

W. P. BRETT.
DRILLING MACHINE.

No. 540,630.

Patented June 11, 1895.

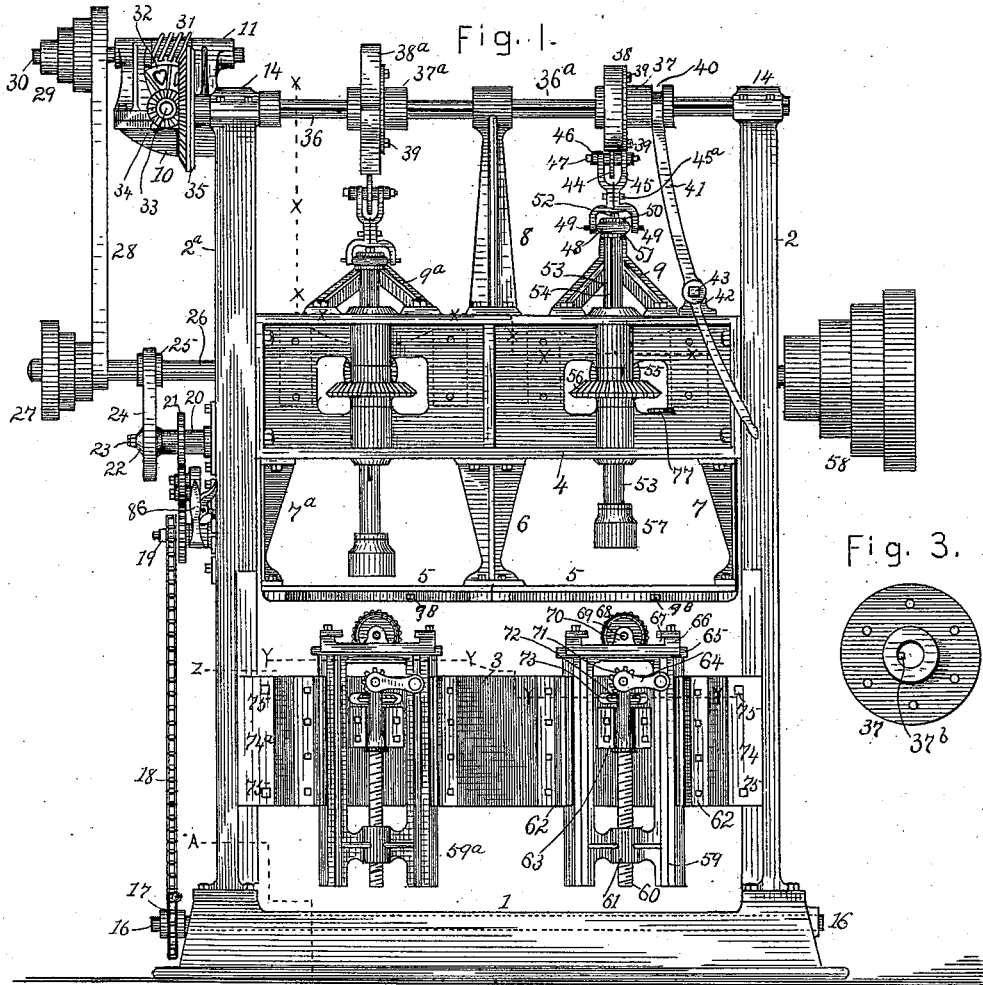


Fig. 3.

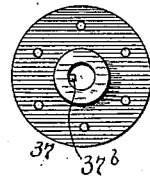
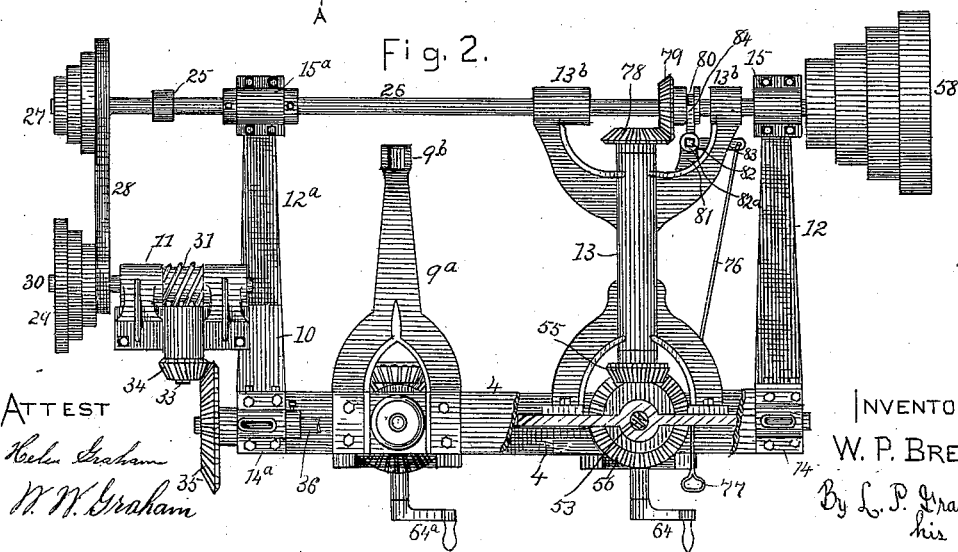


Fig. 2.



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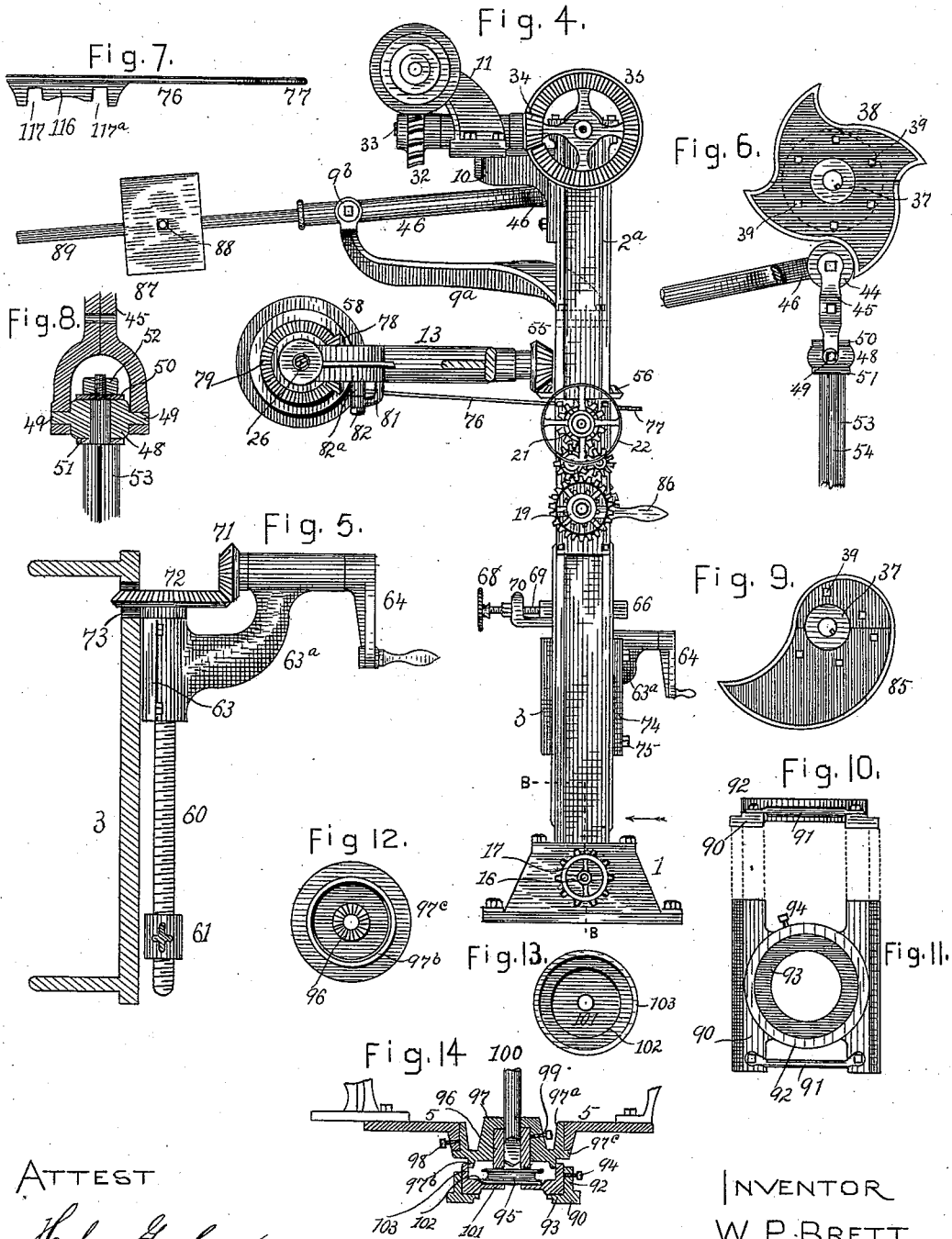
(No Model.)

3 Sheets—Sheet 2.

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Fig. 15.

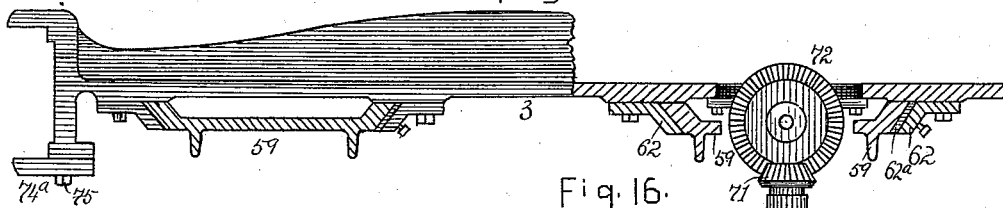


Fig. 16.

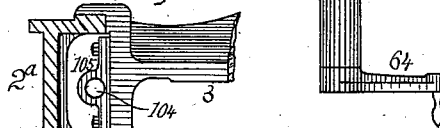


Fig. 17.

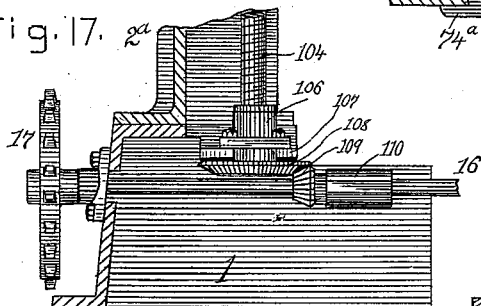


Fig. 18.

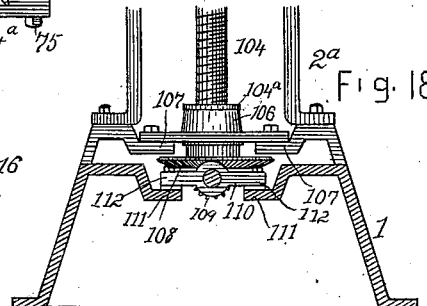


Fig. 19.

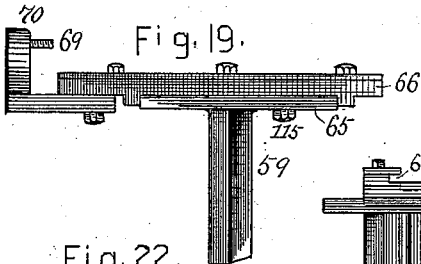


Fig. 21.

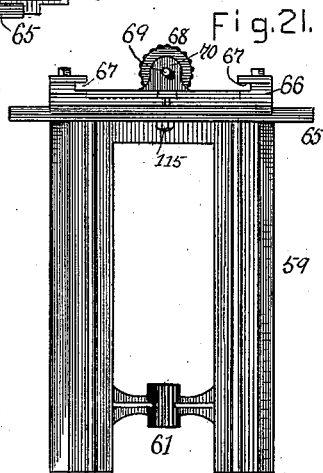


Fig. 20.

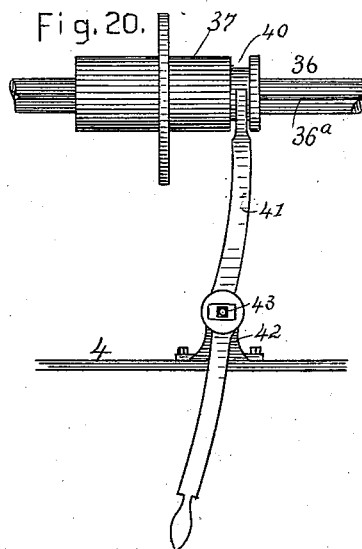


Fig. 22.

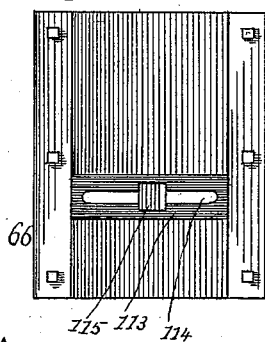
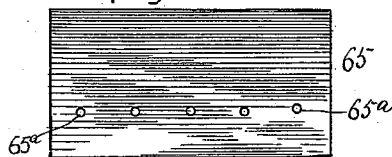


Fig. 23.



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UNITED STATES PATENT OFFICE.

WILLIAM P. BRETT, OF DECATUR, ILLINOIS.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 540,630, dated June 11, 1895.

Application filed September 27, 1890. Serial No. 366,367. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. BRETT, of Decatur, in the county of Macon and State of Illinois, have invented certain new and useful Improvements in Drilling-Machines, of which the following is a specification.

This invention relates to drilling machines and consists in the details of construction and combinations of parts hereinafter set forth and claimed.

In the drawings accompanying and forming a part of this specification, Figure 1 is a front elevation of a machine embodying my invention. Fig. 2 is a plan of such machine with some parts omitted and others shown in section on line X in Fig. 1. Fig. 3 is a face view of a flanged and splined sleeve. Fig. 4 is a side view of the machine with some parts omitted. Fig. 5 is a side elevation of mechanism used for raising and lowering the platens of the machine. Fig. 6 is a side elevation of the automatic feed mechanism and its connection with the upper end of a drill-spindle. Fig. 7 is a side view of a portion of the lever used in starting or stopping one spindle independent of the others. Fig. 8 is a vertical section through that part of the feed mechanism that connects with the upper end of the spindle. Fig. 9 is a face view of a modified form of feed-cam. Fig. 10 is a front view of an auxiliary sliding platen for holding special jigs, and Fig. 11 is a plan of the same. Fig. 13 is a plan of a special jig shaped to hold circular objects and adapted to the auxiliary platen shown in Figs. 10 and 11. Fig. 12 is a view of the lower surface of a circular casting that acts as a holder for the bush that guides the drill, that guides the jig to position, and that coacts with the jig to chuck the object to be drilled. Fig. 14 is a vertical section of the mechanism that guides the drill and holds the article to be drilled. Fig. 15 is a section on dotted line Y in Fig. 1, the object being to show details in the mechanism for raising and lowering drill-platens, and parts not necessary to that result being omitted. Fig. 16 is a section on dotted line Z in Fig. 1. Fig. 17 is a section on dotted line B in Fig. 4, and Fig. 18 is a section on dotted line A in Fig. 1, the three figures last named showing details in the mechanism used to raise and lower the common support of the different platens.

Fig. 19 is a side view of a portion of a platen and guides. Fig. 20 is an elevation of the clutch of the cam shaft. Fig. 21 is a front view of a platen with lower guide-extension complete. Fig. 22 is a plan of a platen or guide block having lateral adjustment on the head-plate shown in plan in Fig. 23. Fig. 23 shows enlarged details of the mechanism used for disconnecting a drill-actuating cam from a drill-spindle.

The base or bed plate is indicated by reference numeral 1.

2^a, 2 are the posts that form the supports for the machine.

3 is the platen carriage.

4 is the spindle cross frame.

5 is a cross plate that acts as a drill guide and also coacts with the platens to clamp the work.

6 is a bracket that supports plate 5 centrally. 7 and 7^a are side supports for such plates.

8 is a supporting bracket for the cam shaft.

9 and 9^a are brackets that provide bearings 9^b for the weighted arms used to raise the spindles.

10 and 11 are brackets that provide bearings for the intermediate gearing connecting the main shaft with the cam shaft.

12 and 12^a are arms or brackets that extend rearwardly from the posts and provide supports for the main shaft.

13 is one of a pair of brackets that extend from the cross head to the main shaft and provide bearings for shafts which connect the main shaft with the spindles.

14 and 14^a are boxes for the cam shaft.

15 and 15^a are the boxes for the main shaft.

16 is a shaft that extends through the bed plate.

17 is a sprocket wheel on shaft 16.

18 is a chain belt that connects wheel 17 with wheel 19. The wheel 19 receives motion through ordinary lathe shifting gear from wheel 21.

20 is a sleeve on which gear wheel 21 and band wheel 22 are mounted.

23 is the shaft on which sleeve 20 revolves.

24 is a belt that connects wheel 22 with pulley 25 on the main shaft 26.

27 is a cone pulley on the main shaft.

28 is a belt that runs on pulleys 27 and 29.

- 30 is the shaft of pulley 29, which shaft has bearings in bracket 11.
- 31 is a worm on shaft 30 meshing with worm wheel 32 on shaft 33. The shaft 33 has bearings in bracket 11 and it carries pinion 34 in addition to worm wheel 32.
- 35 is a gear wheel on cam shaft 36 meshing with pinion 34. The cam shaft has the key way 36^a.
- 37 is a flanged sleeve mounted on the cam shaft and having a spline adapted to the key way thereof, as seen in Fig. 3.
- 37^a is another flanged sleeve similarly constructed.
- 38 and 38^a are cam wheels secured to the flanges of the sleeves by bolts 39.
- 40 is a groove in sleeve 37 adapted to receive the forked end of lever 41.
- 42 is a bracket that provides a pivotal bearing for lever 41, and 43 is a bolt that acts as the pivot and secures the lever to the bracket.
- 44 is a roller on which a cam acts.
- 45 is a link that carries the roller and connects pivotally with the upper end of a drill spindle.
- 46 represents the forked end of a weighted lever that raises the spindle.
- 47 is a bolt extending through the upper end of the link and furnishing a bearing for both the roller 44 and the lever 46.
- 48 is a head swiveled on the spindle and having trunnions 49, 49 on which the link pivots.
- 50 and 51 are washers, the one above and the other below the head, and 52 is the nut that secures the head on the spindle.
- 53 is the drill spindle, or one of them, and it has the key way 54, the chuck 57 and the gear wheel 56.
- 58 is the power receiving pulley of the main shaft.
- 59 is a platen-bearing frame having vertical motion in guides 62 and provided with threaded block 61.
- 59^a is a duplicate of 59.
- 63 is a bracket secured to the platen carriage. 64 is a crank shaft having a journal bearing in such bracket.
- 71 is a gear wheel on the crank shaft.
- 60 is a screw shaft that acts in block 61 to raise and lower the platen, and 72 is a gear wheel on the screw shaft that occupies space 73 in the platen carriage and meshes with wheel 71 of the crank shaft.
- 65 is a head of a platen.
- 66 is a guide block having lateral adjustment on head 65, and 67, 67 are guide ways in the block.
- 68 is a finger wheel by means of which the threaded guide pin 69 is adjusted with reference to the guide block, and 70 is the bearing for the shaft of the finger wheel.
- 74, 74 are plates on the platen carriage that are clamped against the posts by bolts 75 thus securing the carriage at any desired elevation.
- Gear wheel 79 on the main shaft has the groove 80 and it meshes with wheel 78 and conveys through such wheel and gearing 55, 56, motion to the drill spindle.
- A projection 81 on bracket 13 provides a bearing 82 for the pivot 82^a of the bell crank lever 83. One arm 84 of the lever is forked and engages the groove of wheel 79. The other end connects with rod 76 which extends through an opening in the cross head and terminates in handle 77.
- In Fig. 9, 85 represents a modified form of cam.
- 86 in Figs. 1 and 4 represents the lever of the shifting gear.
- 87 in Fig. 4 is the weight, or one of them, used to automatically raise a drill spindle. 88 is the securing bolt or set screw for the weight, and 89 is the lever extension on which the weight may be adjusted.
- 90 in Figs. 10, 11 and 14 represents a jig holder adapted to the guide block 66.
- 91 is a handle for removing the holder from and replacing it in the guide block.
- 92 is a vertical guide for the jig.
- 93 is a horizontal support for the jig, and 94 is a set screw to hold the jig in place.
- 95 is a pulley held in the jig and subjected to the drill.
- 96 is a bush corrugated in its under surface to engage the work.
- 97 97^a is a form in which the bush is held by set screw 99 and which is held in plate 5 by set screw 98. It has the horizontal ledge 97^c which bears upward against the plate, and the vertical ledge 97^b that forms a guide for the jig.
- 100, in Fig. 14, represents a drill point.
- 101 represents a jig adapted to circular objects, 102 being the guide bearing.
- 103 is part of the jig that fits over the ledge 97^b of form 97.
- 104, Fig. 17, is a vertical screw shaft one of which extends up the inside of each post and acts on the platen carriage 3. The gear wheel 109 on shaft 16 meshes with wheel 108 and so imparts motion to shaft 104. Boxing 106 supports the shaft and it rests on ledge 107 of the bed plate.
- 110 is a box for shaft 16, and it has extensions or ribs as seen in Fig. 18 that rest on ledges 111.
- The plan of the guide block shown in Fig. 22 represents the bolt 115 by which the block is held in position, the recess 113 for the bolt head, and the slot 114 for the bolt.
- In Fig. 23 bolt holes in head 65 are shown at 65^a.
- In Fig. 7 rod 76 is shown provided with block 116 having notches 117 and 117^a.
- In operation the guide block 66 is suitably adjusted on the head 65, the carriage 3 is elevated or lowered to suit the work, the article to be drilled is placed in a special jig which is secured in the holder or auxiliary platen 90, Fig. 10, and such holder is shoved into the guide block as far as the previously adjusted stop 69 will permit. Crank shaft 64 is then turned and the platen raised until the ledge

103, Fig. 14, of the jig encompasses ledge 97^b of platen form 97 and the work is gripped between the jig and the bush 96. During the time that the work has been secured in the machine the cam has permitted the weighted lever to raise the spindle and drill, and the cam is so constructed with reference to the time consumed in placing the work that as soon as the jig holder is in place and the work properly clamped the drill begins to operate. The different cams on the shaft are arranged to feed the drills at different times, so that while one drill is in operation the other may be supplied with work. In case a number of articles are to have each a single hole the guide blocks are adjusted on the heads each in the same manner and the stops 69 are similarly set. In case the articles require two holes, one guide block and stop is adjusted to one hole and the other guide block and stop is adjusted to the other hole, and the work is subjected first to one drill and then to the other without being removed from the jig.

The cams may be constructed to feed fast or slow and to any required depth, and their time of feed may be regulated by adjusting them on flanges 37.

If at any time it should be desirable to dispense with the use of a drill spindle, a cam may be made inoperative by means of lever 41, Fig. 1, which may be used to slide the cam out of line with the drill, and the rotation of the spindle may be suspended by drawing wheel 79 from contact with wheel 78, the rod 76 and lever 83 being used for that purpose.

During the operation of the machine the shifting gear used to convey motion to the platen carriage is disconnected. When a change of work makes it necessary to raise or lower the carriage the bolts 75 are loosened and the shifting gear connected in a manner

to raise or to lower the carriage as may be desired.

The two spindles shown explain the principle of my invention but in actual use there are several spindles operated in regular succession by an arrangement of cams on the cam shaft.

I claim—

1. In drilling machines, the combination of a drill spindle, a work holder movable toward and from the spindle, and an intermediate plate adapted to coact with the work holder in clamping the work and having a guide bush for the drill and guide projections for the work holder, substantially as set forth.

2. In drilling machines, the combination of the posts 2, 2^a, the spindle frame 4, the camshaft 36 above the spindle frame, the adjustable platen carriage 3, the platens 65, movable on the carriage, and the drill-guiding and work-clamping plate 5 between the platen carriage and the spindle frame, substantially as set forth.

3. In a drilling machine, the combination of a set of drill-stocks 57, a work-holder guide block 66, for each drill-stock, having lateral adjustment on platen heads 65, said platen heads, adjustable stops 69 in guide blocks 66, and a work-holder, as 90, adapted to be slid into the different guide blocks and against the different stops, substantially as set forth, whereby several holes may be successively drilled in one piece of work by different drills without removing the work from the holder.

In testimony whereof I sign my name in the presence of two subscribing witnesses.

WILLIAM P. BRETT.

Attest:

H. P. PAGE,
W. GRAHAM.