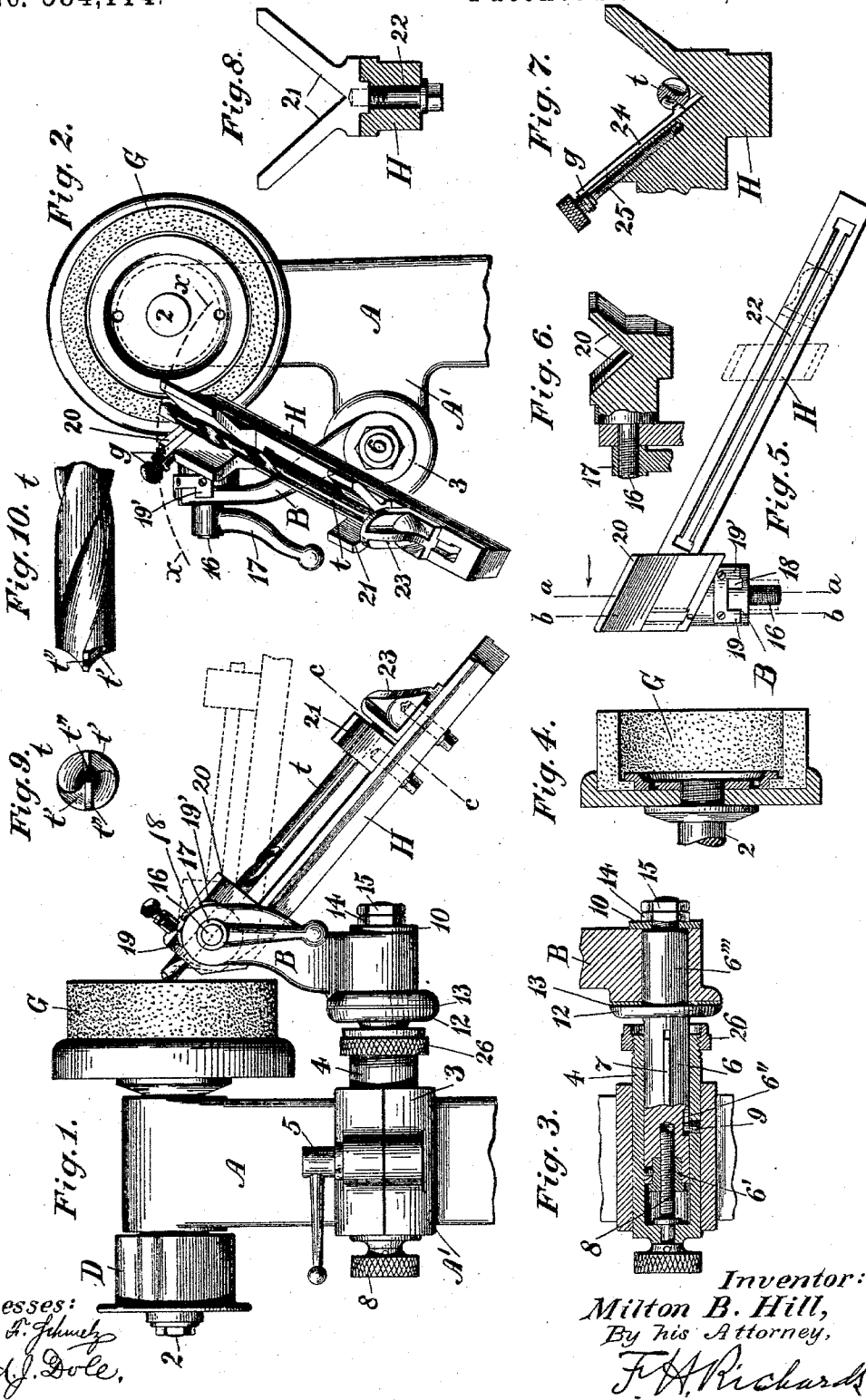


(No Model.)

M. B. HILL.
TOOL GRINDING MACHINE.

No. 584,114.

Patented June 8, 1897.



Witnesses:
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UNITED STATES PATENT OFFICE.

MILTON B. HILL, OF BOSTON, MASSACHUSETTS.

TOOL-GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 584,114, dated June 8, 1897.

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To all whom it may concern:

Be it known that I, MILTON B. HILL, a citizen of the United States, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Tool-Grinding Machines, of which the following is a specification.

This invention relates to tool-grinding machines, and especially to twist-drill grinders; and it has for its main object to provide an improved machine of this class by means of which the lips of twist-drills and the edges of said lips may be accurately ground separately.

In carrying out my invention I prefer to employ a tool-holder mounted on a suitable supporting-arm and adapted to be shifted to either one of two extreme positions and then clamped in place to present either the entire face of the drill-lip to a suitable grinding-wheel or else only the cutting edge of such lip; and, moreover, for the purpose of bringing the cutting edge into position to be sharpened after the face of the lip has been ground I have also provided means for adjusting the arm on which the tool-holder is supported, so that by swinging the tool-holder from one of its extreme positions to the other the edge of the drill-lip may be presented to the grinding-wheel at a different angle to that at which the face of such lip is ground.

In the drawings accompanying and forming part of this specification, Figure 1 is a side elevation of my improved tool-grinding machine mounted on a fragmentary supporting-frame and showing in full and dotted lines, respectively, the two positions to which the tool-holder may be adjusted for bringing the face of the drill-lip and the cutting edge thereof, respectively, into position to be operated upon. Fig. 2 is an end view of the same. Fig. 3 is a detail sectional view illustrating the manner of connecting the tool-holder-supporting arm to the framework and the adjustment of said arm toward and from the face of the grinding-wheel. Fig. 4 is a detail sectional view of the grinding-wheel shown in Figs. 1 and 2. Fig. 5 is a plan of the tool-holder and a portion of the supporting-fixture therefor. Fig. 6 is a detail transverse section of the forward V-shaped tool-rest and of the clamping device for securing the tool-

holder to the supporting-fixture, the section being taken in line *a a*, Fig. 5, looking in the direction of the arrow. Fig. 7 is an enlarged detail sectional view illustrating the operation of the gage for holding the drill in position in the forward tool-rest, the section being taken in line *b b*, Fig. 5. Fig. 8 is an enlarged transverse section of the tool-holder, the section being taken in line *c c*, Fig. 1, and illustrating the adjustable rear V-shaped tool-rest; and Figs. 9 and 10 are detail views illustrating in end and side elevation, respectively, a twist-drill having its lips and the cutting edges thereof ground separately by my improved machine.

Similar characters designate like parts in all the figures of the drawings.

Any suitable framework may be employed for supporting the operative parts of my improved machine. In the present instance a grinding-wheel is shown at G, supported on a shaft 2, mounted for rotation in the upper end of a standard A, the shaft carrying a suitable driver—such as the band-wheel D—for actuating the grinding-wheel, while the tool-carrying mechanism is supported by an extension A' of the standard A. This extension A' preferably embodies a divided clamping-sleeve 3, in which is mounted a cylindrical carrier 4, which may turn in said sleeve and will be held against movement therein, when properly adjusted in position, by suitable clamping means—as, for example, a clamp-screw 5 of the usual type.

Within the carrier 4 there is shown at 6 a stem capable of adjustment longitudinally within the carrier, but held against rotation therein, as by means of a spline 7. The longitudinal adjustment of this stem within the carrier is effected by means of an adjusting-screw 8, passed through the outer end of said carrier and working in a nut 6' in said stem. As only a limited longitudinal adjustment of the stem 6 is necessary, I have illustrated at 9 a stop-screw passed through the shell of the carrier 4 and working in a slot 6'' in the stem 6, it being obvious that the end walls of this slot will limit the movement of the stem in the one or the other direction.

The stem just described serves in the present case for supporting at its inner end an arm B, on which the tool-holder is mounted,

and this arm will preferably be mounted on the journaled end 6''' of the stem 6, so as to be capable of swinging thereon, said arm being advantageously frictionally held normally against oscillation. In the construction shown the arm B is journaled on the end 6''' of the stem 6 and is held in place between a washer 10, carried on the screw-threaded inner end of the stem 6 and a flange 12 integral with said stem, a suitable friction-disk, such as 13, being represented between the flange 12 and the arm B, and the washer being held in place in the usual manner by means of check and clamping nuts 14 and 15, respectively.

At its upper end the arm B is provided with a journal, through which passes the smooth portion of a threaded stud 16, (see Fig. 6,) projecting from the forward end of a tool-holder, (designated in a general way by H.) This stud is preferably integral with the body of the tool-holder and is screw-threaded at its outer end for the reception of a clamp-nut 17, by means of which the tool-holder may be firmly clamped to the arm B at any desired angle relatively to said arm. For the purpose, however, of positively defining the positions of the tool-holder with respect to this arm I prefer to provide coacting stops on these parts, by means of which the tool-holder may be positively located in either one of two extreme positions at different angles relatively to the wheel G. One of these stops is designated by 18 and may be a part of the arm B, while the other two (designated by 19 and 19') may be carried on the tool-holder in such positions that the stop 18 will lie between them, and either one of the two positions of the tool-holder may be determined thereby on the bringing of the proper stop 19 or 19' into engagement with that shown at 18.

The tool or drill, which is designated herein by *t*, may be supported by the holder H in any desired manner; but I prefer to make use of a fixed forward V-shaped tool-rest 20, preferably integral with the body of the holder, and an adjustable rear V-shaped tool-rest 21, this latter rest working in the present case in a guide-slot 22 in the holder H and having a clamp-screw for holding it in any desired position in a manner well known in the art. An adjustable stop is also shown at 23 and is held in place by a clamp-screw in the same manner as the adjustable tool-rest, this stop serving to engage the shank end of the tool and to position the drill during the grinding operation.

For the purpose of holding the forward end of the drill to prevent turning thereof an adjustable gage is represented at *g*, this gage comprising a gage-rod 24 and an adjusting-screw 25, by means of which the gage-rod may be raised and lowered and brought into engagement with the webs of drills of various sizes.

The operation of my improved drill-grinding machine will be apparent from the foregoing description. The tool *t* being placed

in position, with one of the drill-lips in contact with the wheel G, the stop 23 and the holder H are clamped in the positions shown in full lines in Fig. 1, and the wheel G is turned until the face of one of the lips *t'* is properly ground, whereupon the drill is turned half-way around in the holder, and the face of the other drill-lip is correspondingly ground, it being evident that both of these faces will be ground conically. The adjustable stop 23 is then moved back and the tool-holder H released by a partial turn of the nut 17, and the drill-holder is oscillated to the position shown in dotted lines in Fig. 1—that is to say, from a position where the stop 19 engages the stop 18 to one in which the stop 19' abuts against said stop 18, when the drill will be in position for permitting the cutting edges of the lips *t'* to be ground for forming the bevels *t''*, it being apparent, of course, that these bevels are also ground conically, but at an obtuse angle to the faces *t'* of the drill-lips. A slight turn of the clamp-nut 17 will serve to release the holder H from the arm B or to clamp it firmly thereto in either of its working positions.

For the purpose of bringing the drill closer to the grinding-wheel, either during the adjustment of the tool-holder or during the operation of grinding, when only a slight movement is required, the adjusting-screw 8 may be employed, it being apparent that, according to the direction in which this is turned, the stem 6 will be projected from or withdrawn into the cylindrical carrier 4, the stop 9 serving to limit the sliding movements of said stem.

As the adjustment of the arm B toward the grinding-wheel might, if carried too far, bring said arm into engagement with the wheel, I have provided at 26 a stop-collar encircling the cylindrical carrier 4 and screw-threaded thereon, by means of which the extent of the inward movement of the arm may be limited, as if said arm be drawn in by manipulating the adjusting-screw 8 the flange 12 on the stem 6 will be brought into contact with the stop-collar 26 before the arm B strikes the stone G, and further inward movement of the stem 6 and the arm B will be prevented.

It should of course be understood that while this swinging arm is normally held against oscillation about the stem by which it is carried, yet it may be turned while the cylindrical carrier 4 is held fast in the clamping-sleeve of the bracket A' and may be adjusted to bring the forward end of the tool-holder to any desired point in the arc *xx*. (Shown in Fig. 2.)

To prevent grooving or rutting of the grinding-wheel, the arm B may be grasped and swung slowly back and forth on its axis, thereby carrying the drill across said wheel and presenting its surface to be ground to different portions thereof, it being of course understood that said arm is not to be so tightly clamped to its supporting-stem as to prevent such action, if deemed necessary.

Having described my invention, I claim—

1. The combination with a support, of a tool-holder adjustably mounted on said support; coaxing stops on said support and tool-holder, for locating the latter in either one of two extreme positions; and means for clamping the tool-holder to the support in either of said positions.

2. The combination with a grinding-wheel, of a support having a stop; a tool-holder adjustably mounted on said support and having a pair of stops adapted, respectively, for engaging the stop on the support and locating the tool-holder in either one of two extreme positions at different angles relatively to the grinding-wheel; and means for clamping the tool-holder to the support in either of said positions.

3. The combination with a grinding-wheel, of a carrier; a stem; a swinging arm supported by said stem for oscillation toward and from the grinding-wheel; a tool-holder adjustably mounted on said arm; coaxing stops on said support and tool-holder, for locating the latter in either one of two extreme positions at different angles relatively to the grinding-wheel; and means for clamping the tool-holder to the swinging arm in either of said positions.

4. The combination with a grinding-wheel, of a swinging arm supported for oscillation toward and from the axis of the grinding-wheel; means for adjusting said arm longitudinally of its axis; a tool-holder adjustably mounted on said arm; coaxing stops on said arm and tool-holder, for locating the latter in either one of two extreme positions at different angles relatively to the grinding-wheel; and means for clamping the tool-holder to the swinging arm in either of said positions.

5. The combination with a grinding-wheel, of a carrier; a longitudinally-adjustable stem

mounted on said carrier; a swinging arm supported on said stem, for oscillation toward and from the axis of the grinding-wheel; a tool-holder adjustably mounted on said arm; coaxing stops on said arm and tool-holder, for locating the latter in either one of two extreme positions at different angles relatively to the grinding-wheel; and means for clamping the tool-holder to the swinging arm in either of said positions.

6. The combination with a grinding-wheel, of a frame having a clamping-sleeve; a cylindrical carrier mounted in said clamping-sleeve; a longitudinally-adjustable stem mounted in said cylindrical carrier and held against rotation therein; an adjusting-screw for said stem; a swinging arm supported on the stem for oscillation toward and from the axis of the grinding-wheel; a tool-holder adjustably mounted on said arm; coaxing stops on said arm and tool-holder, for locating the latter in either one of two extreme positions at different angles relatively to the grinding-wheel; and means for clamping the tool-holder to the swinging arm in either of said positions.

7. The combination with a grinding-wheel, of a frame having a clamping-sleeve; a cylindrical carrier mounted in said clamping-sleeve; a longitudinally-adjustable stem mounted in said cylindrical carrier and held against rotation therein; an adjusting-screw for said stem; an arm supported on said stem and movable therewith for adjustment toward and from the face of the grinding-wheel; a tool-holder carried by said arm; and an adjustable stop-collar encircling the cylindrical carrier, for limiting the adjustment of the stem.

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Witnesses:

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