(No Model.)

S. LAWTON.

Machine for Holding Milling Tools for Grinding.

No. 241,497. Patented May 17, 1881.

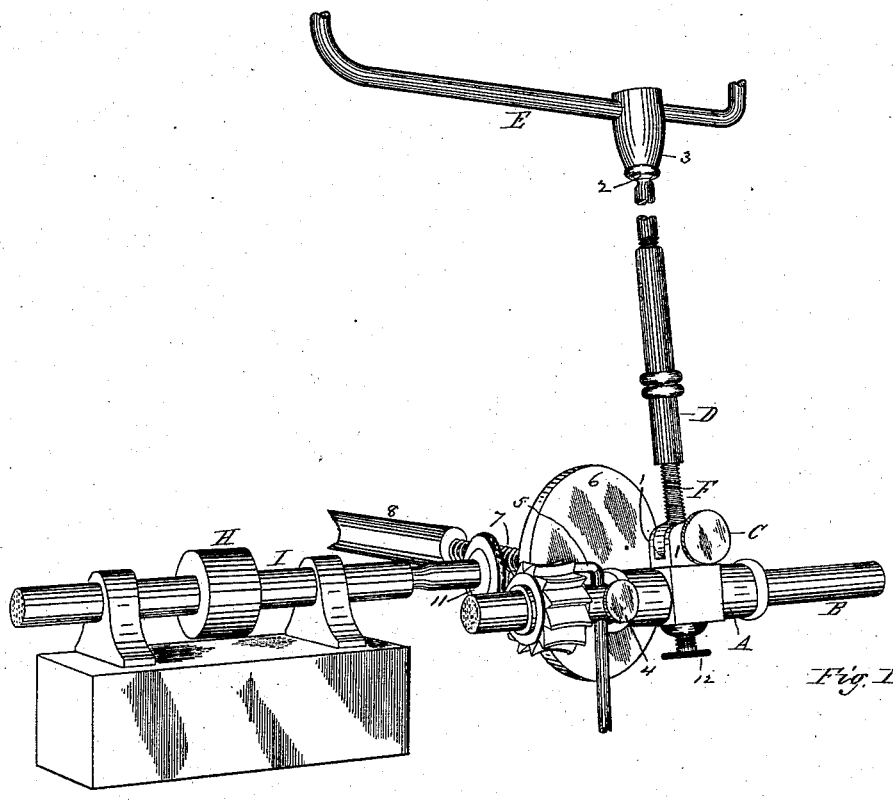

Fig. I.

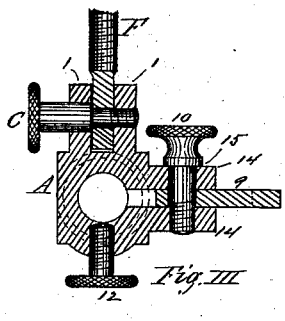

Fig. III.

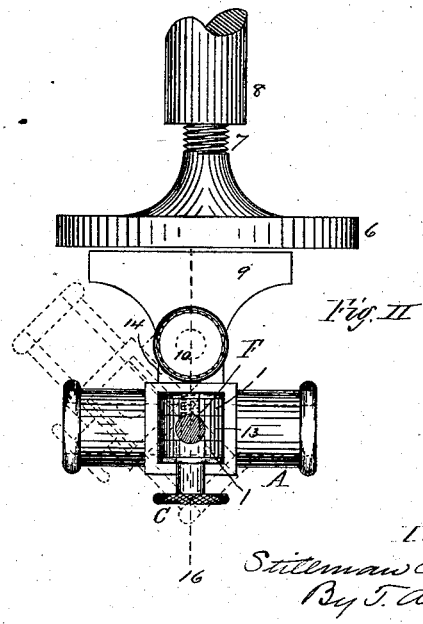

Fig. II.

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UNITED STATES PATENT OFFICE.

STILLMAN LAWTON, OF WEST MERIDEN, CONNECTICUT.

MACHINE FOR HOLDING MILLING-TOOLS FOR GRINDING.

SPECIFICATION forming part of Letters Patent No. 241,497, dated May 17, 1881.

Application filed January 19, 1881. (No model.)

To all whom it may concern:

Be it known that I, STILLMAN LAWTON, of West Meriden, in the county of New Haven and State of Connecticut, have invented a new and useful Improved Machine for Holding Milling-Tools for Grinding, (which has not been patented to any person in any foreign country with my knowledge and consent,) of which the following is a specification.

The object of my invention is to provide a machine for holding milling-tools while being ground or sharpened, whether they are of regular or irregular form, and I accomplish this by the mechanism hereinafter described and illustrated in the accompanying drawings, in which—

Figure I is a perspective view of my invention, and Fig. II is a plan view of the pendent arbor-socket with the guide-piece attached and the guide or face plate in position for use. Fig. III is a transverse vertical section through the arbor-socket at the axis of the clamping-screws at line 16 of Fig. II.

In the drawings, D represents a rod having a universal joint at its upper end, in the present case a ball, 2, at its upper end, suspended in a socket, 3, and known as a "ball-and-socket joint," with the socket suspended upon and arranged to slide to and fro along a fixed rod, E, and the lower end of the rod D is provided with an internal screw-thread into which is turned a screw, F, the lower end of which is provided with a flat perforated ear, 13, to be clamped between two ears, 1, on the arbor-socket A by a clamp-screw, C.

In the device illustrated in the drawings accompanying this application the clamp-screw C has a screw-thread made on its extreme end, which turns into a threaded hole in the ear 1 on the arbor-socket farthest from the head of the screw, the shank of the screw turning freely in the hole through the other ear, and also in the hole through the flat ear 13 on the lower end of the screw F, with a shoulder on said screw C to bear against the ear 13 and force the latter firmly against the ear 1 when the clamp-screw C is turned into said ear 1 firmly.

The shank of the clamping-screw 10, which holds the arbor-socket in the desired relative position with the guide-piece 9, turns freely in the ear 14, nearest the head of said screw, and also in the hole through the guide-piece, and is threaded at its end, and is turned into a threaded hole in the other ear 14, the shoulder 15, near the head of the screw, having a firm bearing against the outside of the upper ear, and thus operating to clasp the guide-piece 9 firmly between the ears 14.

It is evident that the construction of the joint at the screw 10 may be used in place of that shown at the screw C, or any equivalent arrangement may be used whereby the arbor-socket may be held at the desired angle.

The arbor-socket A may be, in its general form, a short tube, into which is inserted an arbor, B, arranged to move freely therein, and which may be secured firmly at any desired point by the set-screw 12.

A finger, 5, is inserted into a hole through the arbor, and the upper end of this finger is bent at right angles to its stem or main part, which is inserted in the hole, so that the finger may be secured by the set-screw 4 at any desired point, with its upper end extending parallel with the axis of the arbor.

A guide-piece, 9, is hinged to the rear side of arbor-socket A, so as to swing thereon in a horizontal direction, and may be secured at any desired angle of inclination to the length of the arbor-socket by a set-screw, 10; and a guide or face plate, 6, whose front face is in a vertical plane adjacent to the edge of the guide-piece 9, is provided on the back side with a screw, 7, which turns into a socket, 8, and this socket may be either a fixture, so that when the face-plate is not in use it may be run back by turning its screw into the socket; or the socket may be swiveled or hinged and held by a set-screw, and when not in use be loosened and turned to one side and out of the way, or it may be arranged in any other convenient manner so that when not required for use it may be moved out of the way.

An ordinary emery grinding-wheel, set in or attached to a shaft, I, and carried by power applied to a pulley, H, or in any other manner, may be used to grind the teeth of the mill.

The operation of the invention is as follows: The arbor B is set at the desired point in the socket A and held firmly by the set-screw 12, and the mill to be ground is slipped on the end

of the arbor and moved up quite near to the finger 5, and the latter is adjusted with its upper horizontal end extending in between two of the teeth of the milling-tool, and is firmly secured by the screw 4.

The socket 3 may be moved along the rod E to any desired position, and, the clamp-screw C first being loosened, the socket A may be set at any desired vertical inclination, and there secured by turning in the clamping-screw C, and if the milling-tool to be ground has its teeth of a curved or of irregular form, the tool is held with the thumb and fingers of one hand, and the arbor or socket A, or both are held with the other hand, and one of the teeth of the tool is guided against the grinding-wheel until the tooth is ground sharp, after which the tool is moved along the arbor away from the finger 5, the next tooth brought up into the position of the one just ground, with the finger 5 between two of the teeth of the tool, and so held while the next tooth is ground, and so on until all the teeth of the tool are ground sharp, the arbor-socket A and arbor being moved with the hands freely in any direction to bring each tooth of the mill or tool all along its length into contact with the grinding-wheel.

If the milling-tool should be straight instead of curved or irregular in form, the screw 7 of the guide or face plate 6 is turned out of its socket until the face-plate is brought forward sufficiently near the socket A, and the guide-piece 9 is adjusted so that its straight rear edge is parallel with the axis of the socket A. The straight milling-tool is then placed in position on the arbor with the finger 5 adjusted between two of the teeth of the tool, and the arbor B adjusted in its socket to bring the desired side of the tooth against the wheel 11, and the socket A is then held back with the straight edge of the guide-piece 9 against the face plate or guide 6, whose front face is in a vertical plane parallel with the axis of the socket, and the latter and the arbor are moved along with the edge of the guide-piece 9 against the guide 6, and the tooth of the milling-tool in front of the wheel is ground. Of course, as the edge of the guide-piece is against the guide in this operation, only a certain amount can be taken off the tooth by the grinding-wheel, and if the tooth is not ground enough the guide 6 may be moved back to any desired degree, however small, by turning it so as to turn the screw 7 into its socket 8. When the desired adjustment is obtained each tooth may be ground in succession, and when finished all the teeth will be ground uniformly, and with their cutting-edges exactly the same distance from the axis of the tool.

If a tapered tool is to be ground, the guide-piece 9 is adjusted by its clamping-screw 10 to the same inclination with reference to the axis of the socket as the inclination of the edge of the teeth of the tool with its axis, and the tool is then placed on the arbor with the finger 5 between two of its teeth, and the tool ground in the same manner as the straight tool, as above described, the guide 6 being adjusted either forward or backward to grind off just the desired amount from each tooth, and to grind them all uniform. In this manner all milling-tools having straight teeth, whether their cutting-edges are parallel with the axis of the tool or not, may be ground perfectly true and straight and all uniform, and with the cutting-edge of each tooth at exactly the same distance from the axis of the milling-tool, the guide-piece 9 and guide 6 both operating to guide each tooth to grind it straight, and as a gage to govern the amount ground off and make the cutting-teeth uniform.

The rod E may be at any desired height from the floor or from the socket A, the tube D being finely adjusted to bring the socket A to any desired elevation by turning it on or off the screw F.

If the milling-tool to be ground is of considerable length, it will describe the arc of a circle in a vertical direction, of which the ball-and-socket joint 2 will be the center, and in such case it will be desirable to locate one end of the arbor higher than the other end, to cause every part of the long tooth, in being ground, to pass in front of the grinding-wheel at the same point of elevation. This may be done by the clamping-screw C and the joint 1 at that point.

The arbor B may be of several sizes near each end, to receive milling-tools made to fit arbors of different sizes in the different machines in which they are used; and different arbors may also be used with the same socket. When the machine is not in use the arbor may be removed therefrom, or secured therein by the set-screw, and the socket and rod swung up out of the way and secured.

In practice it might be possible to hold the milling-tool while grinding it, to prevent its turning on the arbor, by the fingers instead of by the finger 5; but the latter is a great convenience, and there is more certainty of bringing each successive tooth of the tool into the same position to be ground, and it saves much trouble and annoyance.

It is evident that the socket or arbor-holder A may be made of any other desired form, so long as the arbor is adjusted and held in the desired position thereby; and instead of the screw F turning into the tube or rod D to adjust the vertical height of the arbor, any other desired means may be used—such as one rod sliding within a tube with a clamping-collar, or a right-and-left-hand screw, or any other device for lengthening or shortening the said rod.

Any grinding emery-wheel may be used in connection with this device for holding the tool, no especial adaptation of said grinding-wheel being necessary. For example, the grinding-wheel may be chucked in a lathe, and this holding device be suspended from the ceiling above the lathe and swung out of the way when not required for use.

Having thus described my invention, what I claim as new is—

1. In a machine for holding milling-tools for

grinding, a swinging socket having an arbor adapted to be adjusted therein, combined with a rod provided with a universal joint for suspending said socket, and said rod being connected to the socket by an adjustable joint, whereby the socket and the arbor therein may be held in any desired vertical position or inclination, substantially as described.

2. In a machine for holding milling-tools for grinding, a swinging socket combined with an arbor provided with an adjustable finger for holding the milling-tool from revolving on the arbor while being ground, and an adjustable rod for suspending said socket and arbor in any desired position and elevation, substantially as and for the purpose set forth.

3. In a machine for holding milling-tools for grinding, the combination, with an adjustable swinging socket and an arbor adjustable therewith, of a guide-piece connected with said socket, and a movable guide or face plate to serve as a bearing for said guide-piece, said guide or face plate and said guide-piece being made adjustable with reference to the position of one with the other to give the desired horizantal position of the socket and arbor, substantially as described.

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