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C. W. H. BLOOD.

RADIAL SETTING GAGE FOR CUTTER HEAD KNIVES.

APPLICATION FILED APR. 28, 1906.

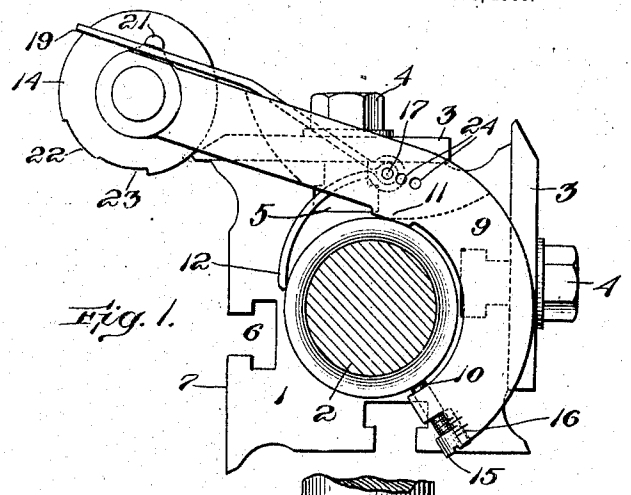


Fig. 1.

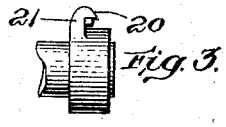


Fig. 3.

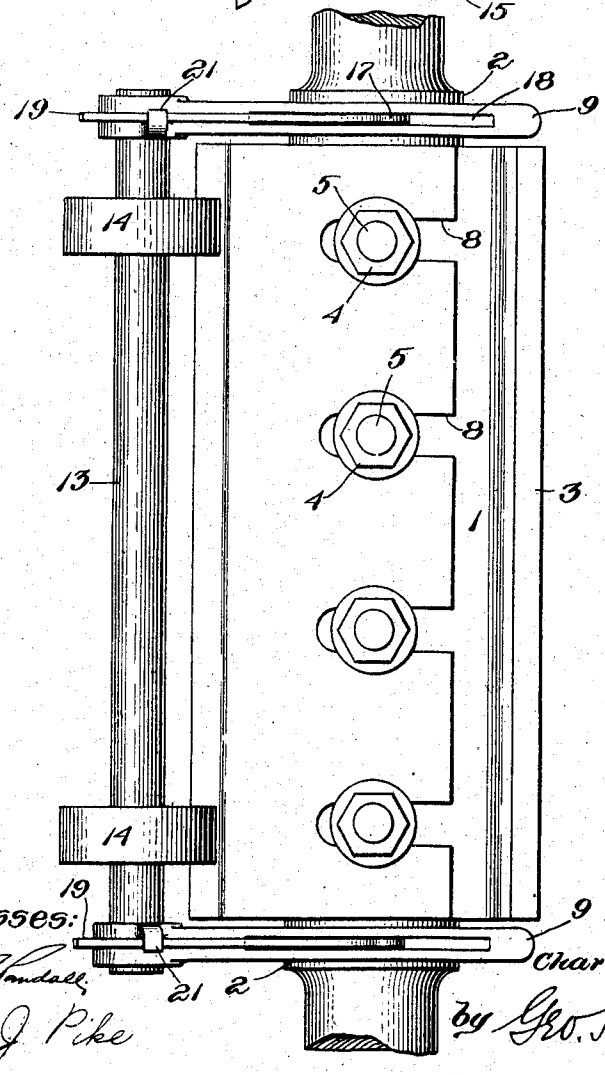


Fig. 2.

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RADIAL SETTING-GAGE FOR CUTTER-HEAD KNIVES.

No. 846,723. Specification of Letters Patent. Patented March 12, 1907.

Application filed April 28, 1906. Serial No. 314,149.

To all whom it may concern:

Be it known that I, CHARLES W. H. BLOOD, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Radial Setting-Gages for Cutter-Head Knives, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The usual way of adjusting cutter-head knives at present is to adjust them outwardly on the head until they meet the gage. Extreme accuracy of machining of the head has heretofore been necessary, and it has also been necessary to have the cutting edges of the knives all in the same relative position with regard to the body of the blade, while various other niceties of construction have been required in order to obtain proper adjustment of the cutting edges of the various blades to the same radial distance from the center of the journal. Inasmuch as the quality of the work depends largely upon the accuracy of the adjustment of the cutter-head knives it is obvious that this adjustment must be as nearly perfect as possible.

Accordingly my present invention has for its object the provision of means for quickly and accurately adjusting the knives to the same radial distance from the center of the journal irrespective of the accuracy of the faces of the cutter-head and of the position which the edges of the knives occupy with relation to the body of the knives.

In accomplishing my object I provide a centering device which can readily change its position on the journal without varying the radial distance of its adjustment and which accomplishes the desired adjustment by forcing the knives backward, being in this respect directly opposite to the previous method above alluded to.

The constructional details of my invention will be pointed out in the course of the following description, reference being had to the accompanying drawings, in which I have shown a preferred embodiment of the invention.

In the drawings, Figure 1 is a view in end elevation of a cutter-head showing my setting-gage applied thereto, the journal being shown in section. Fig. 2 is a top plan view thereof. Fig. 3 is a fragmentary detail in elevation.

For convenience of illustration I have shown my device in operative position on a usual cutter-head 1 and journal 2, said cutter-head being provided with knives 3, secured in usual manner by nuts 4 and T-bolts 5, sliding in grooves 6 for retaining said knives on the flat sides or faces 7 of the head 1, their adjustment being permitted by usual slots 8.

Stated in general terms, my invention resides in providing a knife-edge-engaging device capable of swinging past the edges of the knives in the path of a true circle about the center of the cutter-head journal, the knives being set out slightly beyond their ultimate position and held loosely, so that when said swinging device engages their cutting edges they are instantly crowded back into accurate alinement.

Referring to the drawings it will be seen that I have provided opposite arms 9, provided with three bearing-surfaces 10, 11, 12, for engaging the journal 2 at separate points, and thereby instantly bringing the two arms into self-centered position. These arms extend out tangentially to the surface of the journal and carry a stiff rod 13 at their free ends, on which are mounted, as herein shown, two movable devices 14, having an arc surface concentric to the rod 13, said surface being of sufficient length for the purpose presently to be explained, and preferably having the form of a complete roll or wheel. The point 10, as herein shown, is provided by means of a screw 15, coöperating with a gage 16, and the point 12 is yielding, so as to act as a spring-brake or yielding drag and also to accommodate the device to slightly different sizes of journals, being herein shown as the free end of a downwardly-extending spring member mounted on a pivot 17 in a slot 18 of the arm 9, and thence extending outwardly at 19 to be engaged conveniently by the thumb of the operator and depressed against the slanting upper side of a lip 20 of an ear 21 (see Fig. 3) to be caught beneath said lip for locking the holding-arm 9 in swinging position on the journal.

From the above description it will readily be seen that the application and use of my invention is exceedingly convenient and

quick. The operator simply grasps in his hands the opposite ends of the tool or attachment and releases the spring ends 19 from their locked position, so as to permit the hook shaped or curved ends of the arms to be caught over the journal at the opposite ends of the cutter-head. He then simply drops the contact-points 10 and 11 against the journal and depresses the locking-springs into their locked position, as shown in the drawings, accomplishing said locking by a simple movement of the thumb. As the locking device is more or less yielding, it serves to hold the setting-gage in accurate position, serving to constantly pull the points 10 and 11 tightly against the journal-surface, thereby maintaining the edge-engaging arcs or rolls 14 at an unvarying radial distance from the center of the journal. The gage-setter is then swung downwardly, the shaft 13 being pressed firmly forward, so as to cause the rolls to engage the cutting edge of the adjacent knife 3 and force the latter back into accurate position. This is accomplished instantly and is at the same time absolutely accurate inasmuch as the engaging device 14 engages the very edge of the knife and swings in the exact arc or path to which all the edges of all the knives are to be adjusted. The rolls 14 may be slid along on the shaft 13 for different widths of knives or to test the accuracy of grinding of any knife. By having the engaging device 14 (or whatever other form of engaging device may be employed within the spirit and scope of the broader of my claims, hereinafter contained,) provided with means compelling it to swing about the journal of the cutter it becomes immaterial whether the edges of the knives are in exactly the same place relatively to the bodies of the blades or not inasmuch as the engaging device comes in contact with the edges with reference to the center of the journal and not with reference to the surface 7 or any other portion of the head. Heretofore in this kind of cutter-head it has been usually considered necessary to have the cutting edge in the same plane as the surface 7, so that all the knives should be adjusted the same; but my invention makes it as readily practicable to set all the knives to the same gage even though the cutting edges are located in different relative planes in the different blades. I have shown the knives as beveled at both sides of the cutting edge, and my setting-gage will force all the cutting edges of this kind of blades into absolutely correct and uniform alinement as readily as it will any other location of cutting edge; also, by having the engaging device mounted to move concentrically of the journal it becomes a matter of indifference whether all the surfaces 7 of the cutter-head are machined uniformly and accurately as the gaging of the knife-edges does not depend in any way upon the accuracy of the machining of the head. My setting-gage is further radically distinguished by the fact that it operates to force the knife inwardly as distinguished from adjusting the knife forwardly to a given line, as before. The advantage of having the adjusting device 14 mounted to move on its center 13 as it is swung about the journal is that when it comes in contact with the edge of the knife there is no sliding movement over said edge, but the gaging device simply comes into pressing contact with the edge. By having the engaging surface arc-shaped it is unnecessary always to have the same portion of said device engage the knife-edge; also, the adjustment will be correct even though the operator should be careless in quickly forcing the setting-gage downwardly over the knife-edge, which would not be true of a tangential surface. In some classes of work and for some purposes it is desirable to have different arc surfaces—*i. e.*, to have said surfaces at different radial distances from the shaft 13, as indicated at 22 23, Fig. 1—whereby the operator may quickly bring any one of the arc surfaces into engagement with a given knife-edge, and thereby correspondingly adjust the knife. This is a quick means of bringing the knives to different standards of adjustment, and the micrometer-screw 15 is an accurate means of changing the adjustment to any given extent required. For extreme variations of size of journal I provide means for adjusting the locking-spring, herein shown for convenience as holes 24, for receiving the pin 17. I prefer to use the three-point bearing 10 11 12 because of the facility and quickness which it affords for accurately centering the device for the given radial distance from the center of the journal; also, the spring locking device is of advantage as it brings enough frictional drag on the journal to maintain the setting-gage in position wherever it is placed. This is a great convenience to the operator.

It will be understood that a wide variety of equivalent mechanical embodiments may be resorted to for accomplishing the results which I have explained above without departing from the spirit and scope of my invention, which I consider as broadly new in a number of respects aside from the structural details.

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

1. A setting-gage for cutter-head knives, comprising swinging holding means for positioning the gage, and a rotary engaging device mounted to turn by engagement with the edge of the knife and to swing with said holding means.

2. A setting-gage for cutter-head knives, comprising movable holding means for positioning the gage, and an engaging device to

force the knife backwardly into accurate adjustment, movable automatically with relation to the holding means upon coming in contact with the edge of the knife.

3. A setting-gage for cutter-head knives, comprising holding means for positioning the gage, and an edge-engaging device carried by said means and movable past the edge of the knife, said device having an arc surface mounted to swing concentrically of said arc.

4. A setting-gage for cutter-head knives, comprising holding means for movably engaging one side of the journal of the cutter-head, and edge-engaging means carried by said holding means at the opposite side of the said journal at a fixed radial distance from the axis of the cutter-head.

5. A setting-gage for cutter-head knives, comprising holding means for movably engaging the journal of the cutter-head, including a drag for yieldingly holding the gage in position, and edge-engaging means carried by said holding means for moving therewith at a fixed radial distance from the axis of the cutter-head.

6. A setting-gage for cutter-head knives, comprising holding means for movably engaging the journal of the cutter-head, including a spring locking device for releasing said holding means from the journal, and edge-engaging means carried by said holding means for moving therewith at a fixed radial distance from the axis of the cutter-head.

7. A setting-gage for cutter-head knives, comprising holding means for movably engaging the journal of the cutter-head, said holding means engaging the journal circumferentially at three bearing-points separated by intervening gaps for accommodating said holding means to varying sizes of journals, and edge-engaging means carried by said holding means for moving therewith at a fixed radial distance from the axis of the cutter-head.

8. A setting-gage for cutter-head knives, comprising holding means for movably engaging the journal of the cutter-head, said holding means having at least three independent bearing-points, one of said points being adjustable and normally rigid, and edge-engaging means carried by said holding means for moving therewith at a fixed radial distance from the axis of the cutter-head.

9. A setting-gage for cutter-head knives, comprising holding means for movably engaging the journal of the cutter-head, said holding means having at least three independent bearing-points, one of said points being yieldingly adjustable to different sizes of journals, and edge-engaging means carried by said holding means for moving therewith at a fixed radial distance from the axis of the cutter-head.

10. A setting-gage for cutter-head knives, comprising an arm provided with means for removably embracing the journal of the cutter-head, a lateral shaft extending from the free end of said arm parallel to the journal-axis, and an engaging device on said lateral shaft having an arc surface to engage the edge of a knife to be set.

11. A setting-gage for cutter-head knives, comprising an arm provided with means for removably embracing the journal of the cutter-head, a lateral shaft extending from the free end of said arm parallel to the journal-axis, and an arc-shaped engaging device sliding on said shaft for engaging the edge of a knife to be set.

12. A setting-gage for cutter-head knives, comprising opposite holding-arms provided at one end with means for partially embracing the journal of the cutter-head, and having means for yieldingly engaging said journal opposite said embracing means for holding the latter in constant contact with the journal, a shaft extending laterally from one arm to the other at a given radial distance from said journal, said shaft being provided with an arc-shaped surface for engaging the cutting edge of a blade to be set.

13. A setting-gage for cutter-head knives, comprising opposite holding-arms provided at one end with means for partially embracing the journal of the cutter-head, and having means for yieldingly engaging said journal opposite said embracing means for holding the latter in constant contact with the journal, a shaft extending laterally from one arm to the other at a given radial distance from said journal, said shaft being provided with an arc-shaped surface for engaging the cutting edge of a blade to be set, said yielding means having a projecting portion extending externally of said arm in position to be engaged by the operator for releasing said yielding means from engagement with the journal.

14. A setting-gage for cutter-head knives, comprising opposite holding-arms provided at one end with means for partially embracing the journal of the cutter-head, and having means for yieldingly engaging said journal opposite said embracing means for holding the latter in constant contact with the journal, a shaft extending laterally from one arm to the other at a given radial distance from said journal, said shaft being provided with an arc-shaped surface for engaging the cutting edge of a blade to be set, said yielding means consisting of a spring pivotally mounted in said arm and bent at one end to partially embrace said journal and at its other end projecting outwardly in position to be engaged by the operator, said arm having means for removably restraining said projecting end.

15. A setting-gage for cutter-head knives, comprising opposite holding-arms for partially spanning and engaging the journal of

the cutter-head, a lateral shaft connecting the free ends of said arms, and opposite engaging devices having arc surfaces movable toward and from each other on said shaft, for simultaneously engaging the edge of a knife adjacent its opposite ends and forcing said knife back into gaged position.

16. A setting-gage for cutter-head knives, comprising opposite holding-arms for partially spanning and engaging the journal of the cutter-head, a lateral shaft connecting the free ends of said arms, and an engaging device pivotally mounted on said shaft and having a stepped peripheral surface in arcs of different radial distances from its pivotal center, for engaging the cutting edge of a knife to be set.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES W. H. BLOOD.

Witnesses:

LESTER E. PRATT,

H. E. BUMP.