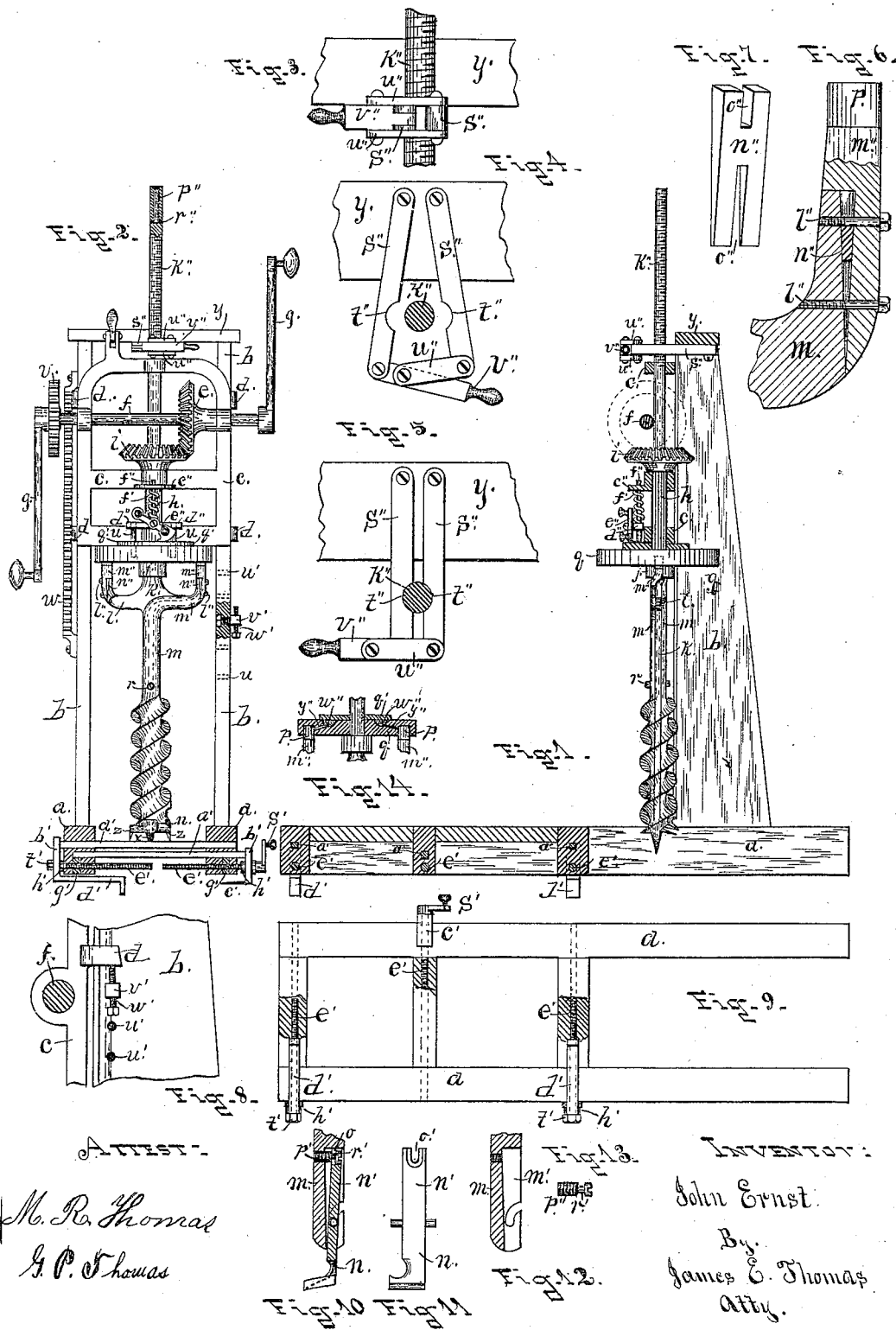


J. ERNST.
BORING MACHINE.

No. 342,688.

Patented May 25, 1886.



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Fig. 15.

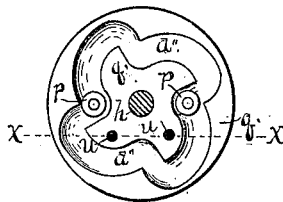


Fig. 16.

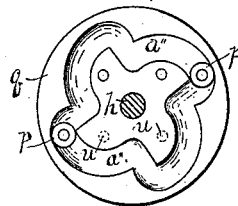


Fig. 17.

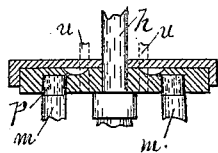


Fig. 18.

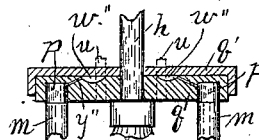


Fig. 19.

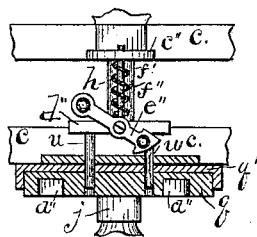
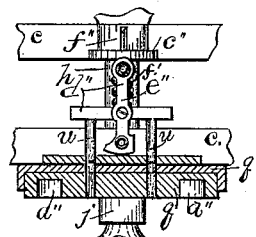


Fig. 20.



Attest:

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UNITED STATES PATENT OFFICE.

JOHN ERNST, OF BAY CITY, MICHIGAN.

BORING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 342,688, dated May 25, 1886.

Application filed September 28, 1885. Serial No. 178,396. (No model.)

To all whom it may concern:

Be it known that I, JOHN ERNST, a citizen of the United States, residing at Bay City, in the county of Bay and State of Michigan, have
5 invented certain new and useful Improvements in Boring-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to
10 make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to certain new and useful improvements in the construction of boring-machines, and is especially designed as an improvement upon the Letters Patent granted to me August 7, 1885, No. 324,100.

This improvement consists, first, in the construction and arrangement of a device for clamping the machine to the timber; second, in an improved means of adjusting the oscillating cutters; third, in the arrangement and location and mode of driving the feeding-screw, and in the construction of the open nut for the same; fourth, in the attachment of a suitable device for stopping the tool from cutting after a required depth of hole shall have been reached, all the other parts of the mechanism being constructed substantially the same as described in the above-mentioned patent.

In the drawings, Figure 1 is a side view, partly sectional, of a machine embodying my invention. Fig. 2 is an end view of the same. Figs. 3, 4, and 5 are enlarged detached views of the open nut. Figs. 6 and 7 are enlarged views of a detached portion of the oscillating lever and wedge for adjusting the same. Fig. 8 is an enlarged view of the stop shown in Fig. 2. Fig. 9 is a view of the under side of the frame, showing the clamping device. Figs. 10, 11, 12, and 13 are enlarged views of the cutter and a portion of the lever carrying the same. Fig. 14 is a section of the cam-plate. Fig. 15 is a view of the under side of the cam-plate, showing the bolts holding the plates rigid. Fig. 16 is a view of the same with the bolts withdrawn. Fig. 17 is a section of Fig. 15. Fig. 18 is a section of Fig. 16. Fig. 19 is a section at *x x*, showing bolts holding the cam-plates rigid. Fig. 20 is the same, showing the bolts withdrawn for allow-

ing the cam-plates to revolve with the boring-tool.

a represents the bed-pieces of the machine, 55 and *b* the vertical standards carrying a gate, *c*, which is held in position by the hooked lugs *d*, which engage with suitable slides on the front edge of the standards *b*. The horizontal shaft *f* is supported by the gate in proper boxes, and carries the gear-wheel *e* on its central portion, while at the ends are provided suitable cranks, *g*, with which to propel the machine. A vertical shaft, *h*, is placed in the central part of the gate *c*, and properly secured in vertical bearings, and to the lower end, below the gate, is the socket *j*, which is attached to the upper end of the boring-tool, and to the upper end of the shaft *h* is attached a gear-wheel, *i*, which intermeshes with the wheel *e*, the teeth in each being placed slightly skewing or diagonal to allow a shaft, *k'*, to pass the shaft *f*. This shaft *k'* is secured to or is an extension of the shaft *h*, and is provided on its upper portion with a suitable screw-thread, which operates to propel the tool into the timber. An open nut consisting of the levers *s''*, which are placed with one end pivoted to the under side of the cross-piece *y* and extending forward on opposite sides of the screw *k''*, is provided with recesses *t''*, which are threaded to engage with the screw *k''*, and at their outer ends are pivoted the one to one end of the lever *v''* and the other to one end of the strap *u''*, the opposite end of the strap being also pivoted to the lever *v''*, in the manner shown in Figs. 3, 4, and 5, so that when the lever *v''* is placed in one position the nut will be closed upon and in engagement with the screw *k''*, and when in another position (shown in Fig. 4) the levers *s''* will be thrown apart and the screw will revolve without engagement, and be free to allow the tool to be withdrawn from the hole which it has bored.

By forming the feeding-screw *k''* upon the upper portion of the shaft *h* the machine is rendered much more simple and complete than with the construction described in the said Patent No. 324,100, granted to me, besides, being located directly above the work, a large amount of side push and friction is avoided.

In the upper end of the feeding-screw *k''* is arranged an oil-chamber, *p''*, having at the

bottom thereof the outlets r'' , through which the oil may pass, lubricating the feed-screw k'' , and, reaching the gear-wheel i , it spreads out and lubricates the teeth of the wheels i and e , and passing below reaches the cam-plate q , where an oil-chamber, w'' , retains and conducts the lubricant to the cam-groove a'' , where the rollers are lubricated, and the surplus oil follows the arms m and lubricates the lower portions of the boring-tool.

In order to make an adjustment for the cutters n in a side direction, I divide the upward-extending arm of the lever m in the manner shown in Fig. 6, the portion m'' carrying the roller p being secured to the part m by the bolts l'' , a slotted wedge, n'' , being placed between the parts m and m'' , and held in position by the bolts l'' passing through the slots o'' , so that when the bolts are loosened the wedge will slide downward, moving the part m'' outward to the required distance, when the bolts can be turned to hold the parts again firmly together. This adjustment of the parts m'' outward causes the cutter n to reach farther outward with a side movement, so that should the cutter become worn away on its side it can be adjusted by the above means to cut the hole to the required size in one direction.

At the lower end of the lever m , and on the under side thereof, is provided a chamber or recess, m' , into which is placed the upward-extending shank n' of the cutter n . Curved slots l' are arranged in the lever m at the sides of the recess, into which rests the pivots i' , which project from the sides of the shank n' , and at the upper end of the shank n' is arranged a slot, o' , into which passes the reduced part r' of the screw p' , the shank n' being recessed for receiving the head of the screw which is screwed into that portion of the lever beneath the recess m' , and by means of this screw p' the shank n' may be moved outward or inward as required, and the pivots i' , holding the center of the cutter in rigid position, the shank n' is tilted, and the cutting-edge is adjusted to reach forward as the cutter becomes worn away.

Through the bed-pieces a , and across the machine, is placed the guide-bar a' , having at its outer end rigidly attached the clamping-piece b' , which extends downward to a short distance below the bottom of the bed-pieces a , and is then turned inward and provided with a wedge-shaped end, c' , to catch into the timber, or with a turned end, d' , which bears against the side of the timber. A clamping-screw, e' , passes through the part b' and through one of the bed-pieces a , a nut, g' , being arranged in the bed-piece which engages with a screw, a jam-nut, h' , being placed on the screw just inside of the piece b' , and a crank, s' , or a square head, t' , is attached to the outer end of the screw with which to revolve the same.

I place on one side of the machine two of the above-described clamping devices, having the clamping-pieces d' extending below the bed-

pieces a , and on the other side one having the end c' . The parts d' are adjusted to bear against the timber when the boring-tool is in a proper position, and then the crank s' is operated to force the part c' into the timber, the part c' reaching in and catching onto an irregular surface and rigidly holding the machine in position.

As shown in Figs. 2 and 8, one of the standards b is provided with holes u' , into one of which is passed the screw-threaded shank x' of a stop, v' , a nut upon the shank holding it firmly in position, and an adjusting-screw, w , is passed through the outer portion of the stop in such a manner that when the gate c travels downward one of the projecting lugs d will catch upon the end of the screw w' and stop the downward movement of the gate and boring-tool. The gear-wheel v is then moved to engage with the rack w , and the gate is raised to its former position, so that several holes can be bored to the same depth into the timber.

At the bottom or under side of the gate c is arranged a rigid projecting plate, y' , beneath which, with the shaft h passing through their centers, are placed the cam-plates q and q' , the plate q being provided on its under side with the groove a'' , and holes are provided through the plate y' , and also through the cam-plates q and q' , into which is passed the bolts u , the upper ends of which are secured to a cross-piece, d'' , and an upward-extending rod, f'' , is secured by its lower end to the cross-piece d'' and passes through a projecting part, c'' , of the gate c , and a spring, f' is coiled around the rod f'' and arranged with its upper end bearing against the part c'' and its lower end bearing against the cross-piece d'' , so that the bolts u will be pushed into the holes in the cam-plates. A prop, e'' , is pivoted to the cross-piece d'' , and arranged so that when in a vertical position the end of the prop will bear upon the cam-plate q' and lift the bolt u from engagement with the cam-plate q , and allow the cam-plate q to revolve with the boring-tool, when a round hole will be produced.

I claim—

1. In a boring-machine, the combination, with the bed-pieces a , and a clamping-arm, d' , secured to the bed-pieces, of a guide-bar, a' , passed through the said bed-pieces, a clamping-piece, b' , attached to the outer end of the guide-bar and provided with an inward-extending end, c' , a clamping-screw, e' , passed through the said piece b' , and provided with means of revolving the same, as described, a nut, g' , upon the screw and secured to the bed-piece a , all operating substantially as described, and for the purpose set forth.

2. In a boring-machine, the combination, with the oscillating lever m , having at its lower end and under side the chamber m' , and recesses l' on the sides of the chamber, of the cutter n , having the upward-extending shank n' , adapted to fit into the said chamber, the

pins *i'*, projecting from the sides of the shank and resting in the recesses *l'*, a slot, *o'*, in the upper end of the shank, and a screw, *p'*, provided with the groove *r'*, resting in the slot *o'* and passing into the lever *m*, substantially as and for the purpose set forth.

3. In a boring-machine, a horizontal crank-shaft and a vertical auger-shaft situated in a different vertical plane from and geared to the crank-shaft, and having its upper portion, *k''*, extending above the crank-shaft and provided with a screw-thread, and the levers *s''*, pivoted to the upper cross-piece, *y*, and extending on opposite sides of the shaft *k''*, and provided with the screw-threaded recesses *l''*, in combination with the lever *v''*, pivoted by one end to the outer end of one of the levers *s''*, and the strap *u''*, pivoted by one end to the lever *v''* and by their opposite ends to the outer end of the other lever *s''*, substantially as and for the purpose herein set forth.

4. In a boring-tool, the combination, with the lever *m*, of the upward-extending part *m''*, secured to the upper part of the said lever by the bolts *l''*, and the adjusting-wedge *n''*, placed between the said parts *m* and *m''*, substantially as and for the purpose set forth.

5. In a boring-machine, the gate *c*, having the plate *q'* rigidly attached to the bottom part thereof, and the cam-plate *q*, located just be-

neath the said plate *q'*, and provided on its under side with the cam-groove *a''*, in combination with the bolts *u*, secured by one end to the cross-bar *d''*, and with their opposite ends passing through the said plates *q* and *q'*, an upward-extending guide-rod, *f''*, secured to the said bar *d''* and passing through the part *c''*, the spring *f'*, and prop *e''*, substantially as shown, and for the purpose set forth.

6. In a boring-machine, the combination of the cam-plate *q* with an oil-chamber, *w''*, formed in the upper side of the cam-plate and provided with openings communicating with the cam-groove *a''*, and adapted to receive the surplus oil from the shaft above and feed it to the cam-groove, substantially as and for the purpose specified.

7. In a boring-machine, the combination, with the feeding-screw *k''*, of an oil-chamber formed in the upward-extending end of the said feeding-screw and provided with outlets adapted to feed the oil to the screw, substantially as and for the purpose specified.

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

JOHN ERNST.

Witnesses:

J. E. THOMAS,
W. H. POWER.