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A. J. STRONG.

TAPPING AND DRILLING MACHINE.

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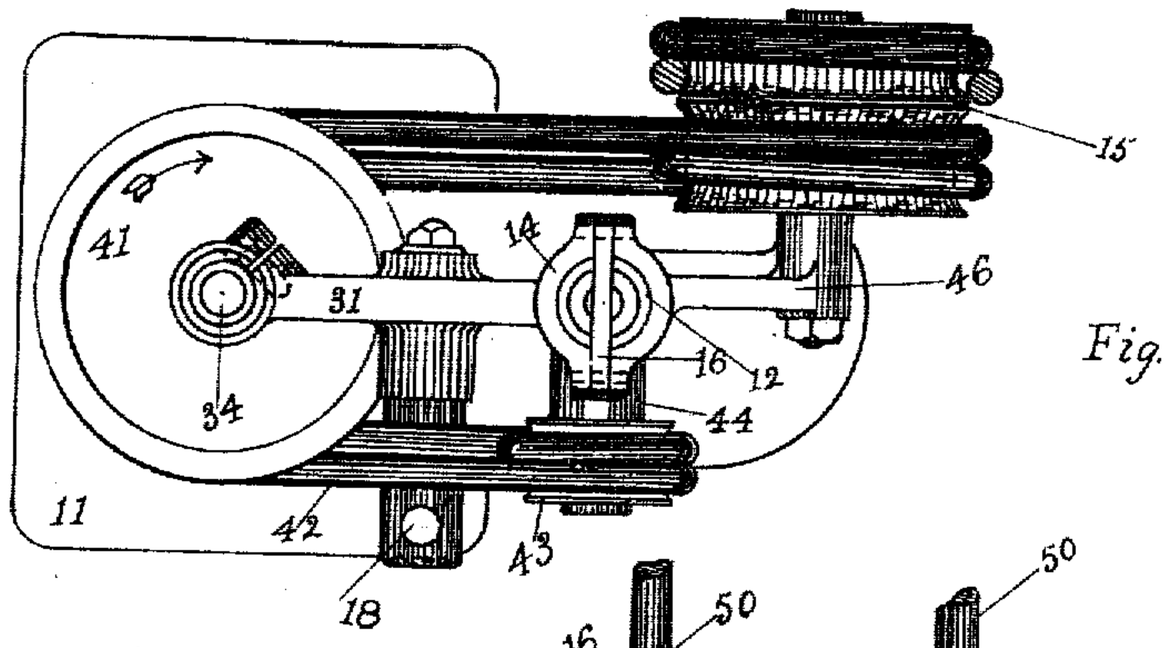

Fig. 2

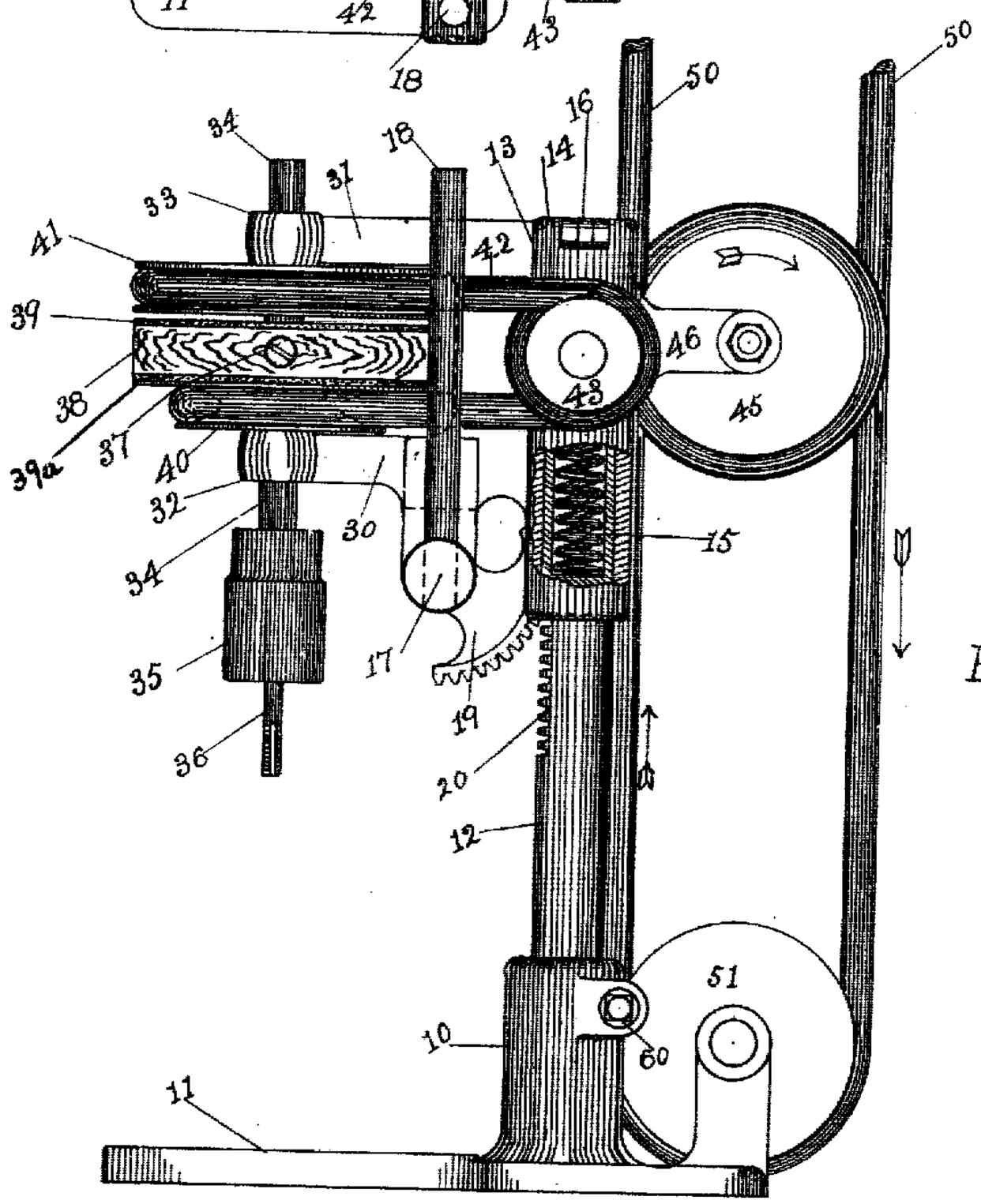

Fig. 1

Witnesses
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TAPPING AND DRILLING MACHINE.

No. 814,247. Specification of Letters Patent. Patented March 6, 1906.

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To all whom it may concern:

Be it known that I, ARTHUR J. STRONG, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Tapping and Drilling Machines, of which I declare the following to be a full, clear, and exact description.

My invention relates to machines of a class particularly adapted for tapping, drilling, or such kindred purpose, and it is among the general purposes and objects of my invention to provide a simple and effective friction drive for such machines, means for reversing the drive and insuring a quick return of the tool, and at the same time to allow the entire tool and its reversing drive mechanism to be readily moved to and from the stationary work.

In the accompanying drawings, forming part of this specification, Figure 1 represents a side elevation of the machine, showing the sleeve of the movable frame partly broken away. Fig. 2 represents a top view of the machine.

The machine is supported upon a standard 10, and extending outward from this standard is a base-plate 11, upon which work may be placed and held in position to be tapped or drilled. Extending upward from the standard 10 is a shaft 12, upon the upper end of which slides a movable frame 13, consisting of a sleeve 14 with various arms projecting therefrom, as hereinafter described. This sleeve fits closely upon the shaft 12, but in such manner that it may slide up and down on the shaft. The upper part of the shaft is hollowed out and contains a spring 15, which at its lower end is seated against the solid part of the shaft and at its upper end bears against a key 16, which is fast to the sleeve 14 and slides in a slot cut in the shaft. This spring normally holds the frame in its uppermost position. An arm 30, extending outward from the lower part of the sleeve 14, has pivoted to it, as at 17, a lever 18, to which is made fast a toothed segment 19. This segment meshes with teeth 20, formed upon the side of the shaft 12. It is thus obvious that when the lever 18 is pulled downward the segment 19 rolls over the teeth 20 and the frame 13 is carried bodily downward against the tension of the spring 15. Extending outward from the upper part of the sleeve 14 is another arm 31. Journaled in bearings 32 and 33 in the arms 30 and 31, respectively, is a tap or drill spindle 34, to the lower end of which is attached by any suitable means a chuck 35 and tap or drill 36. The chuck is not shown in detail, since it forms no part of my present invention. Upon the middle portion of this spindle is made fast by means of a set-screw 37 a friction-disk 38, and this disk has upon its upper and lower surfaces a thin layer of leather 39 or suitable material to afford a flat surface adapted to make a good frictional contact with the driving-pulleys now to be described. Situated on opposite sides of this "driven" disk 38 are two pulleys, the lower one of which, 40, is smaller in diameter than the upper one, 41. These pulleys have flat contact-surfaces adapted to engage with the respective contact-surfaces of the friction-disk 38, and the smaller pulley 40 has a flange 39^a, so that the entire under side of the disk 38 will be engaged, and consequently the whole extent of the friction-surface may be utilized; but the body part of this pulley is smaller in diameter, as before stated, in order to gain greater speed of rotation. The space between the pulleys is slightly greater than the thickness of the friction-disk 38, so that the disk normally rests upon the lower pulley 40 and does not touch the upper pulley 41. These pulleys 40 and 41 may be mounted loosely upon the spindle 34; but they are preferably mounted upon sleeves or bushings that extend from and are clamped to the respective arms 30 and 31, these bushings having flanges to keep the pulleys in place, and by this means the pulleys may rotate upon the bushings without affecting the spindle. Since this method of mounting pulleys upon such bushings free from spindles is a well-known device, I have not shown it in my drawings. These pulleys 40 and 41 are rotated in reverse directions in a manner well known in the art by what may be called the "auxiliary" driving means—namely, an endless belt 42, which passes round the pulleys 40 and 41, around an idler-pulley 43, mounted upon an arm 44, extending horizontally outward from the sleeve 14, and around a main pulley 45, which is mounted upon an arm 46, extending outward from the sleeve 14. Motion is imparted to this pulley 45, and thus to the auxiliary driving-belt 42, by means of a main driving-belt 50,

which is led down from the counter-shaft overhead, is wound around the pulley 45, is then led round an idler 51, and up to the counter-shaft again. It is thus apparent that the frame 13 may be freely moved up and down while the main driving-belt 50 is running, and the tension on this belt is not affected, and the auxiliary driving-belt receives a continuous movement whereby the driving-pulleys 40 and 41 are continuously rotated in reverse directions.

In the general operation of the machine the work to be drilled or tapped is placed upon the base 11, and then the operator moves the lever 18 downwardly, thereby carrying downward the entire frame 13, and consequently the drill or tap 36, as well as its driving-pulleys 40 and 41, which are continuously rotating, as before described. When the tool comes in contact with the surface of the work, the friction-disk 38 is forced upward against the under surface of the driving-pulley 41, which is rotating in the direction shown by the arrow in Fig. 2, and the frictional contact therewith immediately causes the friction-disk and its attached tool to rotate in a right-hand direction, and the tool will thereupon do its drilling or tapping work as fast as it is forced downward by the movement of the lever 18. When the hole has been drilled or tapped to its desired length, the lever 18 is moved backward, whereupon the drag of the tool causes the friction-disk 38 to be shifted, so that its under surface now comes in contact with the upper surface of the smaller driving-pulley 40, and its upper surface is free from the pulley 41. Therefore the tool is now rotated in the opposite direction, and since the pulley 40 is smaller the rotation in this direction is much faster, and the tool is therby given a quick return. In order to adjust the tool to proximity to the work at the start, the support 10 may be made hollow and split, and the shaft 12 may then be adjusted therein until the tool is at the proper height, and then the shaft 12 may be clamped in position by the clamping-screw 60 on the support 10.

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

1. In a machine of the character described, the combination with a reciprocatory frame and a support therefor, of a driven disk having flat contact-surfaces and mounted upon a tool-carrying shaft journaled in said frame; two friction driving-disks situated on opposite sides of said driven disk and having flat contact-surfaces for engaging said driven disk and rotating the same by frictional contact therewith; an auxiliary driving-belt carried upon said frame and arranged to rotate said two driving-disks reversely; a main driving-belt; a rotary member common to said main and said auxiliary belts, said main belt being so connected with said rotary member as to permit the reciprocation of said frame without affecting the tension of said main belt; a hand-manipulative lever for reciprocating the frame toward and from the work; and a spring for forcing said frame away from the work.

2. In a machine of the character described, the combination with a reciprocatory frame and a support therefor, of a driven disk having flat contact-surfaces and mounted upon a tool-carrying shaft journaled in said frame; two friction driving-disks situated on opposite sides of said driven disk and having flat contact-surfaces for engaging said driven disk and rotating the same by frictional contact therewith; an auxiliary driving-belt carried upon said frame and arranged to rotate said two driving-disks reversely; a main driving-belt; a work-supporting base-plate carrying a pulley; a pulley common to said main and said auxiliary belts, said main belt being led once around said common pulley and then under said base-plate pulley whereby to permit the reciprocation of said frame without affecting the tension of said main belt; a hand-manipulative lever for reciprocating the frame toward and from the work; a spring for forcing said frame away from the work; and means for adjusting the said frame-carrying support toward and from said base-plate, whereby to position the tool-carrying frame independently of said manipulative lever.

In testimony whereof I affix my signature in the presence of two witnesses.

ARTHUR J. STRONG.

Witnesses:
O. C. ELSLAGER,
J. B. HAYWARD.