

No. 685,668.

Patented Oct. 29, 1901.

J. W. BROWN, JR.
DRILLING MACHINE.

(Application filed July 13, 1900.)

(No Model.)

2 Sheets—Sheet 1.

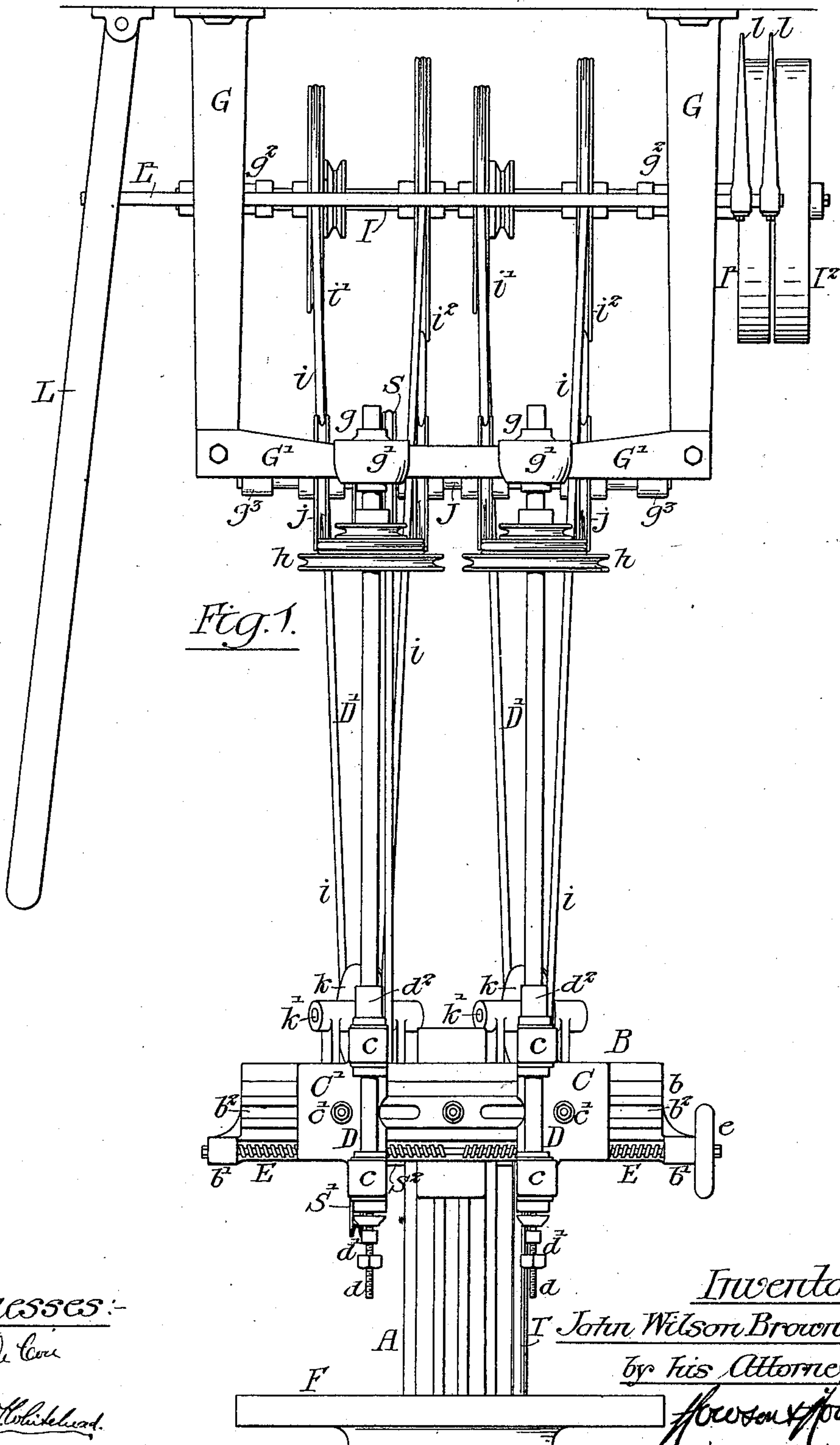


Fig. 1.

Witnesses:-

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Inventor:-

J. John Wilson Brown Jr.

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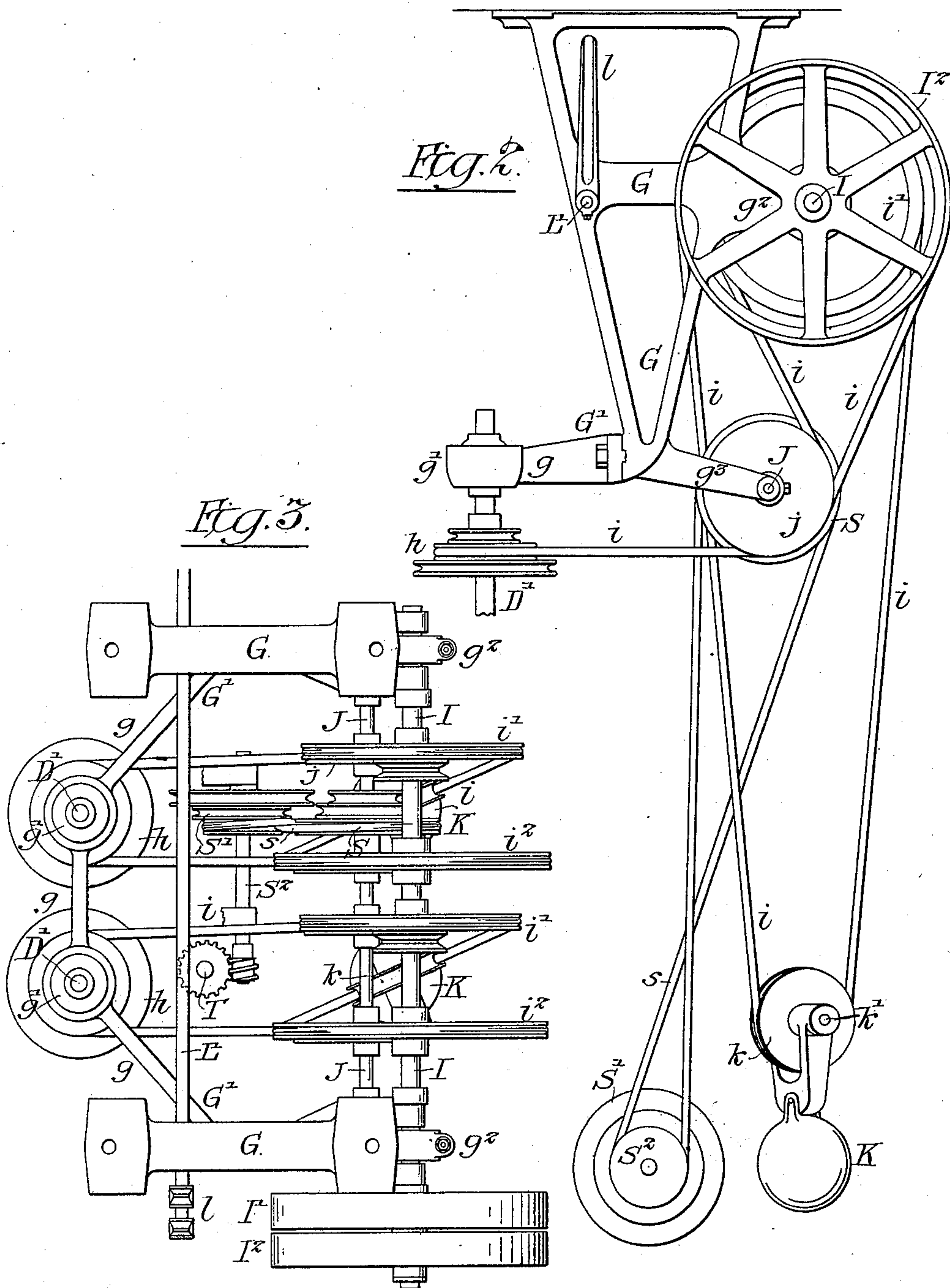
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UNITED STATES PATENT OFFICE.

JOHN WILSON BROWN, JR., OF PHILADELPHIA, PENNSYLVANIA.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 685,668, dated October 29, 1901.

Application filed July 13, 1900. Serial No. 23,513. (No model.)

To all whom it may concern:

Be it known that I, JOHN WILSON BROWN, Jr., a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Drilling-Machines, of which the following is a specification.

The object of my invention is to so construct a multiple drilling-machine that the spindles can be moved toward or from each other without throwing them out of gear with the driving mechanism and to change the speed of either drill-spindle so that when two drills differing in size are used the speed can be so timed that each will properly drill a hole while a table which is common to both drills is fed upward.

In the accompanying drawings, Figure 1 is a front view of my improved drilling-machine. Fig. 2 is a side view showing the driving mechanism and the upper portion of one of the spindles, and Fig. 3 is a plan view of the spindles.

A is the standard, to which is secured the transverse slide-plate B, having guides *b* for the two slides C C', on which are boxes *c c* for the drill-spindles D D.

Mounted in bearings *b'* on the plate B is a screw-shaft E. The screw-thread on one half of the screw is right-handed and the other half left-handed. One section of the screw passes through the box on the slide C and the other through the box on the slide C'. The screw-shaft is provided with a hand-wheel *e* on one end, as clearly shown in Fig. 1.

When the screw-shaft E is turned in one direction, the slides will be moved toward each other, and when the screw-shaft is turned in the opposite direction they will be separated. After the slides are adjusted to the proper position each slide may be fixed by a clamp-screw *c'*, which passes through the slot *b²* in the plate B.

On the end of the spindles are suitable chucks *d'*, by which the drills *d d* are secured to their respective spindles.

F is the table on which the article to be drilled is placed and clamped. Any suitable feed mechanism may be used for feeding the table to and from the drills. In the present instance the feed mechanism shown in Patent No. 518,176, dated April 10, 1894, is used.

The driving mechanism is supported in the

present instance by a framework hung from the ceiling of the room in which the drill is placed.

G G are two hangers secured to the ceiling in any suitable manner. These hangers are connected together by a cross-frame G', having brackets *g g*, in which are ball-and-socket bearings *g'* of any suitable type.

D' represents vertical shafts mounted in the bearings *g'*, and each shaft is coupled to its spindle D by means of a loose joint *d²*. The ball-and-socket bearing *g'* and the loose coupling *d²* allow the slides C C', carrying the spindles D, to be moved toward or from each other without throwing the driving mechanism out of gear.

Mounted in bearings on brackets *g²* of the hangers G is a driven shaft I, having fast and loose pulleys I' I², and fast on the shaft, in the present instance, are grooved cone-wheels *i'* and loose idler-wheels *i²*.

On a shaft J, mounted in bearings on a bracket *g³*, are idler-wheels *j*, and on the vertical shafts D' are cone-pulleys *h*. A belt *i* passes around the driving-wheel *i'*, under an idler *j*, around the cone-pulley *h*, back under another idler *j* to the idler *i²* on the shaft I and around this idler down to a wheel *k*, hung to the spindle *k'*, from which is suspended a tension-weight K. The belt then passes back to the driving-wheel *i*. By this arrangement of the belts I am enabled to drive the spindles independently, and they can be shifted without interfering with the driving mechanism. Furthermore, the cone driving-wheel *i'* having two grooves and the cone-pulley *h* having three grooves six changes in speed can be made by simply shifting the belt, the weight K taking up the slack.

L is a shifting-lever connected to a rod L', carrying belt-shifting arms *l l* for shifting the driving-belts on the wheels I' I². Thus it will be seen that the spindles are independently driven from the driving-shaft I, and the driven shafts D' are so mounted in their bearings and coupled to the drill-spindles in such a manner that the spindles can be moved toward and from each other without interfering with the driving mechanism.

When it is desired to drill two holes in an article simultaneously, all that is necessary is to clamp the article in proper position on

the table, loosen the clamp-screws *c'*, and turn the screw-shaft E so that the drills will be a given distance apart. Then by shifting the driving-belt by the lever L the drills are
 5 set in motion, and by raising the table the drills will drill the holes in the article clamped upon the table at the proper distance apart, so that by this mechanism a number of like articles can be drilled, and when it is desired
 10 to drill different articles in which the holes are at a greater or less distance apart the position of the drills in respect to each other can be changed.

If it is desired to drill one hole a different
 15 diameter from the other, then one of the belts *i* is so shifted that one drill-spindle will be driven at a greater speed than the other and so that the drills will be given their proper speed as the table with the articles is raised,
 20 as it will be understood that two holes cannot be properly drilled simultaneously to the best advantage with the two spindles driven at the same speed.

The drill-spindles and their driving mechanism may be duplicated when it is desired
 25 to drill three or more holes in unison.

I preferably drive the mechanism for raising the table from the same mechanism that drives the spindles, so that if a belt breaks
 30 the feed mechanism will stop as well as the drill. In the present instance I secure to one of the idler-wheels *j* on the shaft J a cone-wheel S, around which passes a belt to a cone-wheel S' on a horizontal shaft S² at the back of the
 35 transverse plate B. This shaft S² is geared by a worm and worm-wheel to a vertical shaft T, which in turn is geared to the mechanism for raising and lowering the table, which is fully described in the Patent No. 518,176,
 40 dated April 10, 1894.

In some instances one of the spindles may be mounted in fixed bearings and the other spindles may be moved toward and from it to obtain the desired spacing without departing from my invention.
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I claim as my invention—

1. The combination of a fixed hanging frame, bearings therein, a transverse slide-plate having guides, a table on which the article to be drilled is placed, two slides mount-
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ed on the plate, a spindle passing through said slides, right and left screw-threads thereon whereby the slides may be moved toward and from each other, a drill carried by each slide, shafts coupled to the spindles of said
 55 drills and carried in the bearings of the said frame and means for driving the shafts, substantially as described.

2. The combination in a drilling-machine, of a fixed hanging frame, bearings therein, a
 60 transverse slide-plate having guides, a table for the articles to be drilled, two slides on the plate, a drill carried by each slide, shafts coupled to the spindles of said drills and carried in the bearings of said frame, a spindle
 65 supported on the plate having on it a right and a left hand thread and passing through a threaded opening in each of the slides, the said spindle being constructed to move the slides toward or from each other when it is
 70 rotated, a cone-pulley mounted on the shaft below the bearing therefor, a driving-shaft and belts passing over the wheels on the driving-shaft and said cone-pulley, substantially as described.
 75

3. The combination in a drilling-machine, of a fixed hanging frame having three sets of bearings, a main shaft carried in one set of said bearings, driving-wheels and idler-wheels carried on said shaft, a shaft carried
 80 by the second set of bearings, having idler-wheels thereon, shafts carrying cone-pulleys hung from the third set of bearings, a drill driven from each of the hanging shafts, said drills being adjustable toward and from each
 85 other, there being for each drill a belt passing from a wheel on the main shaft around an idler-wheel on the second shaft, then to the cone-pulley and to a second idler, then to an idler-wheel on the main shaft to a tension
 90 device, and finally to the original driving-wheel, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN WILSON BROWN, JR.

Witnesses:

WILL. A. BARR,
 JOS. H. KLEINE.