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C. F. MUDGE & G. WHITTAKER.

Rasp-Machine.

No. 203,064. Patented April 30, 1878.

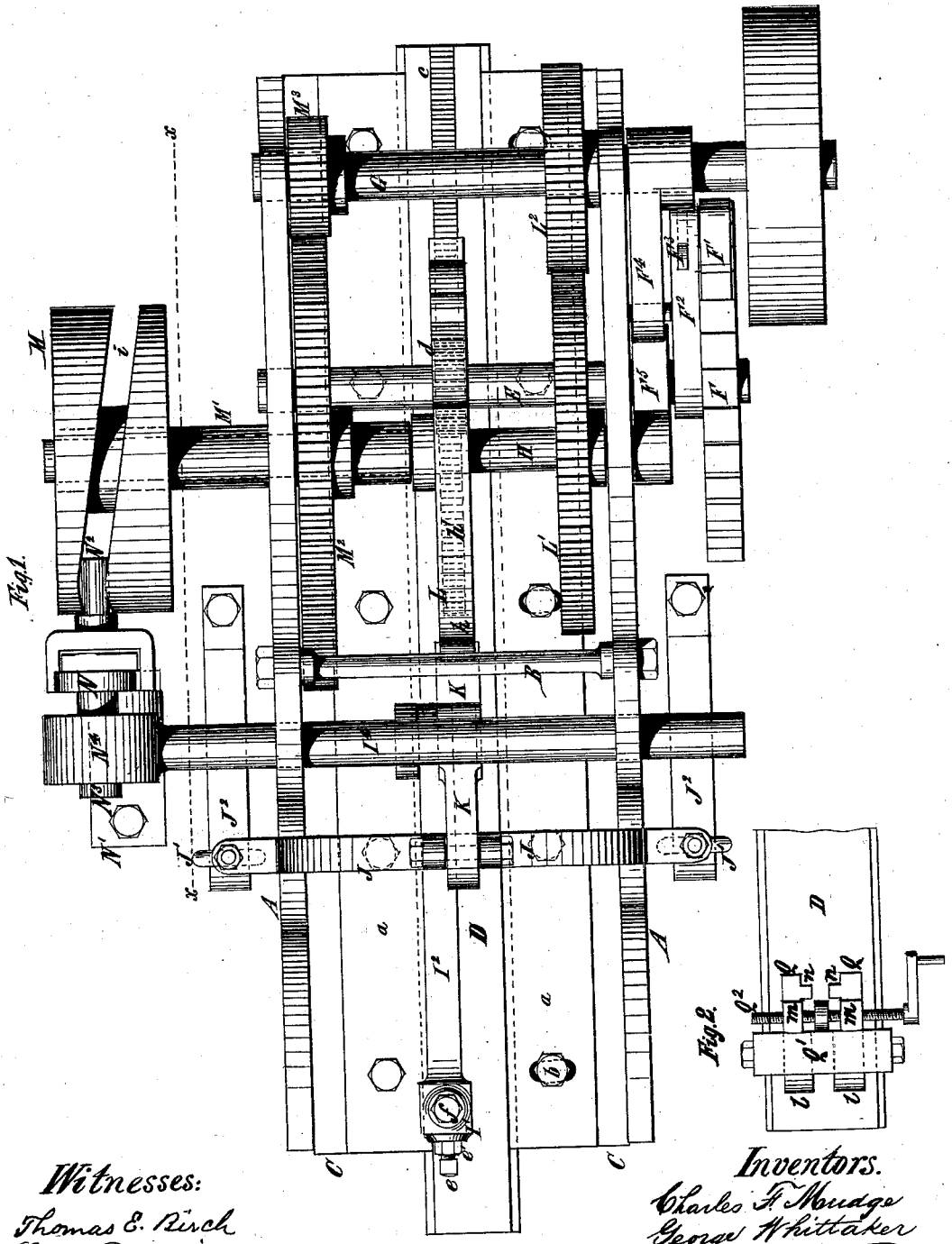

Fig. 1.

Fig. 2.

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Fig. 3.

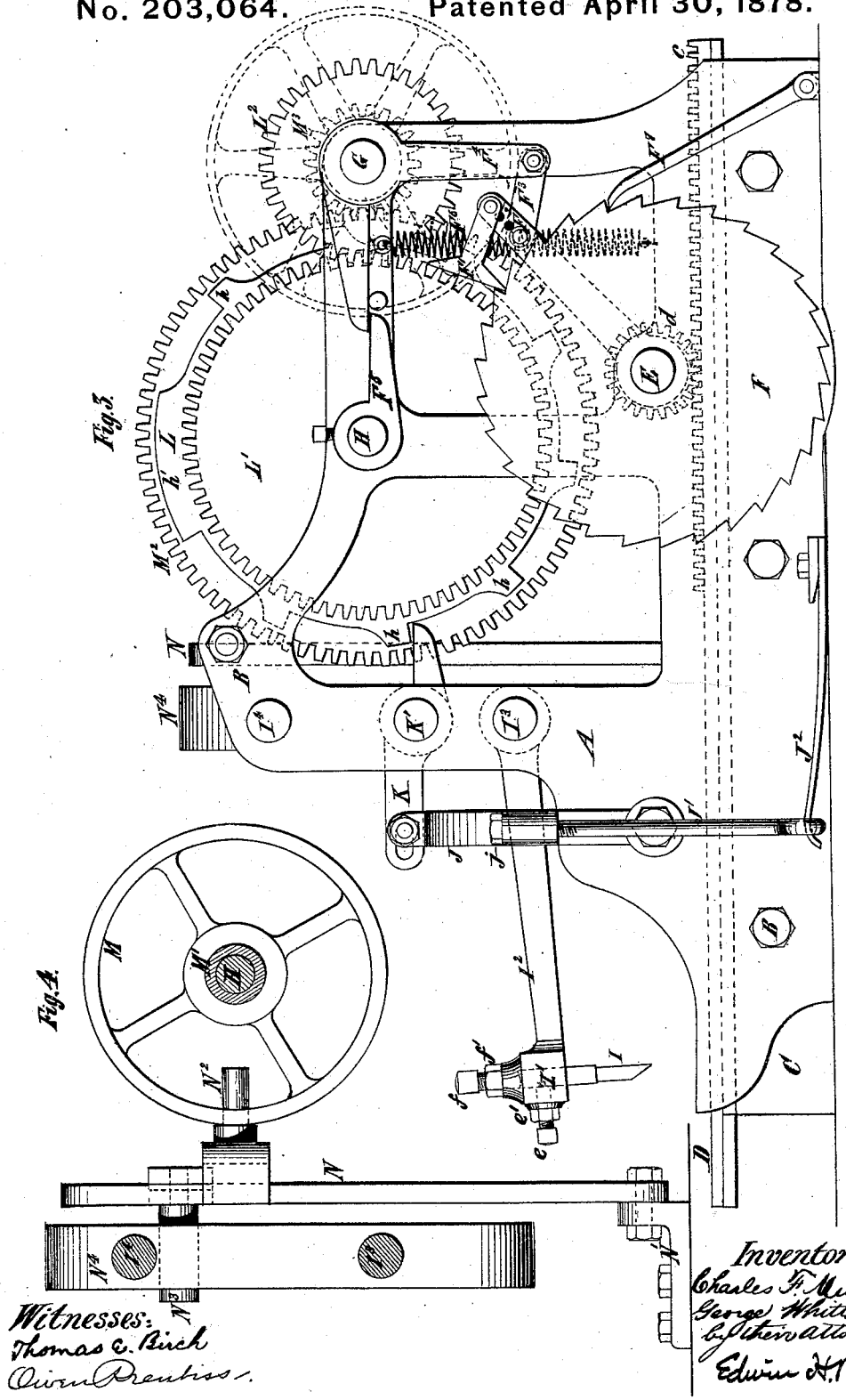

Fig. 4.

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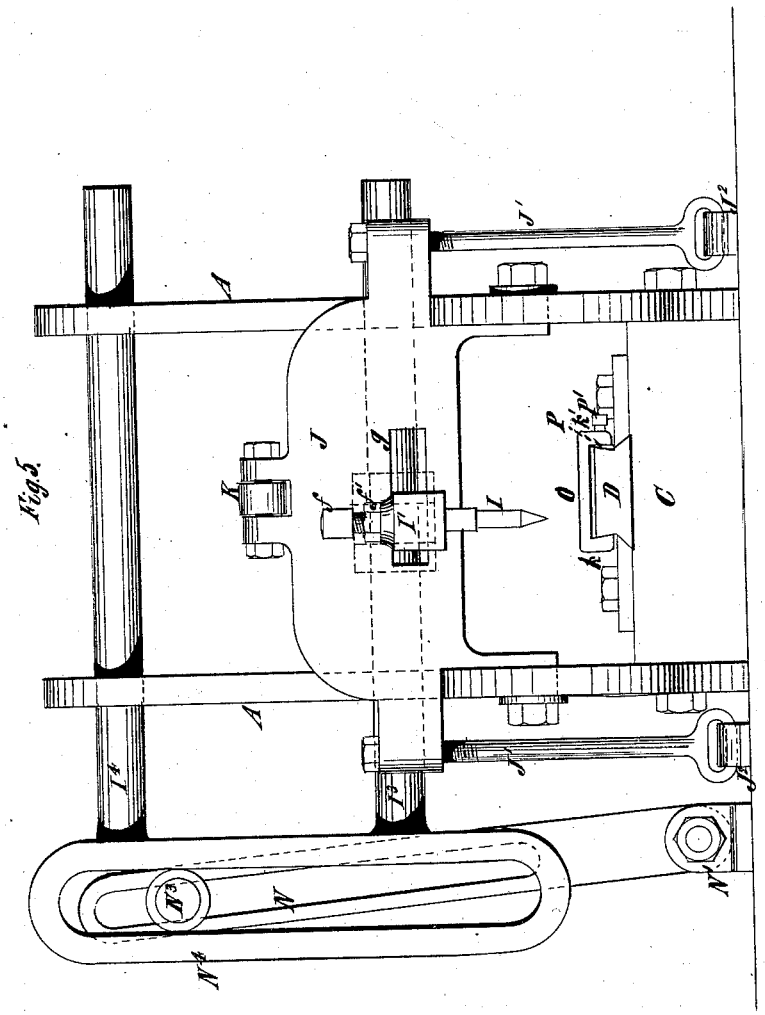

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN RASP-MACHINES.

Specification forming part of Letters Patent No. **203,064**, dated April 30, 1878; application filed January 2, 1878.

To all whom it may concern:

Be it known that we, CHARLES F. MUDGE and GEORGE WHITTAKER, of Brooklyn, Kings county, and State of New York, have invented certain new and useful Improvements in Machines for Manufacturing Rasps, of which the following is a specification:

Our improvement consists in the combination, with a cutter-holder, supported loosely upon a shaft or arbor, of a cross-head provided with a slot for accommodating said cutter-holder and allowing of its traverse, and for striking the same to impart the blow to the cutter while yet allowing of its free rebound after a blow.

Other improvements consist in details of construction, to be hereinafter explained.

In the accompanying drawings, Figure 1 is a plan or top view of a machine embodying our improvements. Fig. 2 is a plan or top view of a rasp-blank holder embodied therein, including a portion of the traveling bed for supporting the rasp-blanks. Fig. 3 is a side view of the said machine. Fig. 4 is a transverse section of the said machine, taken through the dotted line *x x*, Fig. 1; and Fig. 5 is a front view of the cutter-holder, the cross-head combined with said cutter-holder, and a portion of the traverse mechanism for said cutter.

Similar letters of reference designate corresponding parts in all the figures.

The frame of the machine may be of any suitable form. It consists, in the present example of our invention, of two side pieces, A, cross-bars or stretchers B, uniting the same, and a base-piece, C. D designates a bed or platform, supported in guides or ways in the base-piece A B of the machine, so that it may travel longitudinally forward or backward. The gibs *a* of the guides or ways wherein said bed D travels may either or both be adjustable laterally to accommodate the said bed after wear, and the means employed to secure them in place may consist of bolts *b*, fitting in elongated slots and clamping said gibs in position.

The rasp-blank holder which we have represented consists of a strap or frame, O, extending from the top of the bed D, and provided with side pieces *k k'*, the former of which is inwardly inclined, and fits against the downwardly-inclined adjacent sides of the upper portion of the bed D, and the latter of which extends downward vertically, and receives between it and the opposite inwardly-inclining side of the upper portion of the bed D a gib, P, which is secured in place by a set-screw, P'. This holder, upon loosening the set-screw P', may be adjusted to different positions upon the bed D, and secured there firmly.

We preferably use, in addition to the holder just described, another holder, consisting of two jaws, Q Q, sliding through a guide, Q^1, provided with heads *l m*, on opposite sides of the said guides, to retain them longitudinally in position, the said jaws engaging with a screw, Q^2, which is provided, from the center to one end, with a left-hand thread, and from the center to the other end with a right-hand thread, so that when turned it will move both the jaws toward or from the center. Preferably the jaws are provided with stops *n*, against which the end of the rasp-blank may abut, to insure its being in proper position on the bed D of the machine.

The advantages of this holder are that it will centralize the rasp-blank upon the bed, as well as clamp it.

The means represented for effecting the travel of this bed D consist of a rack, *c*, arranged on the upper face thereof, and a pinion, *d*, arranged upon a shaft, E, supported in the side pieces A of the frame. On one end of the shaft E is a ratchet-wheel, F, with which engages a pawl, F^1, pivoted to an arm or lever, F^2, supported loosely on said shaft E. The arm F^2 is connected by a rod or link, F^3, to one end of a bell-crank or right-angled lever, F^4, supported on the end of the driving-shaft G of the machine. The other arm of this bell-crank lever F^4 is tripped or raised intermittingly by a tappet, F^5, secured to the shaft H, carrying the tripper-wheel, whereby the mechanism for imparting the blow to the cutter of the machine is effected. The said tappet trips the said bell-crank lever F^4, and transmits motion to the pawl F^1 and ratchet-wheel

F, moving the said traveling bed D. A spring, F^6, returns the bell-crank lever to its normal position, and moves the pawl F^1 over the teeth of the ratchet-wheel F after the tripper releases said bell-crank lever.

Preferably a stop, which may consist of a pawl, F^7, is employed, in connection with the ratchet-wheel F, to preclude it from movement, and to hold the traveling bed D stationary between the times for feeding said bed to produce another row of teeth on the rasp-blank.

We may with advantage make the teeth of the ratchet-wheel V-shaped, and provide the pawl F^1 with a double point or head, as it is shown in the drawings, to enable it to be swung over so that either point or head will engage with such V-shaped teeth, for then we would have a reversible feed, and could produce teeth on a rasp-blank by moving the said bed either forward or backward.

Preferably the link F^3 is connected adjustably, by means of a bolt and an elongated slot or series of holes, to the arm F^2, carrying the feed-pawl F^1, so that said link may be connected nearer to or farther from the fulcrum of the arm or lever F^2, in order to impart from the bell-crank tripper-lever F^4 a greater or less movement over the teeth of the ratchet-wheel F, and a longer or shorter feed or movement of the bed D. Thus we will be able to adjust the feed of the traveling bed D, as may be desirable, for producing a coarser or finer rasp, because we can thus regulate the spaces between the several rows of teeth thereof.

Having described the mechanism for feeding the rasp-blank under the cutter, we will now proceed to describe the cutter and the mechanism for operating the same.

The cutter I, which we have represented, is shaped so as to produce the desired form of rasp-teeth upon striking the blank, and is preferably supported in a holder, I^1, the helve I^2 of which is pivoted to a shaft, I^3, supported in bearings in the side pieces A of the frame, so that it may be moved longitudinally across the frame to effect the traverse of the cutter. The holder I^1 is provided with a socket for receiving the shank of the cutter I, with a set-screw and jam-nut, *e e'*, for clamping said shank transversely in said holder, and with another set-screw and jam-nut, *f f'*, whereby the cutter may be adjusted longitudinally in said holder, so that it may most advantageously be operated.

J (see particularly Fig. 5) designates a cross-head, supported in vertical guides in the side pieces A of the frame of the machine, so as to be free to ascend and descend therein. This cross-head is provided with a slot or opening, *g*, through which the helve I^2 of the cutter-holder passes, the said slot or opening being long enough to provide for the traverse of the said helve within it. The said cross-head is connected, say at its outer ends, by eyebolts J^1, with flap-springs J^2, which, when the said cross-head is not otherwise actuated, cause it to descend with energy, strike the helve of the cutter-holder, and effect the blow of the cutter upon the rasp-blank, the opening *g* allowing the hammer-helve to rebound after the blow, to simulate the operation of a cutter held in the hand and struck by a hammer.

It is obvious that the energy of the blow of the cutter I may be regulated by adjusting the nuts *j* of the eyebolts J^1 so as deflect the springs J^2 more or less. This cross-head J is connected, preferably, at the upper part to a tripper-lever, K, pivoted on a shaft, K', supported in the side pieces A of the frame and extending rearward, so as to be operated upon by the teeth *h* of a tripper-wheel, L, supported on the shaft H, and deriving motion through gear-wheels L^1 L^2 from the driving-shaft G. This tripper-wheel L is provided with teeth sufficient in number to produce the requisite number of blows of the cutter I to form a row of teeth upon the rasp-blank. Coming in contact with the adjacent end of the tripper-lever K, they severally depress the same, raise cross-head J, and subsequently release the said tripper-lever K and cross-head, so that the holder may be impelled downward by the flap-springs J^2 to effect blows of the cutter I. This tripper-wheel is preferably provided with a dwell, occurring once in every revolution, for the purpose of holding the cutter in suspense while it is changing its traverse, so that the blows produced by it will form a series of teeth upon the rasp-blank opposite the spaces between the teeth of the last preceding row, and thus cover the surface of the blank more perfectly with teeth and render it more effective. A simple means for producing this dwell consists of a tooth, *h'*, having its periphery or outer surface elongated very much more than the corresponding portions of the teeth *h*. This tooth *h'*, owing to its elongated periphery, will hold or retain the adjacent end of the tripper-lever K in a depressed position and the cross-head J and cutter-holder helve and cutter in a raised position for a sufficiently-long time to enable the cutter to traverse the rasp-blank so far that at its next blow it will descend behind the spaces occurring between the two outermost teeth of the last preceding row. When this is accomplished the tripper-teeth *h* operate the tripper-lever K, cross-head J, and cutter at regular intervals, as before. The traverse of the cutter is effected by means of a cam, M, arranged upon a sleeve, M^1, supported loosely upon the shaft H, so that it may revolve independently thereof. This sleeve M^1 is provided with a gear-wheel, M^2, which is driven by a pinion, M^3, mounted on the driving-shaft G, and thence derives its motion.

The cam M is provided with a peripherical groove, *i*, which inclines throughout one-half of the periphery of said cam in one direction, and throughout the other half of its periphery in the other direction; or, in other words, the

center line of this groove is inclined relatively to the axis of the said cam. N designates a lever, pivoted to a stand, N^1, provided with a stud, N^2, preferably furnished with a bowl or roller, entering or fitting within the groove *i* of the cam N. The cam, in revolving, alternately swings this lever N to and fro in a direction transverse to the frame of the machine. The said machine is provided also with a stud, N^3, preferably furnished with a bowl or roller and fitting within a yoke, N^4, connected to the shaft I^3, whereon the helve of the cutter-holder is pivoted, and to a shaft, I^4, arranged above the same. As the lever N is swung to and fro by the cam M, it moves the yoke N^4 and shafts I^3 I^4 transversely to the frame of the machine, and thereby carries the helve I^2 of the cutter-holder in the same direction and effects the traverse of the cutter, the said helve I^2 moving the while through the opening *g* of the cross-head J.

The stud N^3 of the lever N is preferably adjustable relatively to said lever, so that it may be shifted nearer to or farther from its fulcrum, in order to produce a shorter or longer movement of said yoke N^4 by the lever, and hence a greater or less traverse of the cutter I. By this means the machine is adapted for producing teeth on rasp-blanks of different sizes, for when the traverse of the cutter is reduced by the adjustment of the stud operating its yoke, the blows of the cutter will be made nearer together, and hence will produce a finer rasp, providing the energy of the blow be regulated properly to correspond with the traverse of the cutter.

It will be seen that by our invention we produce a machine wherein rasps of various sizes and qualities may be produced by affording provision for the adjustment of the feed of the blank under the cutter, by adjusting the traverse of the cutter to regulate the spacing of the teeth, and by regulating the energy of the blows of the cutters; and that we also produce a machine wherein, owing to the dwell of the tripping mechanism, the arrangement of the teeth of successive rows opposite the spaces between the teeth of preceding rows may be accomplished, and wherein, owing to the provision for the rebound of the cutter independently of the mechanism which operates it, a very superior quality of rasp-teeth may be produced.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, with a cutter-helve, pivoted loosely to a supporting-shaft of a cross-head, admitting of the traverse and vertical play of said cutter-helve within it, of mechanism for raising said cross-head, and means for impelling it toward the bed, so as to produce the blow of the cutter and allowing it to rebound, substantially as and for the purpose specified.

2. The combination of the cutter-helve I^2, supporting-shaft I^3, cross-head J, with its opening *g*, tripper-lever K, eyebolts J^1, and springs J^2, substantially as and for the purpose specified.

3. The combination of the cutter I, supporting-shaft I^3, yoke N^4, lever N, frame J, and tripper-wheel L, provided with the peripherically-elongated tooth *h'*, substantially as and for the purpose specified.

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