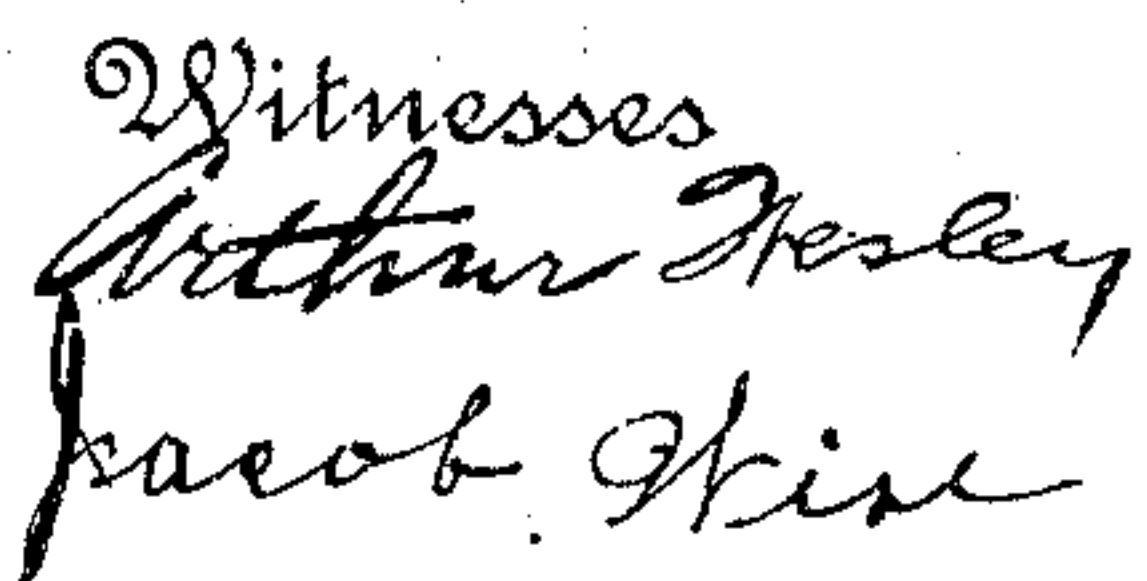


APPLICATION FILED AUG. 2, 1909.

Patented Feb. 7, 1911.

2 SHEETS—SHEET 1.



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983,395.

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DRILLING MACHINE.
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2 SHEETS—SHEET 2.

Fig. 2.

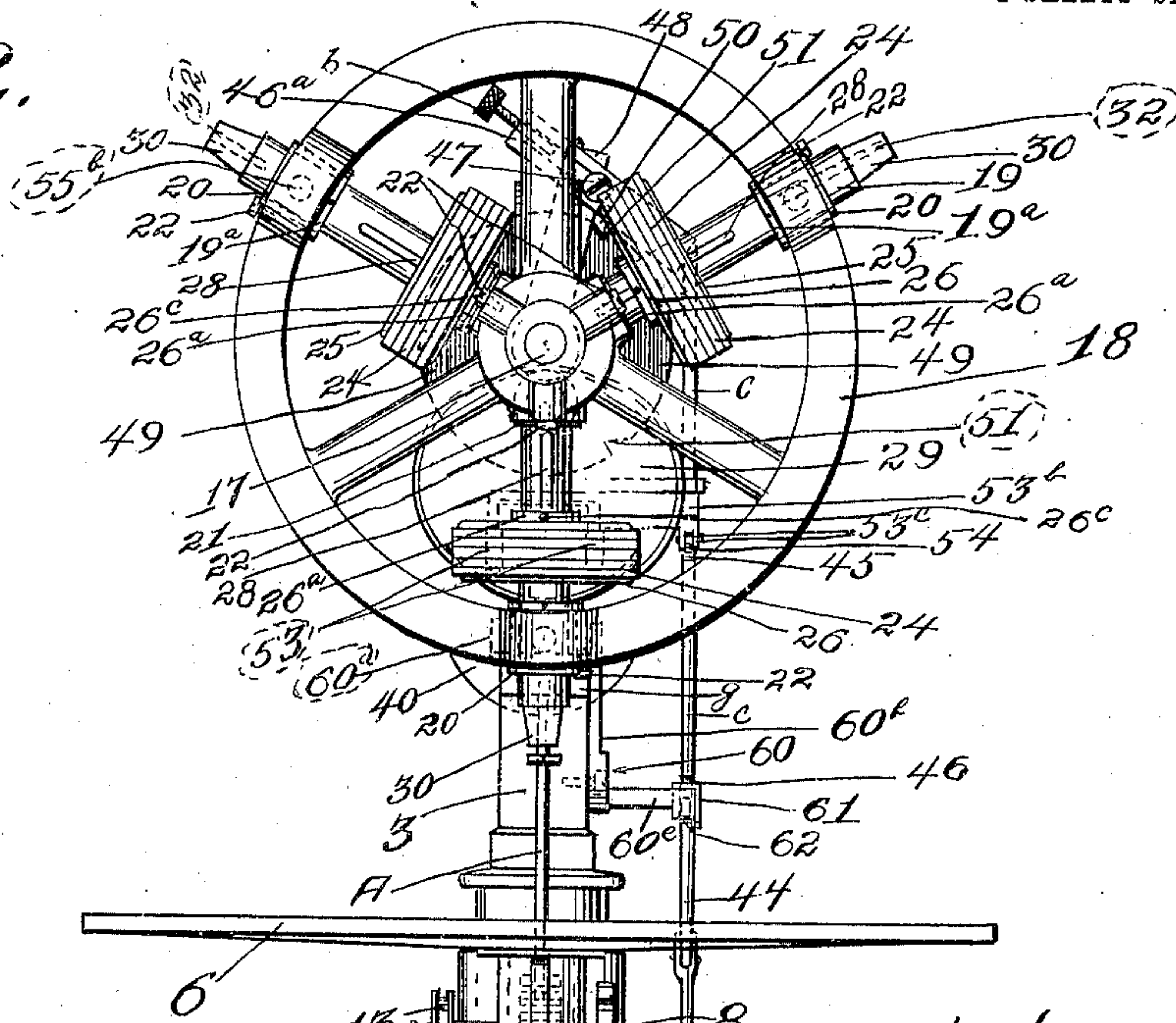


Fig. 5.

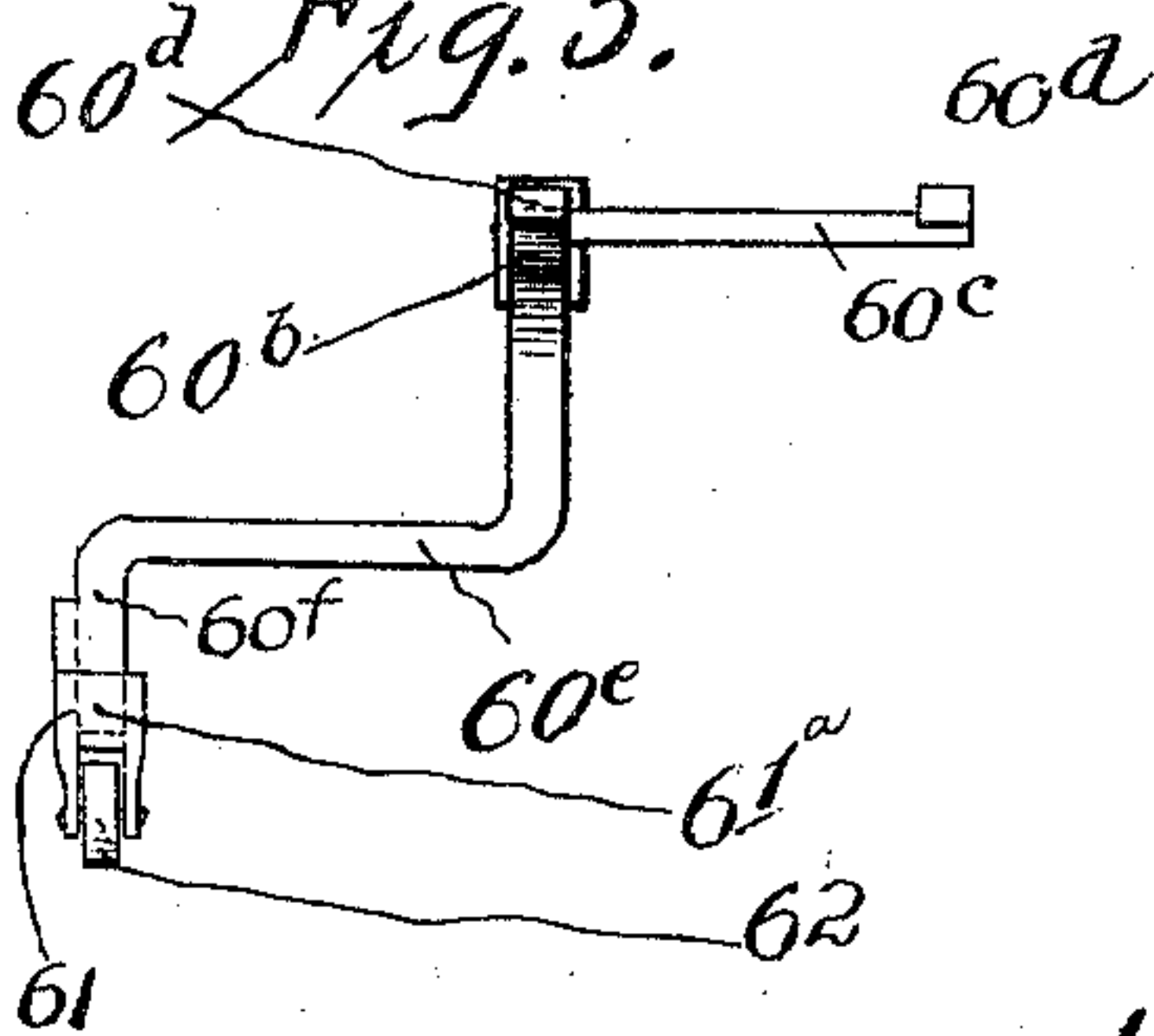
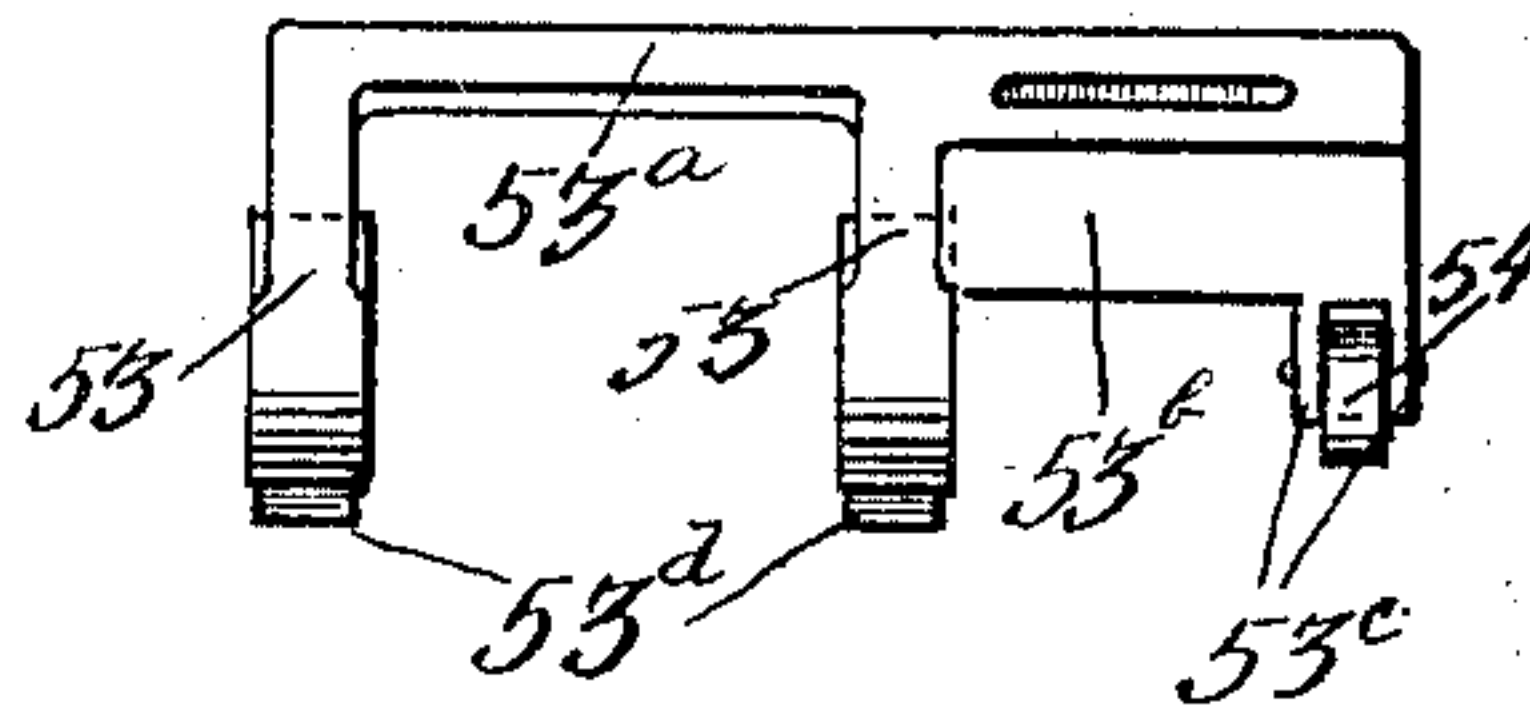


Fig. 6.



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DRILLING-MACHINE.

983,395.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HARLEY ALFRED OGLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Drilling-Machines, of which the following is a specification.

My invention relates to drill presses or machines and more particularly to that class known as turret drills.

The principal object of my invention comprehends the production of a device of the above character having means whereby, by a single operation, the device is thrown out of gear, the turret wheel released or unlocked, and rotated to bring a certain drill above the work holding plate, as well as the relocking of the turret wheel and throwing into gear of the driving mechanism.

A further object of my invention resides in the production of a device of this kind having means whereby any of the drills carried by the turret wheel may be brought into operative position above the work holder without necessitating the stopping of the main driving gear.

A still further object of my invention consists in the production of a device of the above character having frictional driving gearing so arranged that the speed of any of the drill spindles may be varied without stopping the main driving gear.

In the drawings which form a part of this specification and in which like reference numerals designate corresponding parts throughout the several views—Figure 1 is a side elevation of the invention partly in section; Fig. 2 is a front elevation thereof; Fig. 3 is a front elevation of the index wheel showing the means employed for actuating the same; Fig. 4 is a fragmentary sectional view of a part of the turret wheel showing one of the drill spindles mounted therein; Fig. 5 is a top plan view of the means for operating the turret locking pin; Fig. 6 is a front view of the means for breaking the contact between the main driving gear and any of the spindle pulleys. Fig. 7 is an enlarged detail.

Referring specifically to the drawings 1 indicates a base by means of which the machine is mounted on a suitable stand. Formed integral with said base and extending upwardly from about the center thereof is a circular standard or column 2 provided

at its upper end with a casting 3 in which the several parts of my invention are journaled. Clamped around the column 2, at a suitable point thereon, is the inner end of a bracket 4 in the outer end of which is placed the stem 5 of the work holding plate 6. It will be noted by referring to the drawings that the bracket 4 is cast in halves which are united by bolts 7. Passing transversely through the bracket 4 adjacent the rear side of the stem 5 is a sleeve 8 provided with a clutch 8^a. Passing through the sleeve 8 is a shaft 9 around which said sleeve rotates. Fixed to the sleeve 8 is a pinion 10 adapted to engage a rack 5^a fixed on the rear side of the stem 5 whereby when the hand wheel 11 fixed to one end of the sleeve 8 is properly manipulated the work holding table 6 may be adjusted vertically, it being guided in such movement by the post A. I also provide means whereby the vertical movement of the table 6 may be effected by foot power, such means comprising a pulley 12 journaled to the side of the bracket 4, a pulley 13 fixed to the opposite end of the sleeve 8 and a chain 14, indicated by dotted lines in Fig. 2, suitably fastened to said pulley 13 and passing rearwardly over pulley 12 and downwardly to a foot pedal 15. By means of the sleeve 8 and its clutch 8^a it is possible to operate the pinion 10 by the hand wheel 11 without rotating the pulley 13. It will also be noted that the work holding table 6 is so mounted that the rack 5^a will be directly below and on a line with the center of the drill spindles, to be hereinafter referred to, so that no lateral strain will be exerted on the table.

Passing horizontally through boxes formed in the upper end of the casting 3 is a shaft 17 to the forward end of which is fixed the turret wheel 18 in which the several drill spindles 19 are journaled, in tapered split bearings 20 and 21 located in the rim and hub, respectively, of the turret wheel. The bearings 20 and 21 are held in place by set screws 22 one side of the heads of which are adapted to engage in countersunk portions formed in the outer edges of the bearings. It will thus be seen that by tightening the set screws 22 any wear on the bearings 20 and 21 can be readily taken up. As shown in Fig. 4 the bearings 20 are of a length slightly greater than the thickness of the rim of the turret wheel and their inner ends rest against collars 19^a

fixed by any suitable means to the spindles 19. The bores in the hub of the turret wheel extend to the center thereof and the space between the inner ends of the spindles and the shaft 11 is filled with a suitable fiber packing 23. Each of the spindles 19 is provided with a friction pulley or disk composed of several layers of leather 24 clamped between top and bottom plates 25 and 26 respectively, by means of screw bolts 27. The bottom plate 26 is provided with a central portion 26^a, having a central bore 26^b formed therethrough, through which the spindles 19 pass. The upper end of said central portion extends through an opening in the top plate 25 and projects a slight distance beyond said top plate. Passing through one side of the projecting portion of said bottom plate is a set screw 26^c the inner end of which is adapted to rest within a longitudinal groove 28 formed in the front side of the spindle 19. By loosening said screws 26^c the pulleys or disks may be adjusted to come in contact with the main conical driving wheel 29 at different points along its face whereby the speed of the different spindles 19 may be varied to suit the different sizes of the drills carried thereby, and by tightening the screws the pulleys or disks can be held at the desired adjustment.

The outer ends of the spindles 19 project beyond the periphery of the turret wheel a short distance where they each are provided with a tapered portion 30 for the reception of the drill chucks 31. Each of the outer ends of the spindles is also provided with a central bore 32 for the reception of the shanks of the drills.

The periphery of the turret wheel is provided with a groove *f* into which fits the upper end of a plate *g* fastened by suitable screws *g'* to the front of the casting 3, to prevent longitudinal movement of said turret wheel. Mounted in a pocket formed in the casting 3 directly behind the plate *g* is a frictional brake adapted to engage that portion of the rim of the pulley rear of the groove *f*, and held in contact therewith by means of the flat spring *b*.

Mounted in suitable bearing in the casting 3 at an angle of 45 degrees to the turret wheel 18 is the main drive shaft 33 to the forward end of which is fixed the main conical driving wheel 29 the face of which is adapted to normally engage the periphery of the pulley or disk of the spindle adjacent the same. The rear end of this shaft 33 is provided with a collar 34 which is adapted to fit within a barrel 35 screwed to the casting 3 as at 36. Placed within said barrel 35 is a stem 37 having a collar 38 adapted to rest adjacent the collar 34; its outer end projecting through an opening formed in the rear wall of said barrel. The adjacent faces of the collars 34 and 38 are

each provided with ball races in which ball bearings are placed whereby the rotation of the shaft 33 will cause little or no friction between the collars. Placed within the barrel 35 between the under side of the collar 38 and the inside of the rear wall thereof is a coiled spring 39 which tends to normally hold the driving wheel 29 tightly against the friction pulleys or disks of the spindles 19. By this arrangement it will be seen that by screwing up the barrel 35 any wear of the frictional driving mechanism may be readily taken up.

Mounted intermediate the ends of the shaft 33 in an opening 3^a formed in the casting 3 is a pulley 40 over which passes a belt 41, indicated by dotted lines in Fig. 1, and which passes upwardly behind pulleys 42 mounted in suitable bearings in the rear portion of the casting 3, to any suitable power, by means of which motion is imparted to said shaft 33.

Mounted adjacent the right side of the casting 3 and supported in position by brackets 43 is a cam member 44 provided with upper and lower cam faces 45 and 46 respectively, and at its extreme upper end with the slotted member 46^a to which is connected, by means of the screw 47, the arm 48 which is loosely mounted on the shaft 17. Pivoted to the opposite side of the arm 48 is a dog 50 which is adapted to engage the notches 51 formed in the periphery of the index wheel 49 for the purpose of rotating the turret wheel to bring a certain one of the drill spindles 19 above the work holding plate 6, in a manner to be hereinafter described. A spring 52 tends to hold the dog 50 in position to engage the notches 51.

Pivoted to the side of the casting on a line with the center of the shaft 33 and in front of the pulley 40 is the means actuated by the cam member 44 for breaking the contact between the main driving wheel 29 and the pulleys or disks of the drill spindles. As shown in Fig. 6 this means comprises arms 53 which are pivoted at their inner ends to the sides of the casting 3 and are connected at their outer ends by a transverse bar or web 53^a adapted to rest against the upper wall of the space 3^a when in normal position. Extending outwardly from the arm 53 on the left side of the casting 3 is a portion 53^b having formed at its outer end the downwardly extending ears 53^c between which the roller 54 is journaled. Formed on the under sides of the arms 53 slightly forward of the point of pivot are cam faces 53^d which are adapted to engage with the washer 29^a for a purpose to be hereinafter described.

Pivoted to the right side of the casting 3 is the means I employ for withdrawing the locking pin 55 which extends horizontally through the casting 3 between the space 3^a and the inner face of the rim of the turret

wheel, and has a beveled outer end adapted to engage in one of the correspondingly beveled holes 55^b equal in number to the number of spindles, and formed in the inner face of the rim of the turret wheel. Passing transversely through the rear end of the pin 55 is a small rod 55^c against the inner side of which the upper forked end of the means for withdrawing the locking pin, to be hereinafter described, are adapted to rest. Coiled springs 55^d extending forwardly from the rod 55^c on both sides of the casting and connected at their front ends to pins 55^e tend to keep the pin in its normal position, that is, its beveled end within one of the holes 55^b.

The means for withdrawing the pin 55, as will be seen clearly in Fig. 5 comprises a bell crank 60 pivoted to the side of the casting adjacent the lower cam face 46 of the cam member 44, the vertical arm 60^b of which is provided near its upper end with a transversely extending bar 60^c which extends through the opening 3^a and is provided on its opposite end with the finger 60^d. The upper end of the arm 60^b and the finger 60^d form the fork above referred to. The horizontal arm of the bell crank 60 is offset as at 60^e, which is, in turn, offset as at 60^f for the purpose of bringing the same in line with the edge of the cam member 44. The outer end of the offset portion 60^f is provided with a pivoted trip 61 in the forked end of which is mounted the roller 62. The trip 61 is provided with a web 61^a extending across the upper edge of the offset portion 60^f and a coiled spring for normally holding the web 61^a in contact with the upper edge of the offset portion 60^f.

Connected to the extreme lower end of the cam member 44 is a rod 44^a passing through a hole in the base 1 and connected at its lower end to a foot pedal 44^b. Passing around the rod 44 between the upper side of the base 1 and the collar 44^c which is fastened to said rod, is a coiled spring 44^d for returning the cam member 44 to its normal position when the pressure is removed.

The operation of the cam member and the several parts it actuates is as follows: On downward pressure being applied to the foot pedal 44^b the member 44 is moved downwardly and first the upper cam face 45 engages the roller 54 which rocks the arms 53 downwardly, the cam faces 53^d engaging the washer 29^a which causes the shaft 33 to move rearwardly and disengage the main driving wheel 29 from the pulley or disk on the drill spindle. On the continued downward movement of the member 44 the lower cam face 46 engages the roller 62 which causes the rocking of the bell crank 60 and the withdrawing of the beveled point of the locking pin 55 from the hole 55^b, thus unlocking the turret wheel. On the still

further downward movement of the member 44 the set screw 7 in the slotted member 46^a will engage the screw 47 and swing the arm 48 to the right, causing the dog 50 carried thereby to engage one of the notches 51 of the index wheel 49 thereby shifting the turret wheel to the right to bring a certain drill into operative position above the work holding plate. During this operation the rollers 54 and 62 will ride along the straight faces *c* of the cam member until the stroke of the arm 48 is complete when the roller 62 will enter the upper cam face 45 and allow the locking pin 55 to return to its normal position, that is, to lock the turret wheel. The pressure on the foot pedal 44^b is then removed and the spring 44^d will cause the cam member 44 to move upwardly and return to its normal position. As soon as said cam member 44 begins its upward movement, the trip 61 on the bell crank 60 will tilt upwardly and allow the roller 62 to move downwardly along the upper straight face *c* of the cam member 44, without moving the bell crank, until the lower cam face 46 is reached, when said trip will return to its normal position. At the same time this happens, the roller 54 will have moved downwardly along the upper straight face *c* of the cam member 44 and entered the upper cam face 45. This will allow the arms 53 to swing upwardly and will permit the spring 39, within the barrel 35, to move the shaft 33 forwardly and will also permit the driving wheel 29 to engage the friction pulley of the drill spindle. The cam member 44 moving upwardly will also swing the arm 48 upwardly until the dog 50 engages the next notch 51 in the index wheel 49.

While I have only shown three drill spindles it will be understood that as many as desired may be used without departing from the spirit of my invention.

I claim—

1. In a drilling machine, the combination of a vertically arranged turret wheel having a plurality of drill spindles mounted therein bearings located in the hub and rim of said turret wheel, and a frictional pulley adjustably mounted on each of the spindles between the hub and rim of the turret wheel, a main driving wheel mounted at an angle to said pulleys, and adapted to operate the same.

2. In combination a turret wheel for drilling machines having a plurality of drill spindles mounted in bearings in the hub and rim thereof, means to take up the wear on said bearings, and friction pulleys mounted on the spindles and provided with means for adjusting the same thereon to vary the speed of the different drills.

3. In a drilling machine, the combination of a column having a casting formed on its upper end, a horizontal shaft mounted in

bearings located in said casting, a turret wheel fixed to one end of said shaft, and a yieldably supported drive shaft mounted at an angle to said turret wheel and provided
5 with a conical driving wheel, and a suitable pulley by means of which motion is imparted thereto.

4. In a drilling machine, the combination
10 of a vertically mounted turret wheel having a plurality of drill spindles carried thereby, each having a friction pulley adjustably mounted thereon a yieldably supported shaft mounted at an angle to said turret wheel and a main driving cone fixed to one
15 end of said shaft, and adapted to normally engage one of said friction pulleys to impart a rotary motion to the drill spindle, and means for releasing the turret wheel and breaking the contact between the main
20 driving wheel and the friction pulley, and rotating the turret wheel to bring a certain one of the drill spindles into operative position above the work holding plate.

5. In a drilling machine, the combination
25 of a column having a casting formed thereon, a horizontal shaft mounted in bearings in said casting and a turret wheel fixed to one end thereof and having a plurality of drill spindles, and an index wheel fixed to
30 its opposite end and provided with a plurality of notches equal in number to the number of drill spindles, and a swinging arm mounted adjacent the index wheel and having a dog pivoted to its upper end, and
35 means connected to said arm whereby it may be swung to cause the dog to engage one of said notches to rotate said index wheel and thereby the turret wheel.

6. In a drilling machine, the combination
40 of a turret wheel, and a main conical driving wheel having its shaft yieldably supported, a locking pin adapted to normally rest in one of a series of apertures formed in the inner face of the turret wheel, to
45 lock said turret wheel, an index wheel fixed

to the opposite end of the shaft of the turret wheel, and a cam member mounted adjacent one side of the machine and adapted to actuate means for withdrawing the locking
50 pin from the apertures in the inner face of the turret wheel, means to move the main driving wheel rearwardly, and means to rotate the index wheel, all of said means being actuated by a single operation of the cam member. 55

7. In a drilling machine, the combination of a turret wheel having a plurality of drill spindles mounted therein, a main driving wheel located at an angle thereto, a cam member mounted adjacent the side of the
60 machine and having a pair of cam faces adapted to actuate members pivoted to the side of the machine when said cam member is moved downwardly, to unlock the turret wheel, and to throw the driving wheel out
65 of contact with the friction pulleys, and a slotted link pivoted to the upper end of the cam member for actuating means to rotate the turret wheel, and a spring for returning said cam member to its normal position. 70

8. In a drilling machine of the character described, a cam member mounted adjacent the side thereof and having a pair of cam faces formed thereon, members pivoted to the side of the machine and having rollers
75 journaled in their outer ends, said rollers adapted to be engaged by the said cam faces on the downward movement of the cam member, a foot pedal a rod connecting said cam member to said foot pedal and a spring
80 around said rod to return said cam member to its normal position when pressure on the foot pedal is released.

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

HARRY ALFRED OGLE.

Witnesses:

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