

F. D. TAYLOR.
MECHANISM FOR DRIVING DRILL SPINDLES.
APPLICATION FILED OCT. 25, 1910.

1,015,359.

Patented Jan. 23, 1912.

3 SHEETS—SHEET 1.

Fig. 3

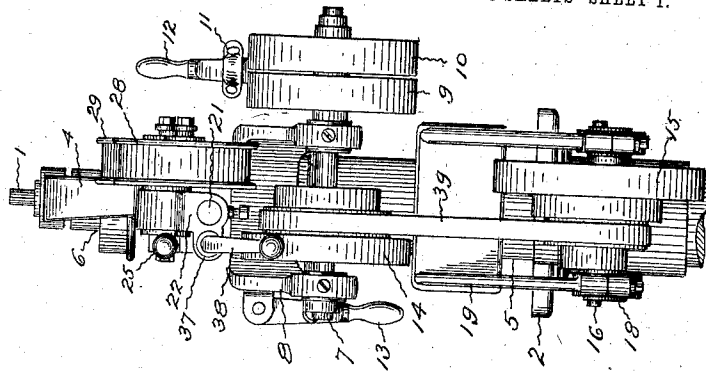


Fig. 2

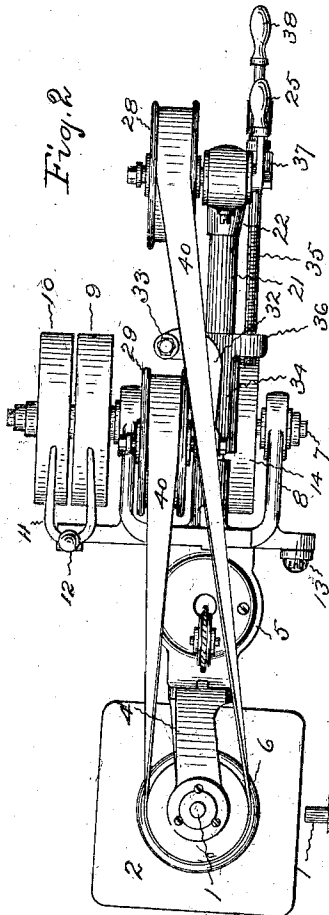
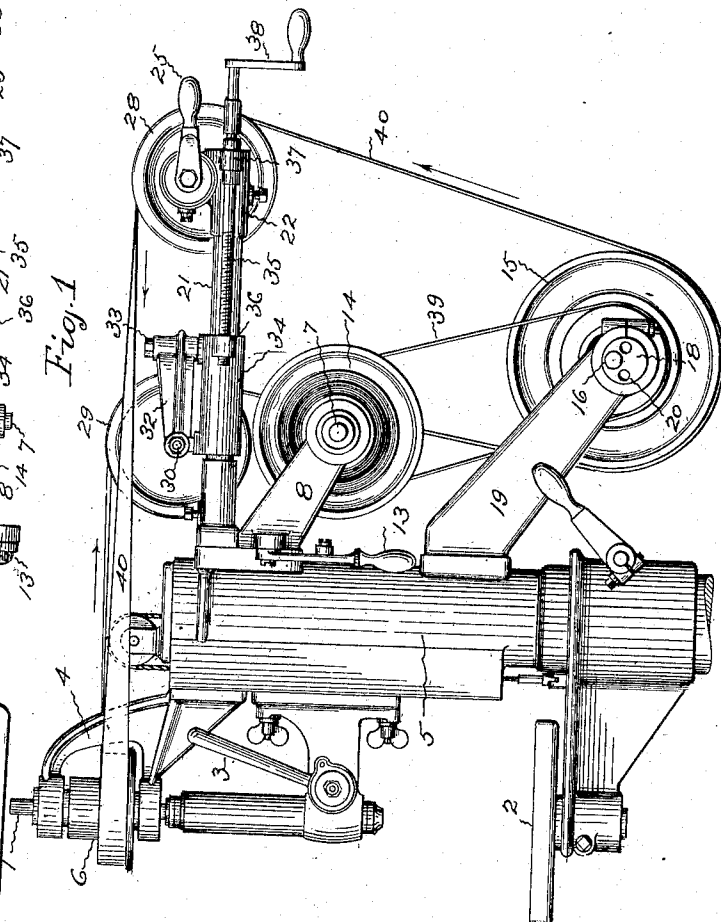


Fig. 1



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Fig. 4

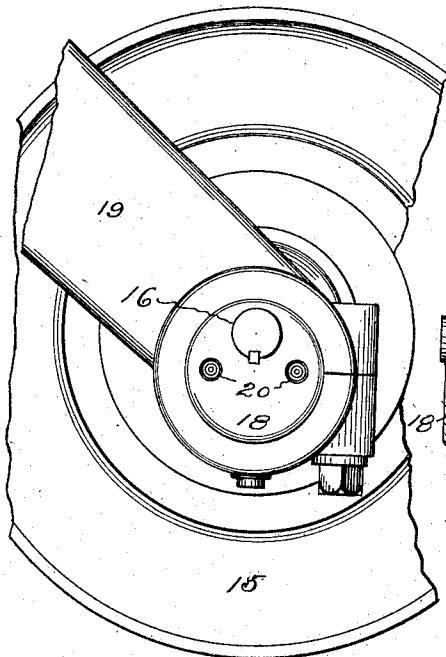


Fig. 5

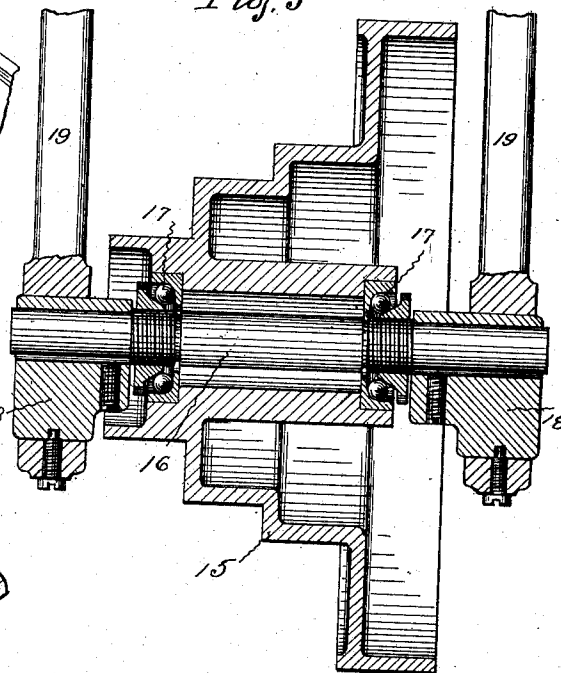


Fig. 6

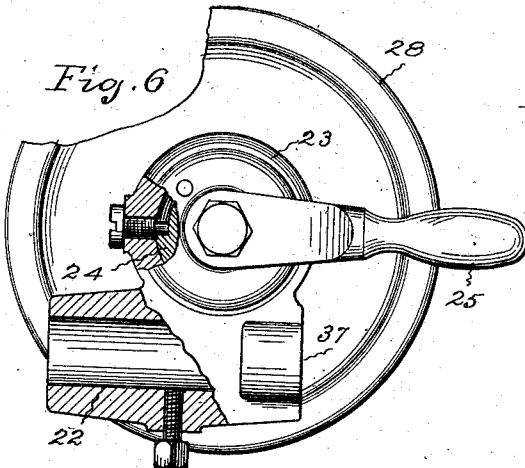
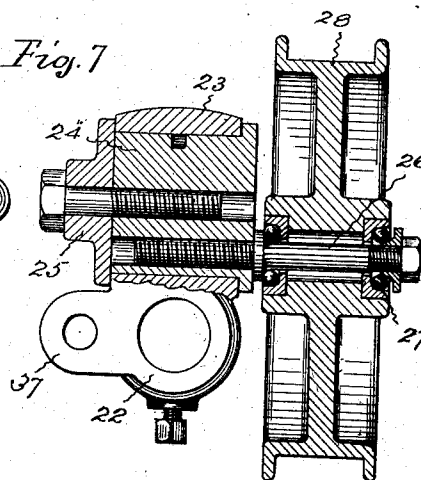


Fig. 7



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3 SHEETS—SHEET 3.

Fig. 8

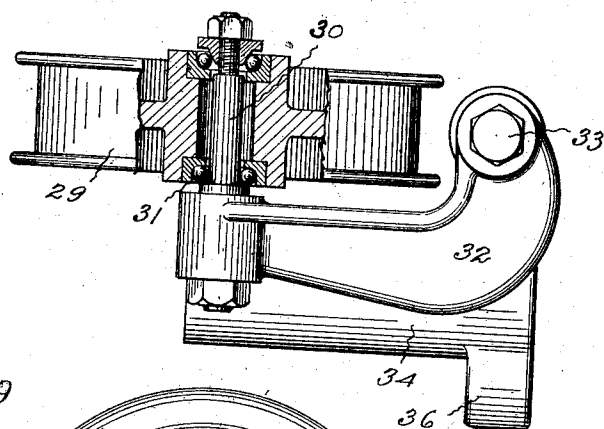


Fig. 9

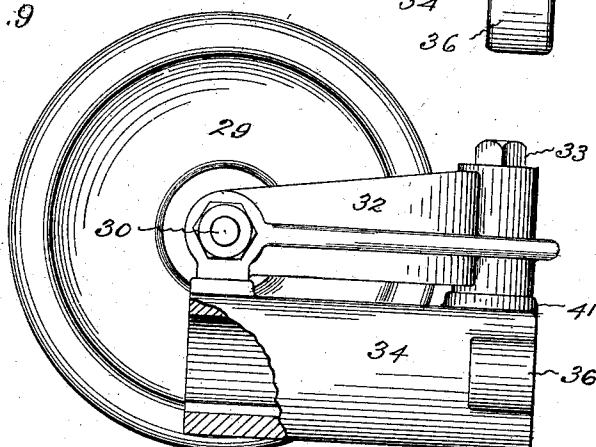
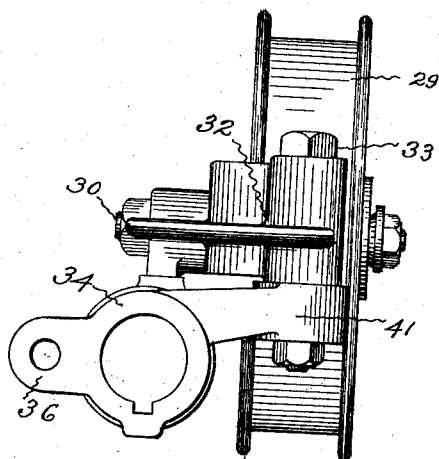


Fig. 10



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UNITED STATES PATENT OFFICE.

FREDERICK D. TAYLOR, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE SIGOURNEY TOOL COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

MECHANISM FOR DRIVING DRILL-SPINDLES.

1,015,359.

Specification of Letters Patent.

Patented Jan. 23, 1912.

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To all whom it may concern:

Be it known that I, FREDERICK D. TAYLOR, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in Mechanism for Driving Drill-Spindles, of which the following is a specification.

This invention relates to the mechanism which is provided for driving the drill spindle of a high speed, sensitive drill press.

To efficiently drill small holes (for instance, 5/16 of an inch and under) in metal, it is necessary to rotate the drill at very high speed. The smaller the diameter of the drill, the faster it must be driven in order to give the cutting lips the essential lineal travel to accomplish the required cut in quick time. With very fine drills the necessary speeds of rotation increase very rapidly with the reduction in diameter, several thousand revolutions per minute being necessary to effect a cutting when the feed is fast. Small drills at such speeds must, of course, run true, the spindles which carry them must be mounted so as to be very sensitive; that is, have a delicate feed, and there must be sufficient power to drive the spindles at such high speeds that the drills will not stick in the material being drilled and stop rotating when fed rapidly. Furthermore, as the efficient speeds of small drills vary greatly, it is essential, in producing a commercial press of this character, to provide for several changes of speed. These high speeds necessitate free and accurately running parts and tight belts.

The object of this invention is to provide a drill press of this type with a simple, compact and powerful mechanism for driving the drill spindle at very high speed, in order to give the drills the requisite rotation to allow rapid feed, and to so arrange such mechanism that the speed can be quickly altered and the belts adjusted, when desired, thereby producing a commercial, sensitive drill press in which fine drills may be efficiently and economically used.

Figure 1 of the accompanying drawings shows a side elevation of the upper portion of a drill press provided with a driving mechanism which embodies this invention. Fig. 2 is a plan of the same. Fig. 3 shows a rear view. Fig. 4 shows a side view on larger scale of a portion of the lower pul-

ley or intermediate cone. Fig. 5 shows a section of the intermediate cone. Fig. 6 shows a side view, with portions broken away, of the outer pulley or lead idler and its support. Fig. 7 shows a section of the same. Fig. 8 shows a plan, with a portion in section, of the inner pulley or return idler and its support. Fig. 9 shows a side elevation, and Fig. 10 shows a rear elevation of the return idler.

The drill spindle 1 is mounted in the common manner and is fed down and up, toward and from the table 2 by turning the handle 3 in the usual way. On the upper end of the spindle, between the arms of the bracket 4 that is attached to the front of the column 5 near the top, is the spindle pulley or two-step cone 6.

The driving shaft 7 is supported by the arms of a fork 8 that is attached to the back of the column. This shaft is provided near one end with a fixed pulley 9 and a loose pulley 10. These pulleys are designed to be belted to the main line pulley. A fork 11 is arranged to be moved by either the handle 12 on one side or the handle 13 on the other side for shifting the main belt from one pulley to the other as desired. Keyed to the driving shaft between the arms of the supporting fork is the driving shaft pulley 14 which in the case shown is a three-step cone.

The lower pulley or intermediate cone 15, which is shown, has four steps. This cone turns on an arbor 16, ball-bearings 17 being interposed to insure its free running. The ends of this arbor are eccentrically mounted in and are keyed to disks 18 rotarily held by the ends of the fork 19 that is attached to and projects downwardly from the back of the column. Sockets 20 are made in the disks for the reception of a spanner wrench. By turning these disks the position of the lower cone can be altered for giving the right tension to the belts. (Figs. 4, 5.)

A post 21 projects horizontally from the back of the column near the top. Fastened on the outer end of this post is a sleeve 22. Loosely mounted in a hub 23 on this sleeve is a disk 24. A handle 25 is attached to the disk for turning it. Eccentrically mounted in this disk is an axle 26, and turning on this axle, ball-bearings 27 being interposed, is the outer pulley or lead idler 28 over which the spindle drive belt leads to

the spindle cone. By turning the handle 25 the axle can be raised or lowered so as to bring the top edge of the lead pulley into line with either step of the spindle cone. (Figs. 6, 7.)

5 The inner pulley or return idler 29 is mounted on an axle 30, ball-bearings 31 being interposed for reducing the friction. This axle is carried by an arm 32 that is 10 pivotally mounted on the stud 33 which is screwed into an arm 41 that extends from the top of the sleeve 34. This sleeve is movable along the post which projects from the back of the column. The arm carrying 15 this return idler swings freely in a horizontal plane so as to allow the idler to aline itself automatically with the outer edge of the particular step of the spindle cone upon which the belt at that time is running. 20 (Figs. 8, 9, 10.) In order to move the return idler so the belt will have the right tension upon the step of the spindle cone upon which it is running, the sleeve 34 is adjusted along the post by means of the 25 screw 35 that passes through a threaded boss 36 projecting from this sleeve, and through a boss 37 that projects from the stationary sleeve 22 which supports the lead idler. A crank handle 38 is provided for 30 convenience in turning this adjusting screw. (Fig. 1.)

An endless belt 39 passes around one of the three steps of the driving shaft cone and the corresponding step of the lower or intermediate cone, depending upon the speed 35 desired. The endless belt 40 passes from the largest step of the intermediate cone, over the outer or lead idler and around the desired step of the spindle pulley, to the 40 inner or return idler, and from this back to the intermediate cone. Three changes of speed are possible by shifting the belt 39 on the various steps of the driving shaft cone and the intermediate cone, and these three 45 changes can be multiplied by two by shifting the belt upon the steps of the spindle pulley. As a result of the various sizes of the pulleys, very high speeds with the necessary power may be imparted to the drill 50 spindle, the outer pulley or lead idler can be instantly adjusted vertically so that its driving face properly alines with the step of the spindle pulley that is to be used, and the inner pulley or return idler, which automatically shifts to aline with the surface 55 of the step of the spindle pulley upon which the belt is running, may be quickly adjusted horizontally toward or from the front of the press in order to permit the changes, 60 while the position of the lower pulley or intermediate cone can be quickly adjusted for giving the belts the necessary tension.

The invention claimed is:

65 1. The combination with a drill column and a drill spindle supported thereby, of a

mechanism for driving the drill spindle comprising a driving shaft supported by the column, a driving pulley and a cone pulley mounted on said shaft, an arbor supported by the column below the driving shaft, a 70 cone pulley turning on said arbor, an endless belt passing around a step of the cone on the driving shaft and a step of the cone on the arbor below, a cone pulley on the drill spindle, a support extending from the back 75 of the drill column, a return idler mounted on and adjustable horizontally along said support, a lead idler mounted on and adjustable vertically at the end of the same support, and an endless belt passing over 80 said idlers and around the pulley on the arbor below the driving shaft and the pulley on the drill spindle.

2. The combination with a drill column and a drill spindle supported thereby, of a 85 mechanism for driving the drill spindle comprising a driving shaft supported by the column, a driving pulley and a cone pulley mounted on said shaft, an arbor eccentrically mounted in bearings supported by the 90 column below the driving shaft, a cone pulley on said arbor, an endless belt passing around a step of the cone on the driving shaft and a step of the cone on the eccentrically mounted arbor below, a cone pulley 95 on the drill spindle, a support extending from the back of the drill column, an idler pulley swiveled upon and adjustable along said support, an idler pulley eccentrically mounted at the end of said support, and an 100 endless belt passing over said idlers and around the pulley on the adjustable arbor below the driving shaft and the pulley on the drill spindle.

3. The combination with a drill column 105 and a drill spindle supported thereby, of a mechanism for driving the drill spindle comprising a driving shaft supported by the column, a driving pulley and a cone pulley mounted on said shaft, an arbor supported 110 by the column below the driving shaft and mounted in eccentric bearings, a cone pulley mounted on said arbor, an endless belt passing around a step of the cone on the driving shaft and a step of the cone on the 115 arbor below, a cone pulley on the drill spindle, a support extending from the back of the drill column, a sleeve adjustable along said support, a screw for adjusting said sleeve along the support, an arm pivotally 120 mounted on said sleeve, an idler pulley carried by said arm, a sleeve located at the end of said support, an eccentric bearing carried by the latter sleeve, an idler pulley 125 mounted on said eccentric, and an endless belt passing over said idlers and around the pulley on the arbor below the driving shaft and the pulley on the drill spindle.

4. The combination with a drill column and a drill spindle supported thereby, of 130

a mechanism for driving the drill spindle comprising a driving shaft supported by the column, a cone mounted on said shaft, an arbor eccentrically mounted on the column
5 below the driving shaft, a cone mounted on said arbor, an endless belt passing around a step of the cone on the driving shaft and a step of the cone on the arbor below, a cone mounted on the drill spindle, a sup-
10 port extending from the back of the drill column, a sleeve movably mounted on said support, a sleeve fixed to said support, a screw supported by said fixed sleeve and
engaging and moving said movable sleeve, an arm pivoted on the movable sleeve, an
15 idler pulley carried by said arm, an eccentric bearing carried by said fixed sleeve, an idler pulley supported by said eccentric bearing, and an endless belt passing over
said idlers and around the pulley on the
20 arbor below the driving shaft and the pulley on the drill spindle.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."