and means for moving said tool back and forth on said lines in each indexed position.

12. In combination, a grinding wheel having bevelled faces and a flat peripheral face therebetween, a truing device including a carriage indexible about a fixed axis, a resurfacing tool mounted on said carriage, means for indexing said carriage with said tool in contact with each of said faces, said tool being carried by said carriage for movement on lines which extend substantially in the same direction as the plane in which the tool is indexed, means for moving said tool back and forth on said lines in each indexed position, said tool being adjustable to and from said axis, and means for determining the extent of adjustment of said tool.

13. A device for resurfacing or truing the surfaces of a grinding wheel and including a resurfacing tool indexible into three positions to bring it into proper operative relation to the respective side and peripheral faces of the grinding wheel while maintaining a single setting of the tool, and means for moving the tool back and forth in each indexed position while maintaining the setting of the tool.

14. A device for resurfacing or truing the surfaces of a grinding wheel and including a resurfacing tool indexible about a fixed axis to two extreme positions and a midposition to bring it into proper operative relation to the respective surfaces of the grinding wheel, means for holding said tool in its respective indexed positions, and means for moving said tool back and forth in each indexed position, said tool being adjustable relative to said fixed axis and said tool being indexible to its respective positions without disturbing the adjustment of the tool relative to the said fixed center.

15. A device for resurfacing or truing the surfaces of a grinding wheel and including a resurfacing tool indexible into more than two positions about a fixed axis, and means for moving the tool back and forth in each indexed position while maintaining the setting of the tool.

16. A device for truing the faces of a grinding wheel and including a carriage indexible to more than two positions about a fixed axis, means for holding said carriage in each of its indexed positions, a resurfacing tool mounted on said carriage for adjustment relative to said fixed axis, said tool being carried by said carriage for movement on lines which extend substantially in the same direction as the plane in which the tool is indexed, and means for moving said tool back and forth in each indexed position.

17. In combination, a truing device including a resurfacing tool indexible into more than two positions about a fixed axis, and means for moving the tool back and forth in each indexed position while maintaining the setting of the tool; and a grinding wheel adjustable to and from said tool on a line passing angularly through said fixed center and substantially lying in the plane in which said tool is indexed.

18. In combination, a grinding wheel having angular adjustment about a diametrical line passing through its center and included in a plane bisecting the angle of the cutting edge of said wheel, and a truing device including a resurfacing tool indexible to more than two positions about a fixed axis intersecting said line, said tool being indexible in a plane substantially parallel to said diametrical line, means for holding said tool in each of its indexed positions, and means for moving said tool back and forth in each of its indexed positions.

19. In combination, a grinding wheel

having angular adjustment about a diametrical line passing through its center and included in a plane bisecting the angle of the cutting edge of said wheel, a truing device including a resurfacing tool indexible to more than two positions about a fixed axis intersecting said line, said tool being indexible in a plane substantially parallel to said diametrical line, means for holding said tool in each of its indexed positions, means for moving said tool back and forth in each of its indexed positions, and means for adjusting said grinding wheel to and from said tool on said diametrical line.

BENGT M. W. HANSON.