(No Model.) 3 Sheets—Sheet 1.

C. McNEAL.

BORING MACHINE.

No. 359,270. Patented Mar. 15, 1887.

Fig. 1.

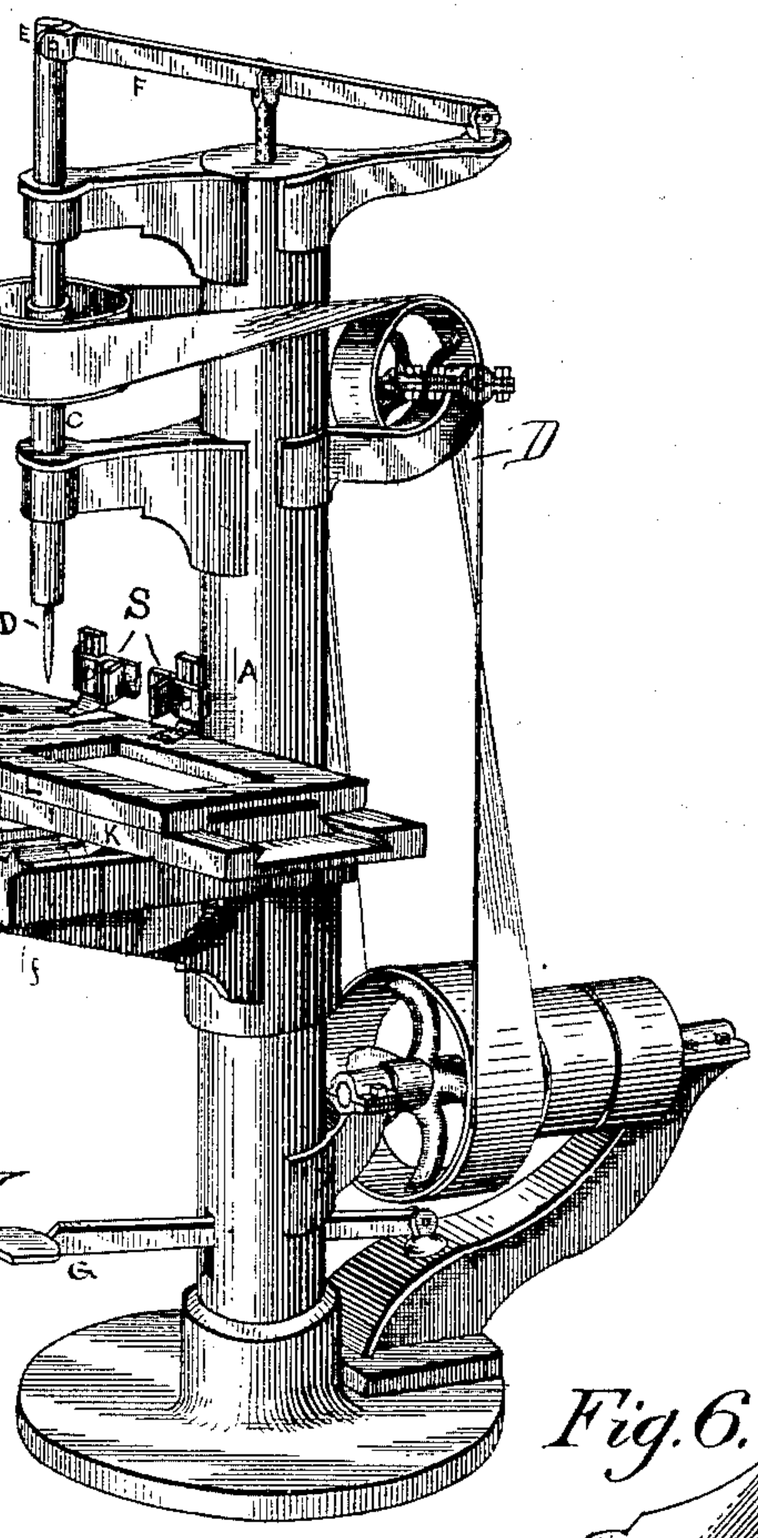


Fig. 16.

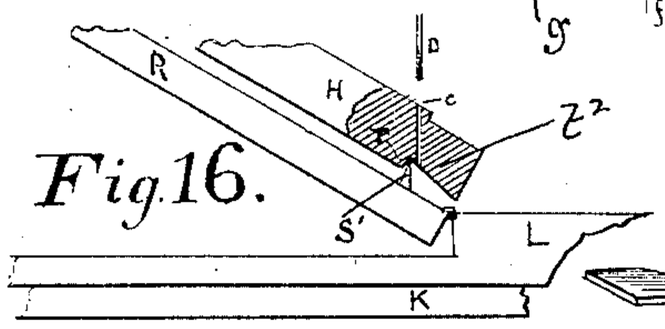


Fig. 5.

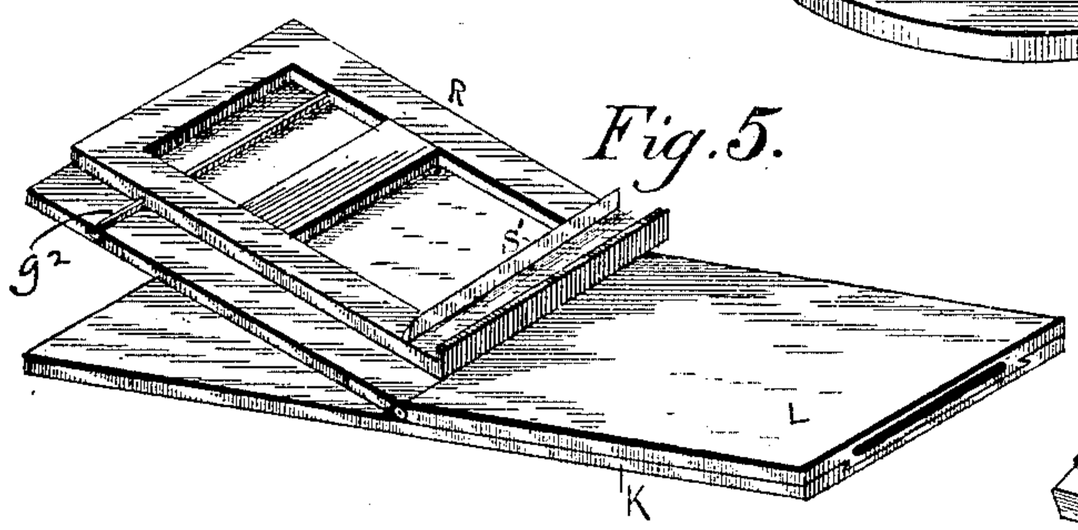


Fig. 6.

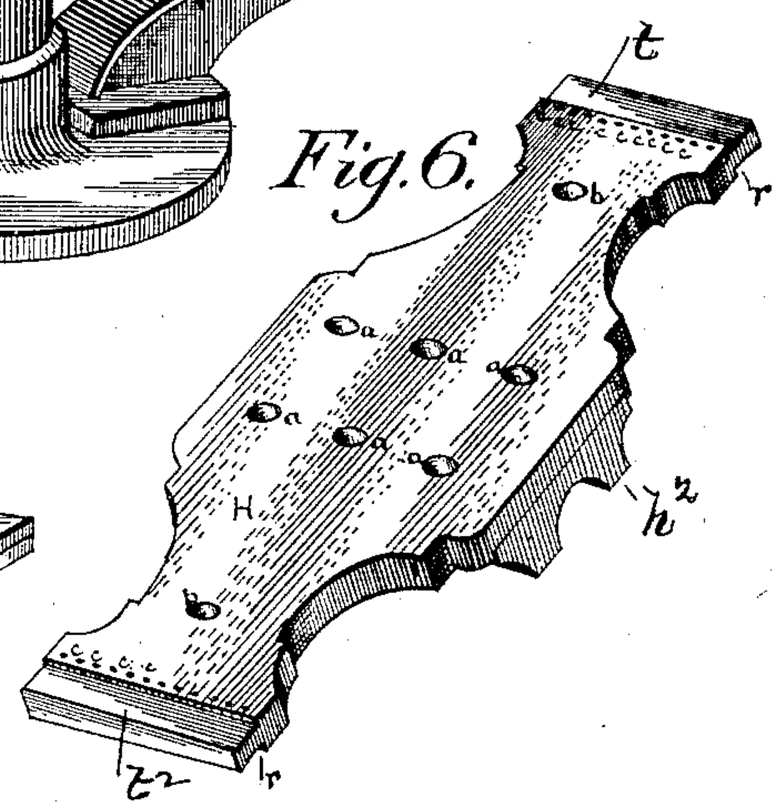
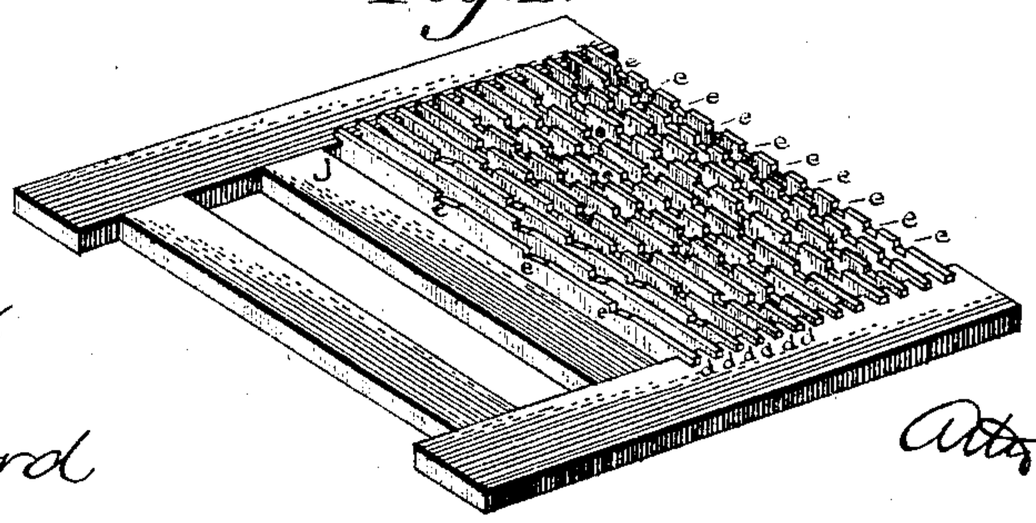


Fig. 4.



Witnesses:

J. B. McGirr.

Edw. C. Ford

Inventor.

Chas Mc Neal

By his

Atty R. D. Smith

(No Model.) 3 Sheets—Sheet 2.

C. McNEAL.

BORING MACHINE.

No. 359,270. Patented Mar. 15, 1887.

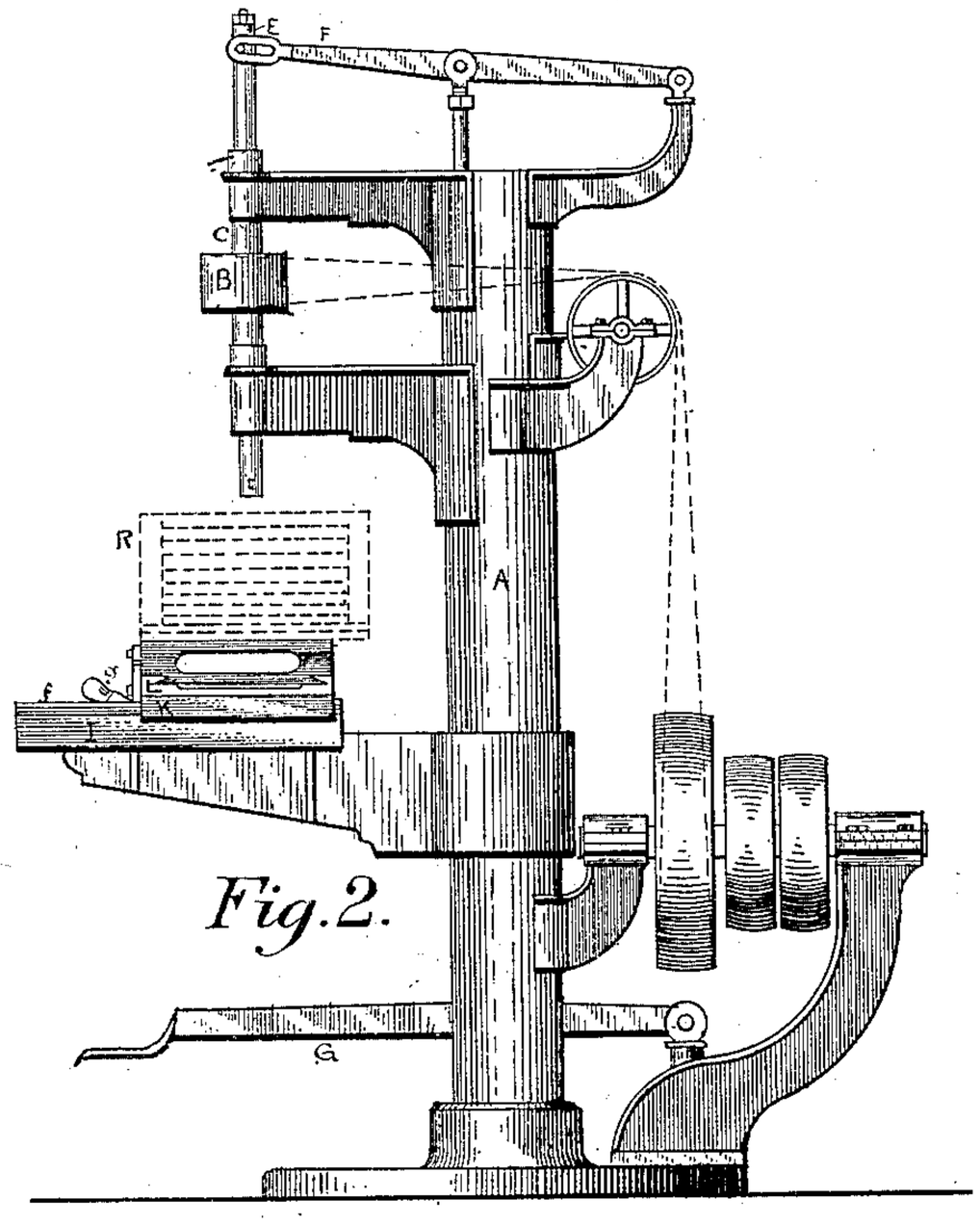


Fig. 2.

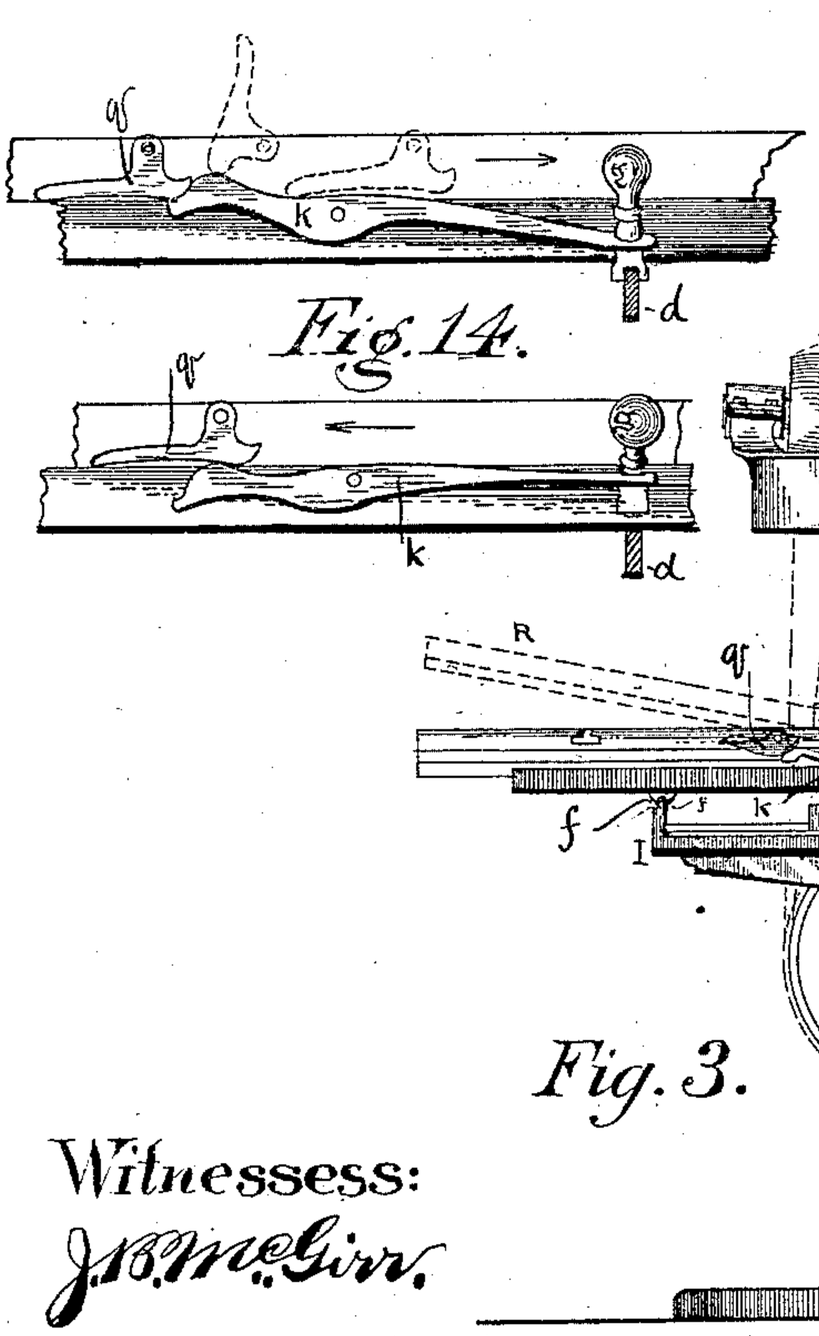


Fig. 14.

Fig. 3.

Witnessess:
J. B. McGinn.
Edw. C. Ford

Inventor:
Chas. McNeal.
By his Atty
R. D. Smith

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C. McNEAL.

BORING MACHINE.

No. 359,270. Patented Mar. 15, 1887.

Fig. 12.

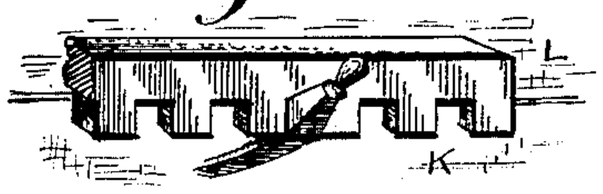


Fig. 10

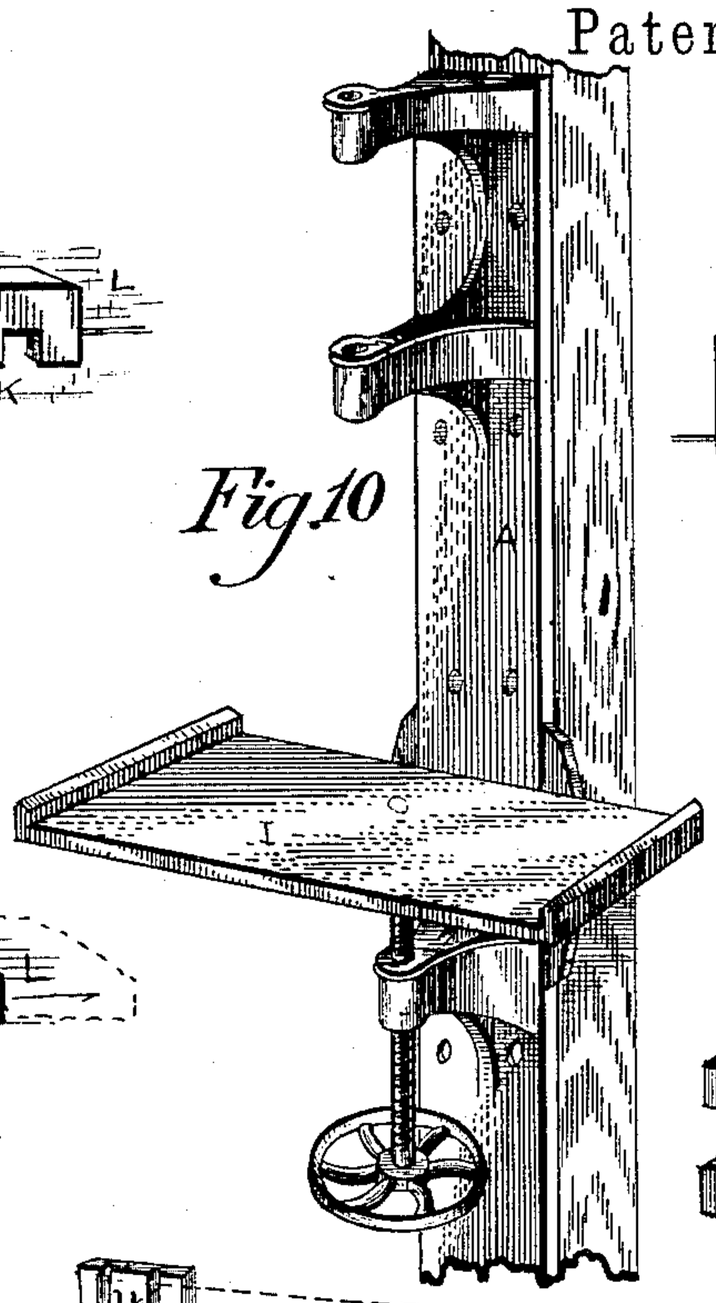


Fig. 11.

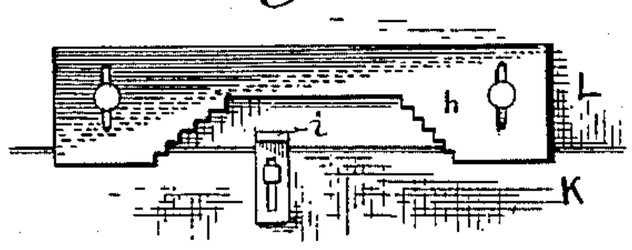


Fig. 13.

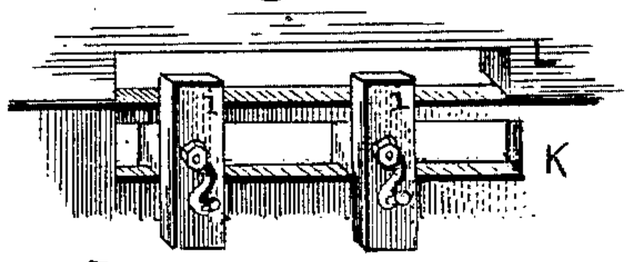
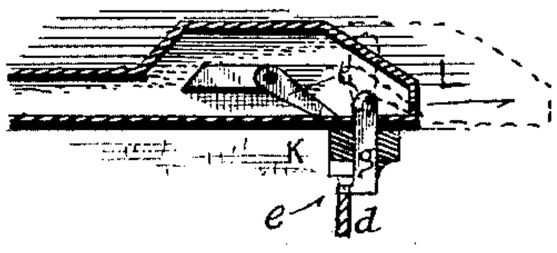


Fig. 15.



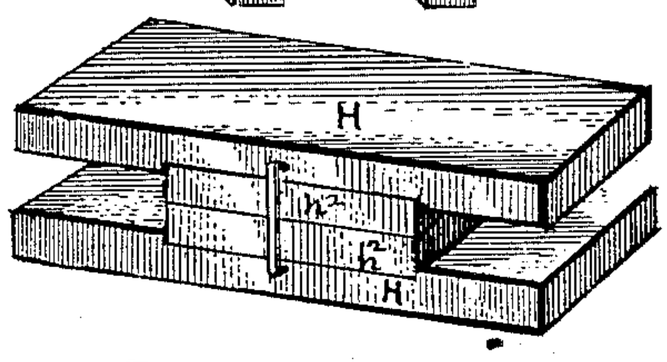


Fig. 9.

Fig. 7.

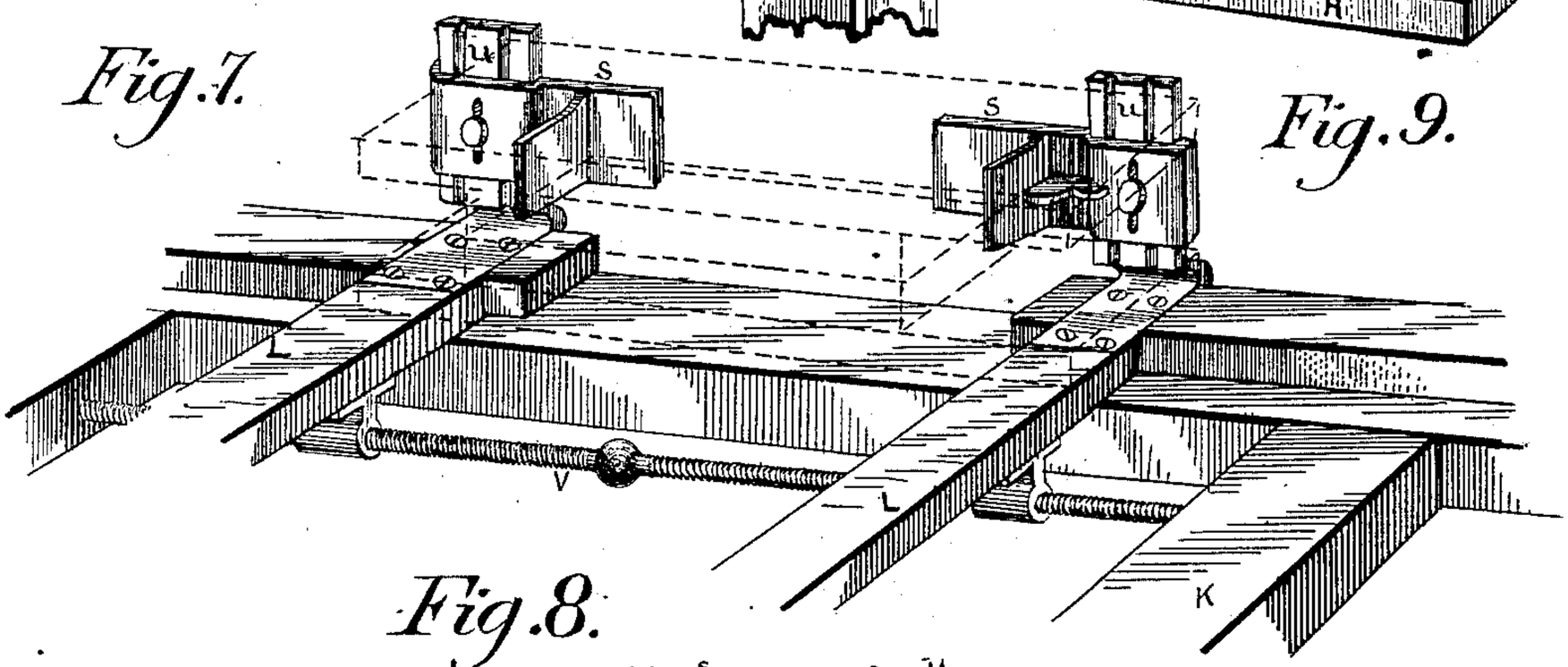
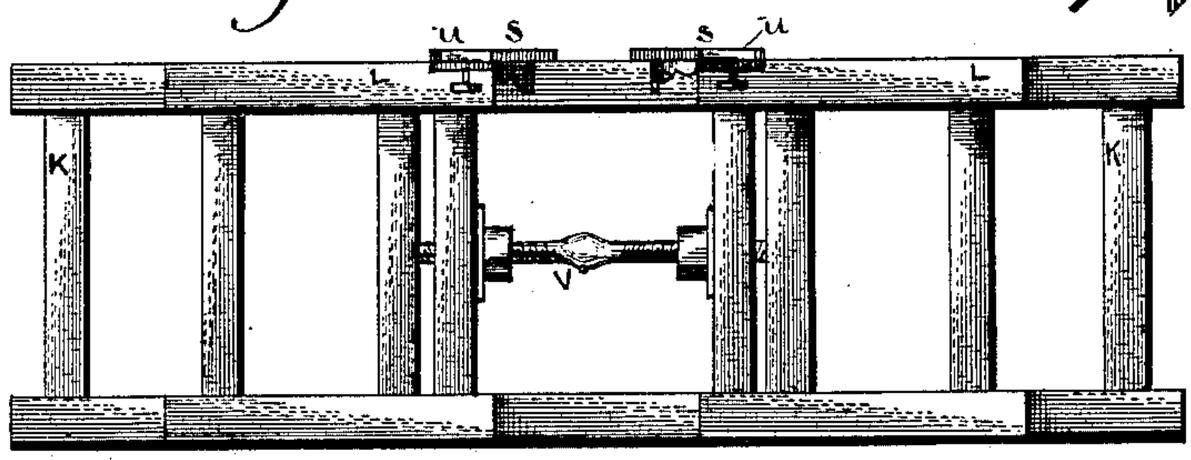


Fig. 8.



Witnesses:
J. B. McGirr.
Edw. C. Ford

Inventor.
Chas Mc Neal
by his atty
R. A. O. Smith

UNITED STATES PATENT OFFICE.

CHARLES McNEAL, OF MISHAWAKA, INDIANA, ASSIGNOR TO THE DODGE MANUFACTURING COMPANY, OF SAME PLACE.

BORING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 359,270, dated March 15, 1887.

Application filed October 11, 1886. Serial No. 215,974. (No model.)

To all whom it may concern:

Be it known that I, CHARLES MCNEAL, of Mishawaka, in the county of St. Joseph and State of Indiana, have invented a new and useful Improvement in Boring-Machines; and I do hereby declare that the following is a full and accurate description of the same.

The object and capacity of my invention will be illustrated and fully understood from a description of the machine, which I have constructed and used for the special work of boring the bolt-holes in the arms of wooden pulleys, though I wish it to be understood that I do not limit myself to either the details of construction shown nor the particular duty described, because it will be apparent that the principles of operations are applicable to other kinds of work where duplicate arrangement of uniformly-spaced holes is required.

In the accompanying drawings, Figure 1 is a perspective view of my machine. Fig. 2 is a side elevation of the same. Fig. 3 is a front elevation of the same. Fig. 4 is a perspective view of the spacing rack-plate. Fig. 5 is a perspective view of the angular table detached. Fig. 6 is a perspective view of a pulley-arm finished. Fig. 7 is a perspective view of my adjustable shoulder-stops, showing a modified form of the table. Fig. 8 is a plan view of the same. Fig. 9 is a perspective view of pulley-arms as prepared for boring. Fig. 10 is a perspective view of table and bracket-plate for use with a wooden post. Fig. 11 is a front elevation of a part of the table, showing the adjustable stop to limit lateral movement. Figs. 12 and 13 represent modifications of the lateral stop device shown in Figs. 3 and 11. Fig. 14 is an elevation of the latch-stop in two positions. Fig. 15 is an elevation of a modification of the same, partly in section. Fig. 16 is an elevation, partly in section, showing the manner of boring oblique holes. Figs. 5 and 16 show a modification wherein the table has a hinged part, which may be raised obliquely to the plane of said table.

A is the post and frame of the upright boring-machine, similar to such machines as ordinarily constructed. B is the driving-pulley, provided with the sliding mandrel C, having at its lower end a socket to receive the boring-tool D, and at its upper end a collar, E, attached to a forked or stirrup lever, F, whereby said mandrel is depressed or raised, as the case may be, to carry the boring-tool into or out of action. The lever F is connected with and controlled by the treadle G. These parts do not differ from common forms of such machines.

The particular duty of the machine shown in the drawings is to bore the holes *a a b b c c* in the pulley-arms H. (Shown in Fig. 6.) In order to match similar holes in the other similar arms, it is necessary that the holes shall be accurately spaced and all exactly alike. Heretofore such spacing has usually been accomplished by means of a templet; but it is very difficult to bore the holes exactly by that means. The arms H differ in size and width, and the number of holes required differs, as well as their spacing. Therefore the means for securing a uniform spacing must be variable.

The most convenient mode of causing the machine to properly and uniformly space the holes is by means of notched spacing-rack *d*, with its notches separated by the desired spaces and a latch adapted to engage one of said notches; but to meet the various spacings required a considerable number of such racks must be provided, and it is convenient to assemble all of them in a single frame and to make the same movable, so that any particular rack may be quickly moved to position with reference to the latch. Therefore I first place upon the table a rack-frame, J, which is capable of movement laterally upon said table, and may be suffered to rest or be fixed in any position within its range of movement. The frame J is provided with a number of spacing-racks, *d d*, each provided with a series of notches, *e*, but each series differing from the others.

A carriage-frame, K, is mounted on the table I, to move forward and backward on guides *f* above and at right angles to the rack-frame J. The frame K is provided with a latch, *g*, impelled by gravity or by a spring, and adapted to engage in the notches *e*, so as to control the movements of the frame K and limit them to the distances between the notches *e* in the particular rack *d* which may be in line with said latch. By moving the frame J

in its guides either one of said racks may be brought into the line of the latch *g*, and the order and extent of the movement of the frame K may be changed accordingly. It will be perceived, now, that a succession of blanks may be placed upon the carriage K and holes bored therein in position and spacing all exactly corresponding with the spacing of the particular rack-bar *d* which may be used, and that it will only be necessary to provide adjustable stop-guides, so that the blanks in succession may be all placed in the same place and position on the carriage.

The particular duty in boring the parallel series of holes *a a* requires the blank to be shifted endwise to bore the second series with the same spacing as the first. I therefore, for convenience, mount upon the carriage K another carriage, L, capable of lengthwise movement on said carriage K—that is, transverse to the direction of the guide *f*—so that when the arm H has been placed on carriage L the arm may be shifted endwise by movement of the carriage L to bore the first hole of each series before the carriage K is shifted on the rack *d* from first to second place.

It is evident the movement of the carriage L is not limited to the two positions. It may have a similar set of rack-plates or some other suitable and convenient means of step-by-step movement, so that any desired number of equivalent series of holes may be bored.

For the particular duty which I have required for this machine only two series of holes, *a a*, have been required, and it has only been necessary to provide a notched stop-plate, *h*, on the carriage K, and on the carriage K a stop, *i*, adapted to engage said notched plate *h*, and allow it a longer or shorter range of motion, as desired, to make the series *a a* nearer or farther apart to suit arms of different lengths.

The stop-plate *h* is provided with a series of steps or shoulders approaching each other, so that each pair represents a different intervening distance, so that when said plate is moved up or down on the carriage L the stop *i* will permit a longer or shorter motion of said carriage, as the case may be. The same result will be attained by moving the stop *i* up or down on the carriage K. Fig. 12 represents a modification for the stop-plate, *h* being a spaced rack-bar and a spring-latch.

Fig. 13 also represents a modification, being a pair of adjustable stops the effect of which will be apparent to any mechanic. For convenience I provide and attach to the carriage L stops S, which are adjustable laterally and vertically to fit the shoulders or ends of the arms H as most convenient, so that said arms will all assume the same place and position on the carriage.

In operation the arm H is placed on the carriage L, and said carriage moved to one end of its stroke. The boring-bit is then caused to descend and the first hole of one series is bored. The carriage L is then moved to the other end of its stroke and the first hole of the other series is bored. The latch *g* is then raised and the carriage K is moved one step until said latch engages the next notch in the rack then in use, and the second hole in the series is bored, and so on. To make the release of the latch *g* automatic, I couple said latch to a lever, *k*, which is pivoted on the carriage K. A swinging trip-latch, *q*, is pivoted to the carriage L, which, when said carriage moves in one direction, engages said lever *k* and lifts the latch *q*, and when said latch moves in the other direction said latch passes over said lever. Fig. 15 represents a modification wherein the latch is in the form of a reciprocating bolt raised from its notch in the rack by the switch *t*, attached to the carriage L, and thereby alternately carried under and over said latch as said carriage is reciprocated. Many other modifications may be suggested. When the arm H is joined to the pulley-rim, long nails are driven through it into the rim, and for this purpose the nail-holes *c c* are bored obliquely through the arm H, and to support the arm in the required position I employ a frame, R, adjustable as to inclination. Said frame R is placed on the carriage L and fixed thereon, but subject to adjustment forward and backward on the guide-strip g^2. A thin edge bar, S′, forms at once a convenient and efficient gage and support. The shoulder *r* of the arm H rests on said bar S′, and the boring-bit, when it descends, then enters the arm H behind the tenon t^2, and, passing obliquely through the arm, makes its exit in front of the shoulder *r* and in the tenon, as shown in Fig. 16. The spacing of the nail-holes *c* is effected with the movement of the carriage L, and the rack-bar having the desired spacing of notches *e*.

The frame R may be made a part of carriage L, if desired, as shown in Fig. 16, or may be separate, as shown in Fig. 5, and the carriage L may be constructed of wood or metal, as preferred. In case it is made of metal, it will be made of cast metal, in the form of a thin shell, as shown in Figs. 1, 2, and 5.

In Figs. 7 and 8 I represent the adjustable shoulder-stops S, the same being vertically adjustable on posts *u*, each attached to a part of frame L, which, for this purpose, is made in two parts, adjustable in opposite direction coincidently by revolving the right and left hand screws V. I now couple the two arms H, designed for one pulley, by a clamp or dog, as shown in Fig. 9, and adjust the stops S to the ends of the hub-blocks h^2, attached to said arms, as shown by dotted lines in Fig. 7, and bore both arms at one operation. The holes *a a* being equally spaced both transversely and longitudinally, the stop *i* is adjusted to permit the required longitudinal movement of the carriage L, so that at the end of its movement in one direction the arm H will be in position for one hole *a*, and at the end of its movement in the other direction will be in position for the other hole *a* in the same longi-

tudinal line. The movement of the carriage L from the first to the second hole will not raise the latch *g;* but the return movement will raise said latch from its notch *e* before it reaches the termination of said movement, and the attendant at the moment of said disengagement will push the carriage K backward, while the carriage L continues to move endwise thereon. Said latch will then ride on the rack *d* and will drop into the next succeeding notch, and so on. The transverse spacing of the holes *a* will vary as the width of the arm varies and with the number of holes desired. Therefore the rack-frame J is shifted to bring the rack *d*, having the proper spacing, under the latch *g*.

If it is desired to make in each end of the arm H a series of holes, *b*, and in making the holes *c c* the carriage L is not moved endwise at all, but with the carriage K is moved step by step backward, the latch *g* may then be released by hand.

Having described my invention, I claim as new—

1. The carriage whereon the blank is supported and moved to position, combined with the latch *g*, attached to said carriage, and the movable rack-plate J, provided with two or more racks, *d*, differently spaced, whereby by moving said rack-frame J either one of said racks may be placed in line with the latch *g*, as set forth.

2. The adjustable rack-frame J, provided with racks having notches *e* in series mounted on the table I, and the carriage K, mounted to move on the guides *f* on said table I, provided with the latch *g*, adapted to engage either one of said racks, as the case may be, combined with the carriage L, mounted to move on said carriage K at right angles to the direction of the guide *f*.

3. The rack-frame J, provided with a series of different racks, and the carriage K, mounted to move on guides *f*, and provided with latch *g*, adapted to engage with the notches of said rack, combined with the carriage R, capable of adjustment as to inclination, to hold the arm H while the nail-holes *c* are being bored obliquely, as set forth.

4. The rack-frame J, provided with a series of different racks, the carriage K, mounted to move on the guides *f*, and provided with a latch, *g*, mounted at the end of the lever *k*, combined with the carriage L, mounted to move on the carriage K, as set forth, and provided with a trip-latch adapted to unlock the latch *g* when said carriage L is moved in one direction, and pass it undisturbed when moved in the opposite direction.

5. The rack-frame J, provided with a series of different racks, and the carriage K, mounted to move on guides *f*, and provided with the latch *g*, attached to the lever *k*, pivoted to the carriage K, combined with the carriage L, provided with the swinging trip *q*, to release said latch when said carriage moves in one direction.

6. The carriage K, adapted to reciprocate on the guides *f*, and the carriage L, adapted to move on the carriage K in a direction transverse to the guide *f*, combined with the adjustable-step stop-plate *h* and the stop *i*, substantially as and for the purpose set forth.

7. In combination, in a boring-machine, the sliding mandrel C, revolving in vertical bearings and beneath it, the carriage K, mounted to move forward and backward on the guide *f*, the carriage L, mounted on said carriage K and movable toward the right hand or left on guides thereon, a notched spacing-rack, *d*, below said carriage K, and a latch, *g*, to engage therewith, whereby the backward movement of the carriages may be made step by step, as set forth.

CHARLES McNEAL.

Witnesses:
WILL W. DODGE,
W. H. DODGE.