

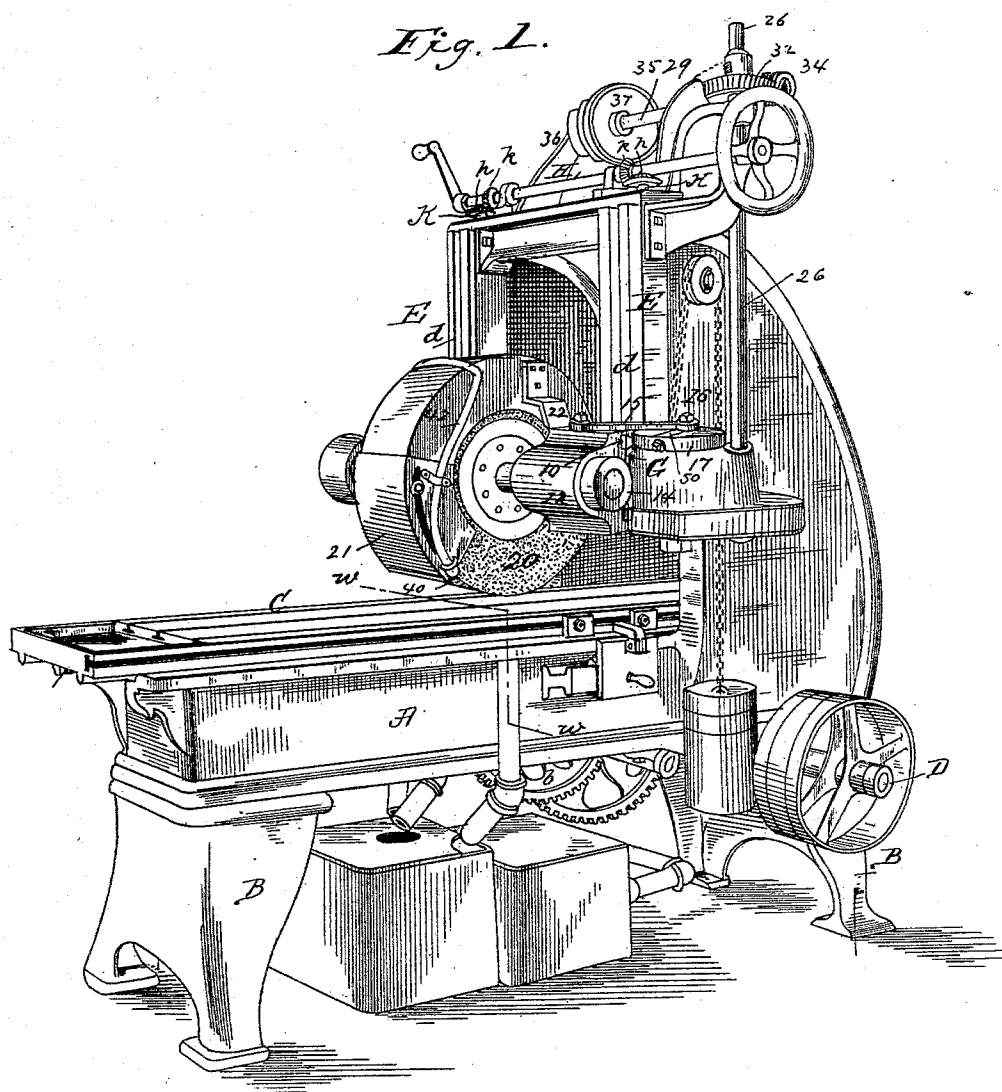
(No Model.)

3 Sheets—Sheet 1.

E. R. HYDE & R. C. HORNER.
SURFACE GRINDING MACHINE.

No. 401,278.

Patented Apr. 9, 1889.



Witnesses

W. J. Bellows
G. M. Chamberlain

Inventors

Elwin R. Hyde,
Richard C. Horner,
By their Attorneys *Chapman*

(No Model.)

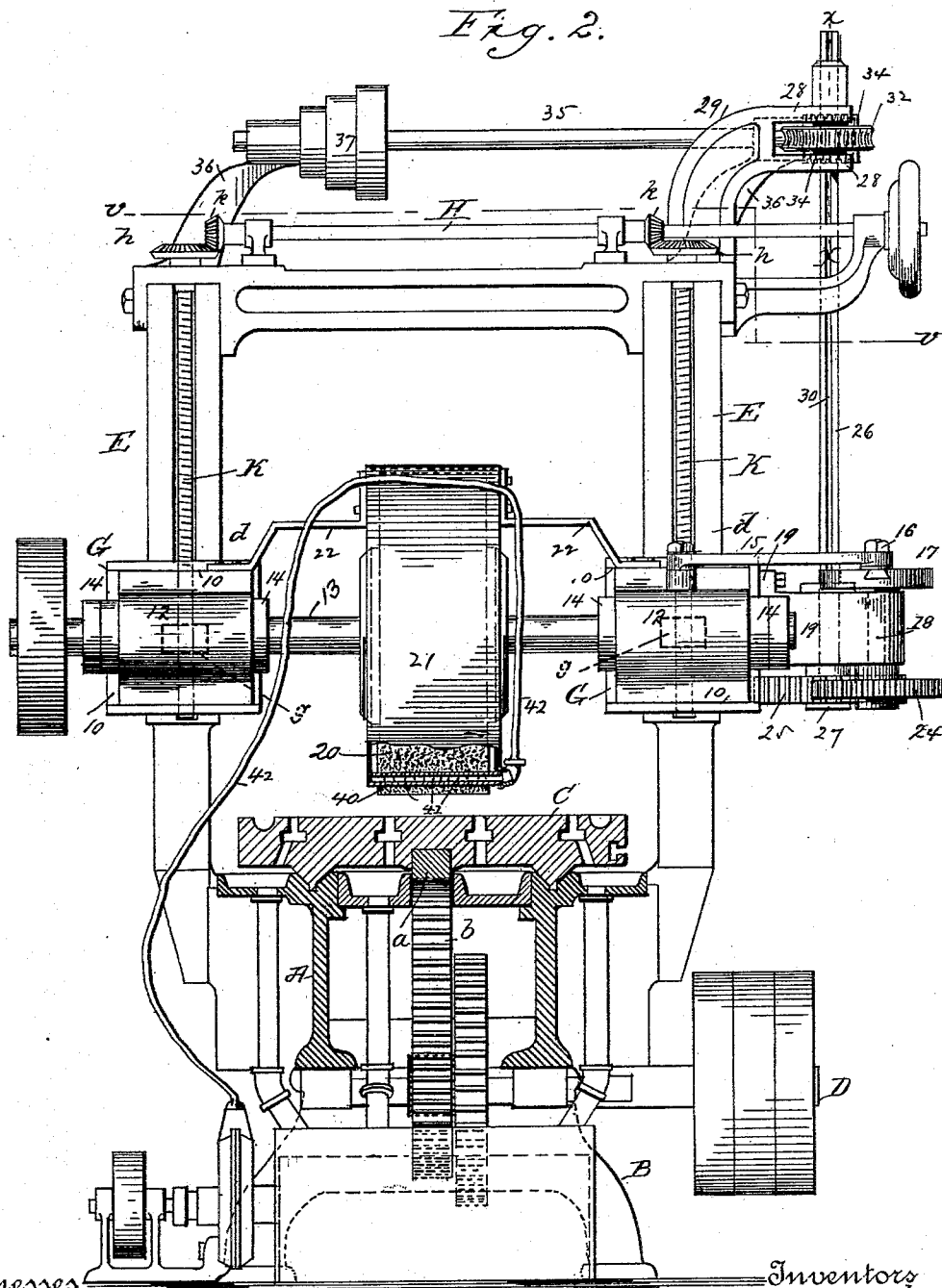
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Fig. 2.



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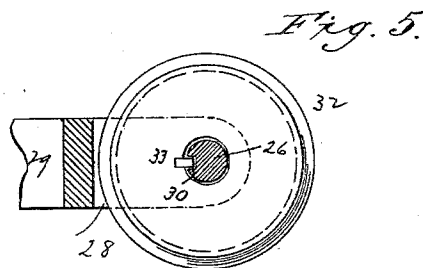
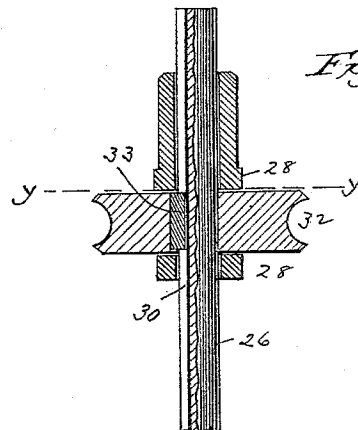
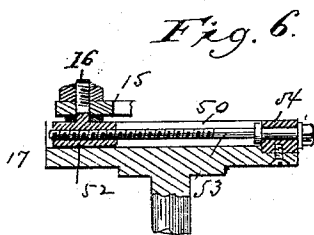
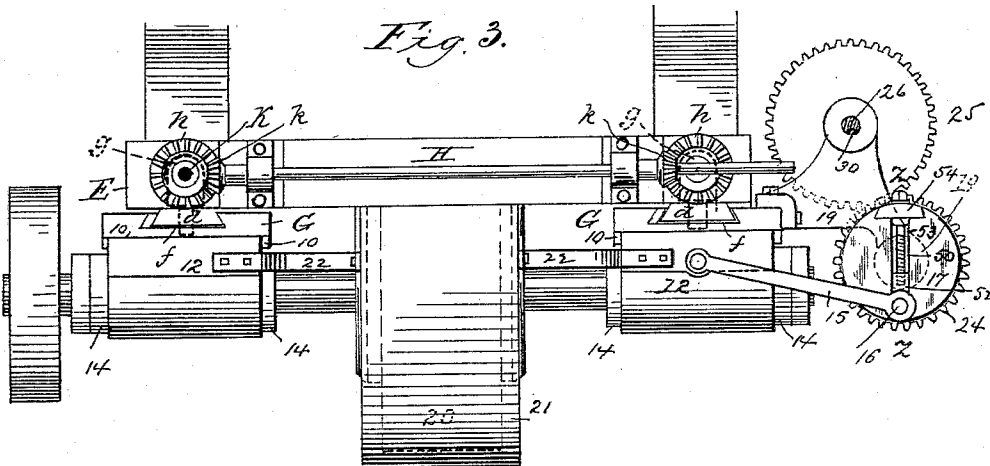
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UNITED STATES PATENT OFFICE.

ELWIN R. HYDE AND RICHARD C. HORNER, OF SPRINGFIELD, MASSACHUSETTS.

SURFACE-GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 401,278, dated April 9, 1889.

Application filed March 23, 1888. Serial No. 268,244. (No model.)

To all whom it may concern.

Be it known that we, ELWIN R. HYDE and RICHARD C. HORNER, citizens of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Surface-Grinding Machines, of which the following is a specification.

This invention relates to that class of surface-grinding machines in which a rotatable grinding wheel or disk is mounted in suitable bearings or supports from a bed or body for receiving and supporting the work to be surfaced or ground, the essential feature of the present invention consisting in the means employed for securing a vibration of said rotatable grinding-wheel across the bed or table thereon; and the invention consists in the construction and combinations of the parts, all substantially as will hereinafter more fully appear, and be set forth in the claims.

In the accompanying drawings the present invention is illustrated.

Figure 1 is a perspective view of the grinding-machine. Fig. 2 is an end elevation thereof, with some parts in cross-section on line *w w*, Fig. 1. Fig. 3 is a partial plan view at the head of the machine, with parts above the horizontal plane indicated by line *v v*, Fig. 2, removed for better illustration. Fig. 4 is a vertical section in detail on line *x x*, Fig. 2. Fig. 5 is a horizontal section on the line *y y*, Fig. 4. Fig. 6 is a detail vertical section on line *z z*, Fig. 3.

The machine here illustrated as embracing the features of the present invention comprises a bed, A, suitably mounted on legs B, said bed being provided with V-ways, in which a reciprocating table, C, is longitudinally guided and driven by the engagement with its rack *a* of a gear-wheel, *b*, mounted in suitable bearings of the bed and driven through intermediate gearing from the main shaft D, as common in planer-beds. The bed at one end has the uprights E E secured thereto, each provided with vertical dovetail ways *d d*, on which are vertically guided slide-blocks G G, having correspondingly-formed dovetail openings *f f*, for embracing the dovetail ways *d d*, and with the usual screw-threaded nut or projection on each vertically-sliding block G

(indicated by dotted lines at *g*) engages a vertical rotatable screw-shaft, K, hung in bearings of each of the uprights, said screw-shafts each being provided at its upper end with a bevel-gear, *h*, with which bevel-gears the bevel-gears *k k* of a common horizontal shaft, H, mesh, said latter shaft being mounted in bearings and brackets of the uprights, and provided with a hand-wheel for securing its rotation.

Each vertically-movable slide-block G is provided with suitable horizontal ways, 10 10, within which are supported slides or carriers 12 12, having therein in horizontal alignment bearings for a shaft, 13, which is rotatable therein, but prevented from any endwise movement therethrough by the employment of the collars 14 at each side of said slides 12, whereby said slides are caused to move in unison in their horizontal ways on motion being imparted to one thereof through the medium of a pitman-rod, 15, by one end connected to one of said slides, and by its other end connected to a pin, 16, eccentrically located on a face-plate, 17, hung at one end of shaft 18, bearing in a bracket arm or extension, 19, of one of the vertically-movable slide-blocks G. Intermediate of the said slides 12 the shaft is provided with a grinding disk or wheel, 20, about which for the greater portion of its periphery and sides is a hood, 21, supported by arms 22 from said slides 12. The said shaft 18, extending through the bracket 19, is provided at its lower end with a fixed gear, 24, with which meshes a gear, 25, and a vertical shaft, 26, having bearing by its lower end within the said bracket 19; and by its abutting collars 27 above and below the bracket it is prevented from any endwise movement in relation to said bracket, or, in other words, on the bracket being moved vertically with the one slide G the shaft also correspondingly moves. Said shaft is provided with a longitudinal spline-groove, 30, and at the upper part of the machine it has bearings in the bifurcated end portion, 28, of a bracket, 29, between the members of which end portion is confined a worm-wheel, 32, through which the said shaft 26 passes, a feather, 33, provided at the central opening of the said gear extending into the shaft-groove 30, form-

ing a sliding spline-connection between the said shaft and the gear. A worm-screw, 34, engages with said worm-wheel 32, said worm-screw being carried by a horizontal shaft, 35, mounted in bearings of brackets 36 at the upper ends of the uprights E, said shaft 35 being rotated by a speed-pulley, 37, secured thereon.

There is transversely supported thereon at the front side of the hood 21 a pipe, 40, provided through its walls toward the said grinding-wheel 20 with a series of perforations, 41, therein, said pipe at its one end being closed, and to the other end thereof is connected a flexible hose-pipe, 42, leading from a suitable pump and tank, whereby water is forced into said pipe 40, and by the perforations therein uniformly disposed upon the face of the grinding-wheel.

With the article to be ground placed upon the reciprocating table C and a rotation secured on the shaft 35, through the worm-connection between said shaft and the shaft 26 the latter is rotated, and through its gear 25 engaging the gear 24 on the shaft 18 the face-plate 17 is rotated, through the connecting-rod 15 the slides 12 are vibrated, carrying the grinding-wheel across the work, while under the longitudinal movements of the carriage C the work thereon is also moved in relation to the grinding-wheel, and thereby securing a most effective, accurate, and speedy surfacing of such work. The water being conveyed to the face of the grinding-wheel, and thence onto the article being ground, serves to prevent any expansion of such article, whereby an inaccurate or uneven surfacing would result.

As seen in Fig. 1, the gears 24 and 25 are inclosed by a casing for preventing the entrance of dirt thereto. It will of course be understood that under the construction described the grinding-wheel supports or carriers and the mechanism for securing their vibration are vertically movable to accommodate varying heights of articles to be ground, the driving-connection from the shaft 29 remaining unsevered, as on a raising or lowering of the parts carried by the one slide G the splined shaft 26 plays vertically through the feathered opening in the gear 32 and the bearings 28. Provision is made for securing a longer or shorter lateral throw of the grinding-wheel slides by making the eccentric-pin 16 of the face-plate adjustable in relation to the center of the face-plate, and, as particularly shown in Figs. 3 and 6, the face-plate is provided with a radial groove, 50, within which is fitted a slide-block, 52, upon which is formed or attached the said pin 16. A headed and collared screw, 53, pass-

ing through a shoulder, 54, of the face-plate and along said groove 50, engages by its threads with said block 52, whereby on the turning of the screw in the proper direction the block may be moved radially toward or away from the center of the face-plate.

What we claim as our invention is—

1. In a surface-grinding machine, the combination, with a table and suitably-supported horizontal guideways, of the slides guided in said horizontal ways, carrying a rotatable grinding-wheel, a face-plate having a crank-pin, and a pitman-rod between said face-plate and said slide, for the purpose set forth.

2. The combination, with a bed, a longitudinally-reciprocating table thereon, and suitably-supported horizontal guideways, of the slides guided in said horizontal ways, carrying a rotatable grinding-wheel, a face-plate having a crank-pin, and a pitman-rod between said face-plate and said slide, substantially as and for the purpose described.

3. The combination, with a bed, a horizontal reciprocating table thereon, the uprights, and horizontal guideways thereon, of slides 12, movable in said guideways and carrying a rotatable grinding-wheel, the shaft 35, provided with the worm-screw 34, a shaft, 26, having a worm-wheel engaged by said worm-screw, and a gear, 25, a face-plate, 17, having a shaft, 18, and a gear, 24, engaging said gear 25 and provided with a crank-pin, and a pitman-rod, 15, connecting said crank-pin and one of said slides, substantially as and for the purpose described.

4. The combination, with a bed, a horizontal reciprocating table thereon, the uprights E E, and the screw-shafts K K, of the vertically-movable slide-blocks G G, engaging said screw-shafts having horizontal guideways, the slides 12, movable therein and carrying a rotatable grinding-wheel, the shaft 35, provided with the worm-screw 34, a vertical shaft, 26, having a spline-groove, a gear, 25, and a feathered worm-wheel confined against axial movement and engaged by said worm-screw, a bracket carried by one of said slide-blocks G, in which the lower end of said shaft 26 bears, the shaft 18, bearing in said bracket, provided with the gear 24, and the face-plate 17, having the crank-pin, and the pitman-rod connecting said crank-pin and one of said slides 12, substantially as and for the purpose described.

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