

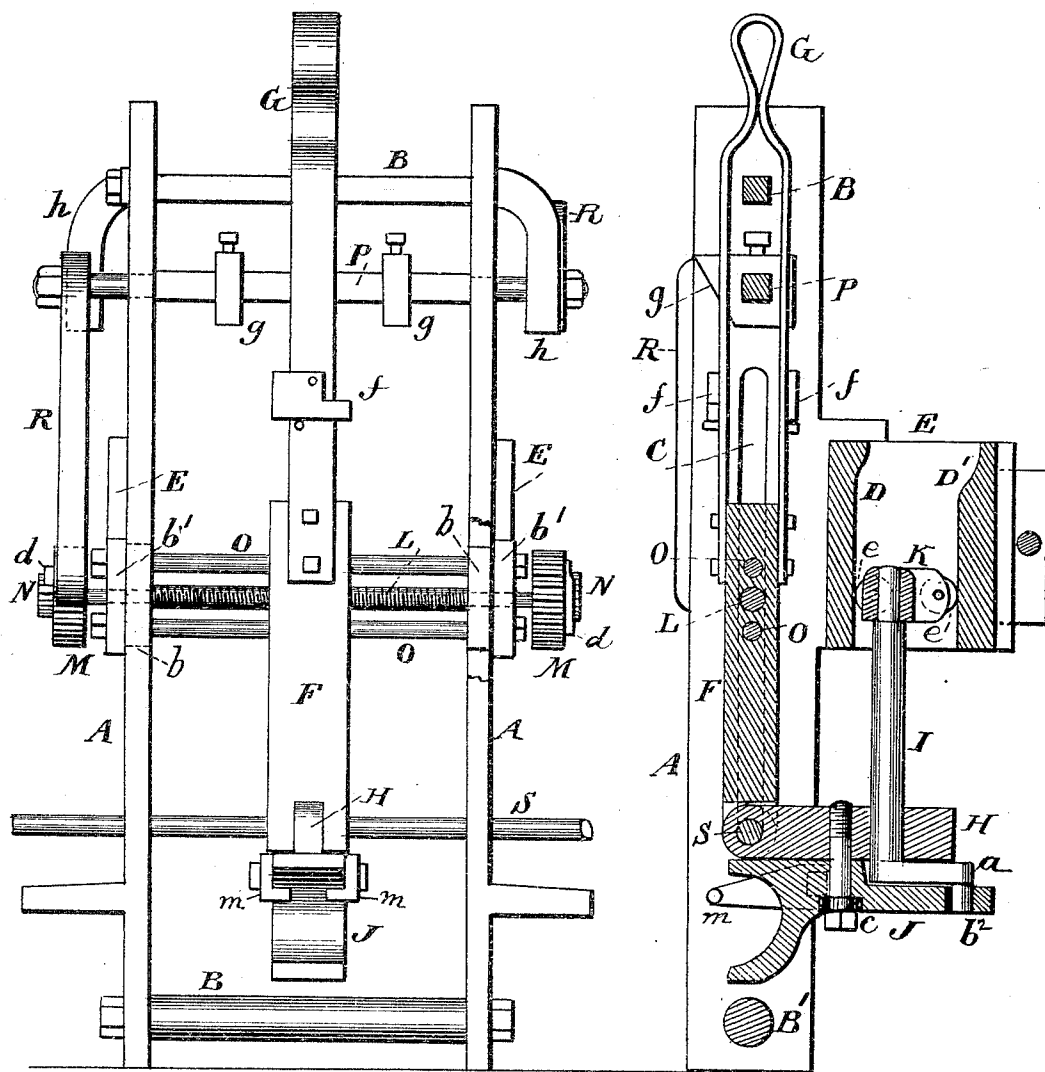
J. H. CRANE.
GRINDING MACHINE.

No. 491,530.

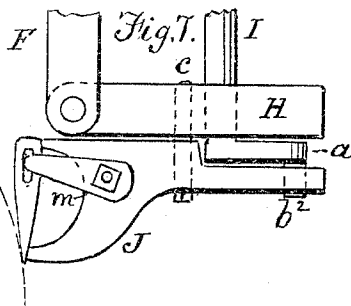
Patented Feb. 14, 1893.

Fig. 1.

Fig. 2.



Witnesses
A. Ruppert
H. A. Daniel



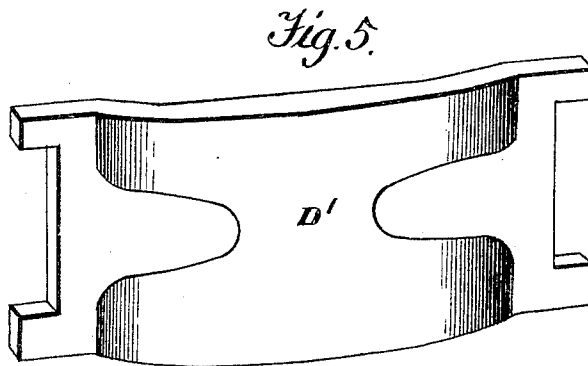
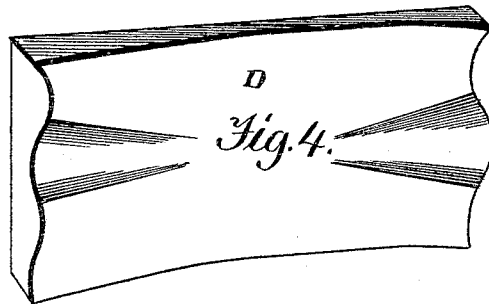
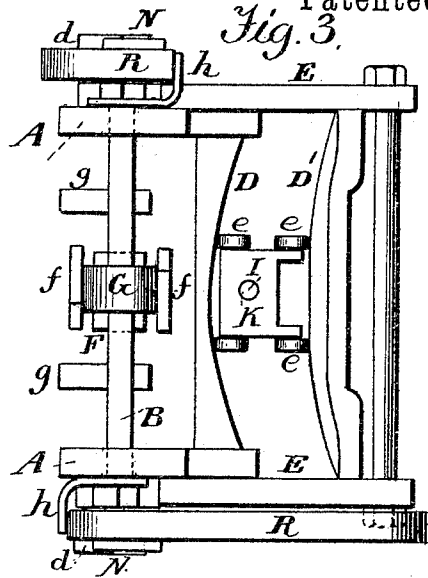
Inventor.

John H. Crane,
Per
Thomas P. Simpson
att'y

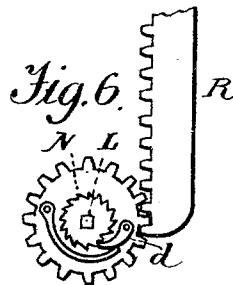
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UNITED STATES PATENT OFFICE.

JOHN H. CRANE, OF AUBURN, NEW YORK.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 491,530, dated February 14, 1893.

Application filed April 22, 1892. Serial No. 430,229. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. CRANE, a citizen of the United States of America, residing at Auburn, in the county of Cayuga and State of New York, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to machines for grinding axes, hoes and other tools having irregular surfaces to be ground, and consists in certain improvements in the construction of such machines as hereinafter described and claimed.

In the accompanying drawings—Figure 1 represents a front view of the machine. Fig. 2 is a sectional side view of the same. Fig. 3 is a plan view. Figs. 4 and 5 illustrate two guide plates employed. Fig. 6 illustrates the rack bars and ratchet mechanism. Fig. 7 illustrates in side view the tool-holder and its connections.

A designates the main supporting standards which are connected by a bar B at the top and a bar B' at the bottom—said standards being provided with the longitudinal slots C. To the standards A are rigidly secured the brackets E by which two guide plates D, D', are supported, being fastened thereto.

F indicates a traveling column which has a lateral movement between the standards A, and also a vertical movement by means of a lifter G, connected with said column. To the lower end of the column F is secured a stock or bearing piece H for a shaft I which extends through said bearing piece and has a crank-form *a* on its lower end, said shaft being in a vertical position. A tool-holder J is pivoted at *c* to the bearing piece H, and is also connected with the crank *a* at *b*², so that a movement of the tool-holder on its pivot *c* is imparted from the shaft I, through the crank *a*, as hereinafter stated. The arms *m* are removably secured to the sides of the holder J by screw bolt and nut, the free ends of said arms being turned inward to enter the eye of a tool to be ground, and said tool may be secured firmly by said arms to the forward part of the tool-holder in position to be ground. The shaft I extends upward and carries a head-block K which is secured to the upper

end of said shaft and moves between the guide-plates D D'. The said head-block is provided with rollers *e* for bearing against the inner faces of the opposite plates D D' during operation.

L indicates a screw-shaft which is passed through a threaded aperture in the column F and extends through blocks *b* which slide in the slots C of the standards A. On each end of the shaft L is loosely mounted a pinion M, and a ratchet wheel N is fast on said shaft, a pawl *d* being connected with pinion M to connect with ratchet N. Two shafts O, one being at either side of the shaft L, are passed through the column F with their ends extending into the blocks *b* and form guides or ways on which the column moves laterally as hereinafter set forth.

P indicates a shaft mounted in the standards A near the top of the machine; and on said shaft, at its extremities, are the shifting rack-bars R, which are constructed to engage alternately with pinions M. When one of the rack-bars R is turned down to connect with a pinion M, the other rack-bar is turned from engagement with the opposite pinion and is brought to a horizontal position, such movements of the rack-bars being produced by the turning of the shaft P one quarter of a revolution. This turning of the shaft P is effected by the action of the tripping devices *f* which are pivoted to the lifter G and severally impinge against the cams *g* which are fast on the shaft P. The springs *h* serve to hold the rack-bars in position when the latter are turned up, but allow the movements of said bars.

As before stated, the head-block K, being secured to the shaft I, moves between the guides plates D D'. These two plates are formed with inner surfaces which are somewhat irregular, the plate D having an inner surface which is somewhat concave and the plate D' having a surface that is correspondingly bulging or convex, so that the head-block, during operation moving between these surfaces, makes a curving movement and imparts a like movement, through the crank-form on shaft I, to the tool-holder J and to the ax or other tool carried by said holder, as the tool bears against the grind stone located in front of the machine. The column

F being drawn upward by means of the lifter G, one of the pinions M is engaged by one of the rack-bars R, and, through a ratchet and pawl, the screw-shaft is rotated, thus giving the column a lateral movement on said shaft; the shaft I, bearing piece H and tool-holder J, making the same lateral movement with the column F, the head-block K is moved laterally between the bulging and convex surfaces of the guide plates D and D', so that the head-block is somewhat tilted in its movement, and, being fast on the shaft, produces a slight turning movement of the latter, whereby, through the crank *a*, a turning movement of the tool-holder on its pivot is effected. As the column rises, a tripping device *f* strikes a cam *g* on the shaft P and partially rotates said shaft, thus moving the rack R out of engagement and turning the opposite rack into engagement with the opposite pinion M; as the column F descends, its movement on the screw-shaft is reversed and the movement of the head-block between the guide-plates D D' is correspondingly reversed, the tool making a like movement against the face of the grindstone, according to the action of the crank-form on the lower end of the shaft I. A press-rod S serves to hold the tool to the grind stone.

I claim—

1. The combination, with two slotted stand-

ards, of two guide plates supported by said standards, a screw-shaft provided with guides and a column, movable on said screw-shaft, a vertical shaft mounted in a bearing carried by said column and provided with a crank, a pivoted tool-holder attached to said crank, a head-block secured to said vertical shaft, in position to move between said guide-plates, a cam-shaft mounted in said standards, pivoted tripping devices, and rack-bars secured to said cam-shaft and constructed to connect alternately with gearing on said screw-shaft, substantially as set forth and described.

2. In a grinding machine, the combination with a supporting frame, of a screw-shaft L, having movable bearings, a column mounted on said screw shaft, a vertical shaft I carried by said column, a head block, provided with rollers, and connected with shaft I, a crank form and tool holder connected therewith, two guide plates, provided each with a curved inner surface, and mechanism for raising said column and for rotating said screw-shaft, substantially as set forth and described.

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

JOHN H. CRANE.

Witnesses:

JAMES THOMAS,
C. L. HICKOK.