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MULTIPLE SPINDLE DRILLING MACHINE.

APPLICATION FILED MAR. 27, 1912.

1,135,974. Patented Apr. 13, 1915.

Fig. 1.

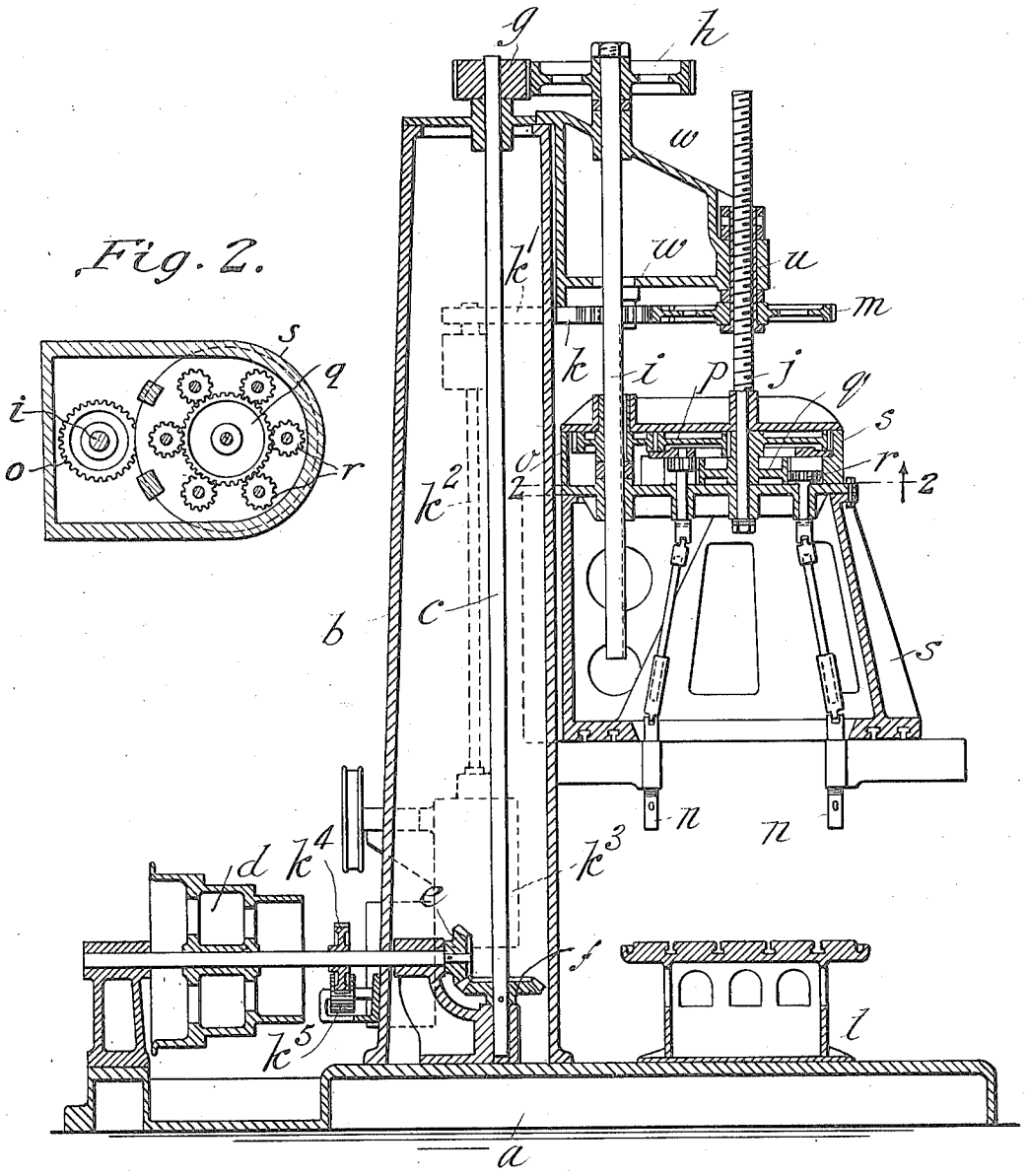


Fig. 2.

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MULTIPLE-SPINDLE DRILLING-MACHINE.

1,135,974. Specification of Letters Patent. Patented Apr. 13, 1915.

Application filed March 27, 1912. Serial No. 686,595.

To all whom it may concern:

Be it known that I, CLARENCE J. WETSEL, a citizen of the United States of America, residing at Chicopee, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Multiple-Spindle Drilling-Machines, of which the following is a specification.

This invention relates to improvements in drilling machines, and more particularly of the kind known as the feeding head type of multiple spindle drilling machines.

Broadly, the invention consists in means for exerting a direct pressure on the feeding head in axial alinement with the feed screw.

Heretofore it has been the common practice in most upright drilling machines to effect the axial movements of the drill-carrying head by means of a feed-screw located at one side of the head. This is objectionable for the reason that the impulse of the screw is not communicated along the line of the common axis of the drills carried by the head, which results, as may readily be seen, in an objectionable torque or improper leverage, causing a binding action upon the screw and a stiff and unsatisfactory operation of the machine. My invention, on the other hand, relates to a construction whereby I have both obtained the result that the feed-screw bears, as it should according to mechanical principles, upon the head and also have eliminated all the complexity which I have noted above by locating the driving-shaft for the drills at one side thereof. Upon a consideration of the mechanics of the problem it will be seen that this arrangement is mechanically sound and perfect for the reason that while the feed-screw communicates an axial impulse to the drills and should, therefore, obviously be properly centered in relation therewith, the driving shaft communicates, on the other hand, a radial or horizontal, or rather tangential, impulse to the drills and may, therefore, perfectly satisfactorily be located at one side of the drills. This is the gist of my invention and in so far as I am aware my arrangement and structure are broadly new.

In the drawing, which forms a part of this application,—*a* is the base portion of the drill; *b* the upright or standard through which passes a drive-shaft *c* that is geared to the driving cones *d* by means of the bevel gears *e* and *f*. To the upper end of the drive-shaft *c* is secured a spur gear *g* which meshes with the gear *h* that drives the shaft *i* that operates the drill-carrying spindles. Extending parallel with the drive-shafts *c* and *i* is a feed-screw *j* that is driven by means of the spur-gears *k* and *m* which are conveniently connected to a suitable part of the driving mechanism by means of the mechanism, as shown in dotted lines at k^1, k^2, k^3, that is located on the rear side of the machine. The gears k^4 and k^5 adjacent the cone pulleys *d* are operatively connected with the gears *k* and *m*. The drill-carrying spindles *n* are driven from the shaft *i* through the chain of spur-gears *o*, *p*, *q*, and *r* which are all mounted for rotation in the feeding-head *s* which is located directly above the work-table *t* which may be placed on the base-portion *a*, if desired, in operating on certain kinds of work.

It should be particularly observed that the feed-screw *j* is located in the center of the feeding-head *s*. This feed-screw is operated by the gear *m* which rotates the threaded sleeve *u* that engages the threads of the feed-screw. This sleeve is driven from the gears k^4 and k^5 through the connections k^1, k^2, and k^3, indicated in dotted lines. It should also be noticed that the feed-screw *j* is spaced away from the upright *b* and that it is located practically in the geometric center portion of the head *s* so that when the drill is in operation the downward movement of the head *s* by the feed-screw will be equally distributed to all of the drill spindles *n*. By spacing the feed-screw *j* from the upright or standard *b* by means of the bracket *w*, all leverage effect of the head, when the machine is in operation, is avoided.

What I claim is:—

A multiple spindle-drilling machine, comprising in combination a fixed frame, an outwardly extending bracket fixed to the upper end thereof, a feeding head slidably mounted on said frame, a circular series of drill spindles rotatably mounted in said head, a feed-screw mounted in said bracket and said head, said feed screw being attached to said head at the center of said series of drill spindles, a drive shaft rotatably mounted in said bracket and slidably and rotatably mounted in said head, said drive shaft being located between said frame

and said feed screw and in parallel relation thereto, means to cause said feed screw to move said head downwardly to simultaneously transmit an equal pressure simultaneously on each one of the drill spindles, and operative connections between said drive shaft and said drill spindles, said connections comprising spur gears, whereby each drill spindle is driven with uniform torque.

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