Sept. 25, 1923. 1,469,121

H. A. STEWART

MILLING MACHINE HEAD

Filed Dec. 16, 1922 2 Sheets-Sheet 1

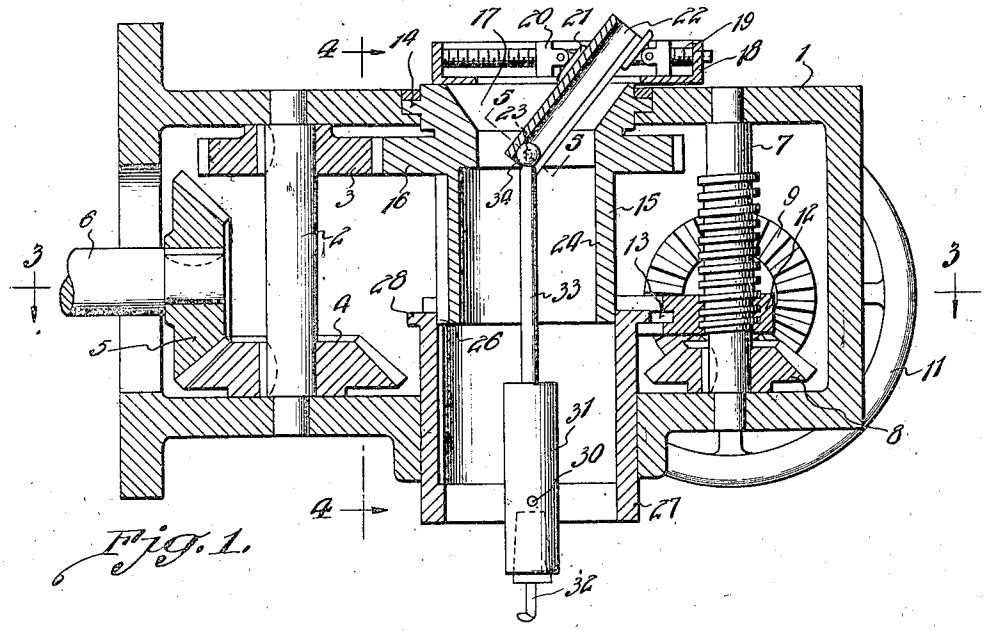

Fig. 1.

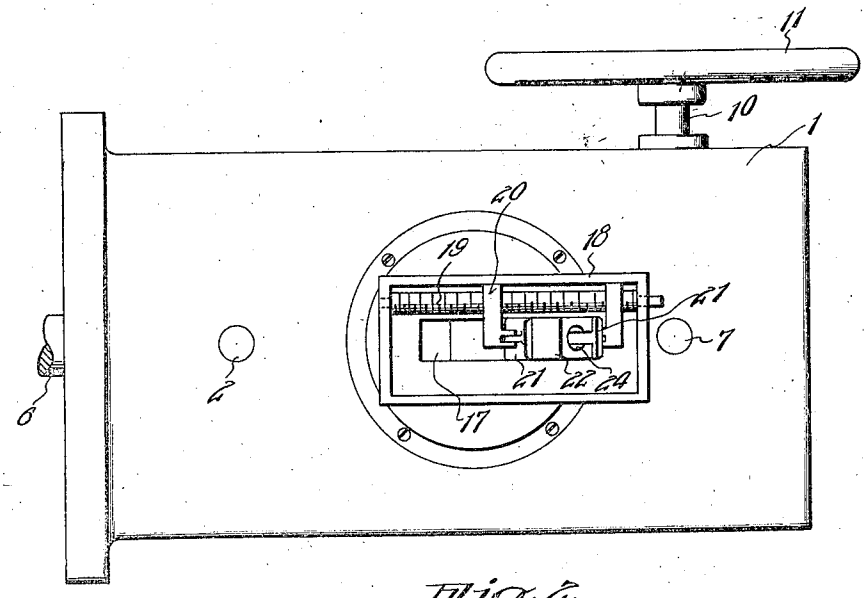

Fig. 2.

H. A. Stewart
INVENTOR

BY Victor J. Evans
ATTORNEY

WITNESS:

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Fig. 3.

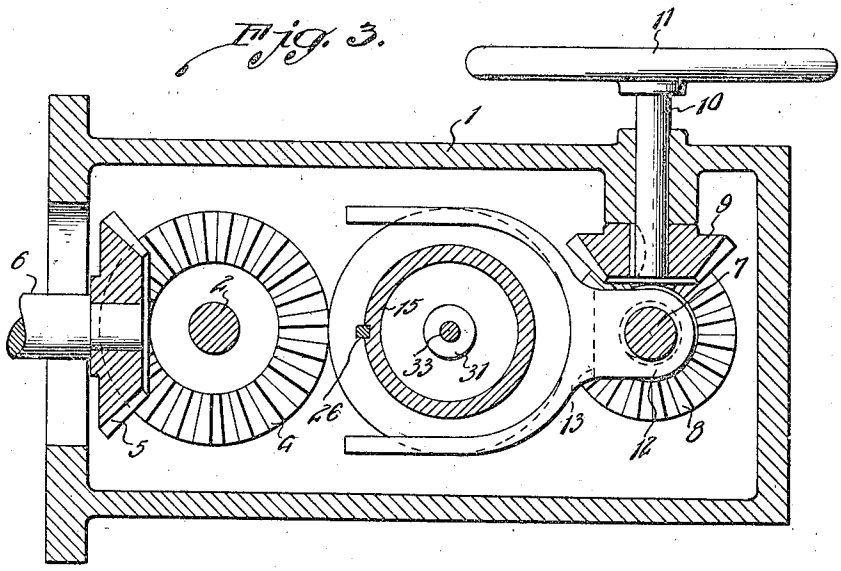


Fig. 4.

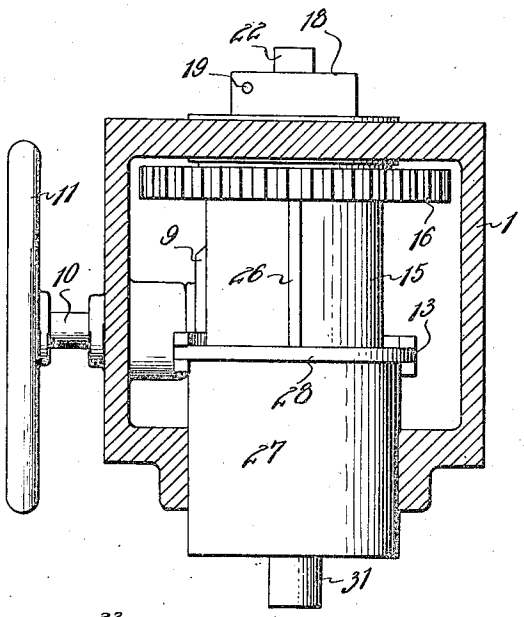
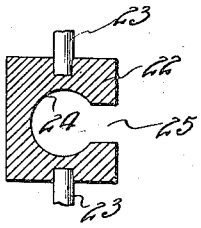


Fig. 5.



H. A. Stewart
INVENTOR

BY Victor J. Evans
ATTORNEY

E. W. Markward
Thos. E. Turpin
WITNESSES

Patented Sept. 25, 1923. 1,469,121

UNITED STATES PATENT OFFICE.

HENRY A. STEWART, OF HIGHLAND PARK, MICHIGAN.

MILLING-MACHINE HEAD.

Application filed December 16, 1922. Serial No. 607,367.

To all whom it may concern:

Be it known that I, HENRY A. STEWART, a citizen of the United States, residing at Highland Park, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Milling-Machine Heads, of which the following is a specification.

One object of my said invention is the provision of a milling machine head possessed of the capacity of boring taper holes.

Another object of the invention is the provision of the capacity indicated and adapted in addition to do the work of an ordinary milling machine head.

In accordance with my invention the depth to which holes may be bored and the extreme angle of the holes will be determined by the size of the essential elements of the head.

To the attainment of the foregoing, the invention consists in the improvement as hereinafter described and definitely claimed.

In the accompanying drawings, forming part of this specification:—

Figure 1 is a vertical section of the milling machine head constituting the preferred embodiment of my invention.

Figure 2 is a top plan view of the same.

Figure 3 is a horizontal section taken in the plane indicated by the line 3—3 of Figure 1 looking downwardly.

Figure 4 is a vertical cross-section taken in the plane indicated by the line 4—4 of Figure 1, looking toward the right.

Figure 5 is an enlarged fragmentary section taken in the plane indicated by the line 5—5 of Figure 1 and showing the means for pivotally connecting the angle governor of the device in the upper rotary tubular member of the improvement.

Similar numerals of reference designate corresponding parts in all of the views of the drawings.

Among other elements my improvement comprises an appropriate support 1. Journaled in the support 1 is a shaft 2 to which is fixed a spur gear 3 and a bevel gear 4, the bevel gear 4 being meshed with a corresponding gear 5 on a drive shaft 6. Also journaled in the support 1 is a feed screw 7 to which is keyed a bevel gear 8. This bevel gear 8 is meshed with a corresponding gear 9 on a shaft 10 which is shown as equipped with a hand wheel 11 for manual control though it may, when deemed desirable, be connected with automatic feed means, which latter is not of my invention and is therefore not illustrated. Movable vertically on the screw 7 is a nut 12, grooved at 13. Appropriately held against vertical movement in the support 1 as by a circumferential flange 14 is an upper tubular member 15 that is rotatable in the support 1 by virtue of a gear 16 with which it is equipped being meshed with the before mentioned spur gear 3. The said tubular member 15 is provided with an upper flared bore 17, and appropriately fixed on the tubular member 15 is a frame 18, Figures 1 and 2, in which is mounted an adjusting screw 19. Engaged with the screw 19 and appropriately guided in the frame 18 are nuts 20, and carried by the said nuts 20 are clamp heads 21. The said clamp heads 21 are disposed at opposite sides of the angle governor 22 which constitutes an important element of my improvement. The said angle governor 22 is pivoted at 23 in the tubular member 15, Figures 1 and 5, and is provided with a bore 24 and a slot 25. In virtue of the screw 19, nuts 20 and clamp heads 21 it will be manifest that the angle governor 22 may be expeditiously and easily disposed and fixed at various angles of inclination. Keyed at 26 to the tubular member 15 so as to turn with said tubular member 15 and be capable of endwise rectilinear movement thereon is a second tubular member 27 on which is a circumferential flange 28, disposed in the groove 13 of the nut 12 so that vertical movement of the tubular member 27 will attend vertical movement of the nut 12. Pivoted at 30 in the tubular member 27 is a holder 31 for an appropriate tool 32, and on the said holder 31 is a shank 33 which extends through and is movable in the slot 25 of the angle governor and is provided with a head 34 disposed and movable in the bore 24 of said governor.

Manifestly in the practical use of my improvement when the tubular member 27 is raised, the tool holder 31 will be positioned by the angle governor 22 with the result that the tool will be caused to cut a taper the angle of which is determined by the position of the said governor.

I have entered into a detailed description of the construction and relative arrangement of the parts embraced in the present

and preferred embodiment of my invention in order to impart a full, clear and exact understanding of the said embodiment. I do not desire, however, to be understood as confining myself to the specific construction and relative arrangement of parts inasmuch as in the future practice of the invention various changes and modifications may be made such as fall within the scope of my invention as defined in my appended claims.

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

1. In a milling machine head, the combination of a support, a tubular rotary member mounted in said support, means for rotating said member about its axis, a second tubular member keyed to and rotatable with the first-named tubular member and movable endwise relative to said member, means for adjusting the second tubular member endwise, an angle governor pivoted in the first-named tubular member, means to adjustably fix said angle governor with respect to said member and at various angles of inclination, and a tool holder pivoted in the second-named tubular member and having a shank and a head on the shank and engaged with and movable endwise of said governor.

2. In a milling machine head, the combination of a support, a rotary member mounted in said support, means for rotating said member about its axis, a second member engaged with the said rotary member to turn therewith and move endwise relative thereto, means for adjusting said rotary and endwise movable member, an angle governor mounted on the first-named rotary member to swing relative thereto, means to adjustably fix said angle governor with respect to the first-named rotary member, and a tool holder mounted to rock relative to the second-named endwise movable member and engaged with and adjustable lengthwise of the angle governor.

3. In a milling machine head, the combination of a support, a tubular rotary member mounted in said support, means for rotating said member about its axis, a second tubular member keyed to and rotatable with the first-named tubular member and movable endwise relative to said member, means for adjusting the second tubular member endwise, an angle governor pivoted in the first-named tubular member, means to adjustably fix said angle governor with respect to said member and at various angles of inclination, and a tool holder pivoted in the second named tubular member and having a shank and a head on the shank and engaged with and movable endwise of said governor; the first-named rotary member having a flared upper portion, and the angle governor being provided with a slot to receive the shank of the tool holder and with a bore to receive a head on said shank.

4. In a milling machine head, the combination of a support, a tubular rotary member mounted in said support, means for rotating said member about its axis, a second tubular member keyed to and rotatable with the first-named tubular member and movable endwise relative to said member, means for adjusting the second tubular member endwise, an angle governor pivoted in the first-named tubular member, means to adjustably fix said angle governor with respect to said member and at various angles of inclination, and a tool holder pivoted in the second-named tubular member and having a shank and a head on the shank and engaged with and movable endwise of said governor; the first-named rotary member being equipped at its upper end with a frame, a screw bearing in said frame, nuts guided in the frame and movable by said screw, and clamping heads carried by the nuts and disposed at opposite sides of the angle governor.

5. In a milling machine head, the combination of a support, a tubular rotary member mounted in said support, means for rotating said member about its axis, a second tubular member keyed to and rotatable with the first-named tubular member and movable endwise relative to said member, means for adjusting the second tubular member endwise, an angle governor pivoted in the first-named tubular member, means to adjustably fix said angle governor with respect to said member and at various angles of inclination, and a tool holder pivoted in the second-named tubular member and having a shank and a head on the shank and engaged with and movable endwise of said governor; the second-named rotary and endwise movable member being equipped with a circumferential flange, and the adjustment of said member being effected through the medium of a screw journaled in the support, means to rotate said screw, and a nut on the screw and grooved to receive said flange of said member.

In testimony whereof I affix my signature.

HENRY A. STEWART.