(No Model.) 3 Sheets—Sheet 1.

# F. A. PALMER.

## APPARATUS FOR SUPPLYING ABRADING AND POLISHING MATERIAL TO CUTTING AND POLISHING TOOLS.

No. 419,346. Patented Jan. 14, 1890.

Fig. 2.

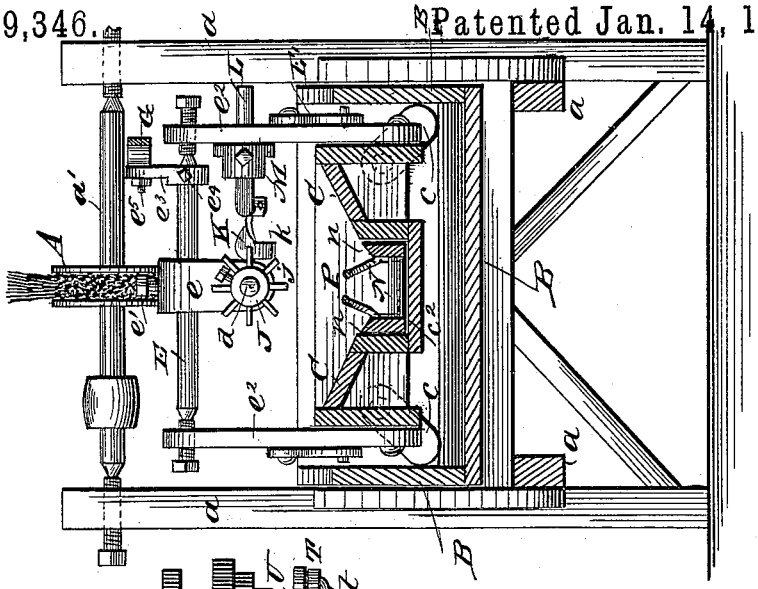


Fig. 1.

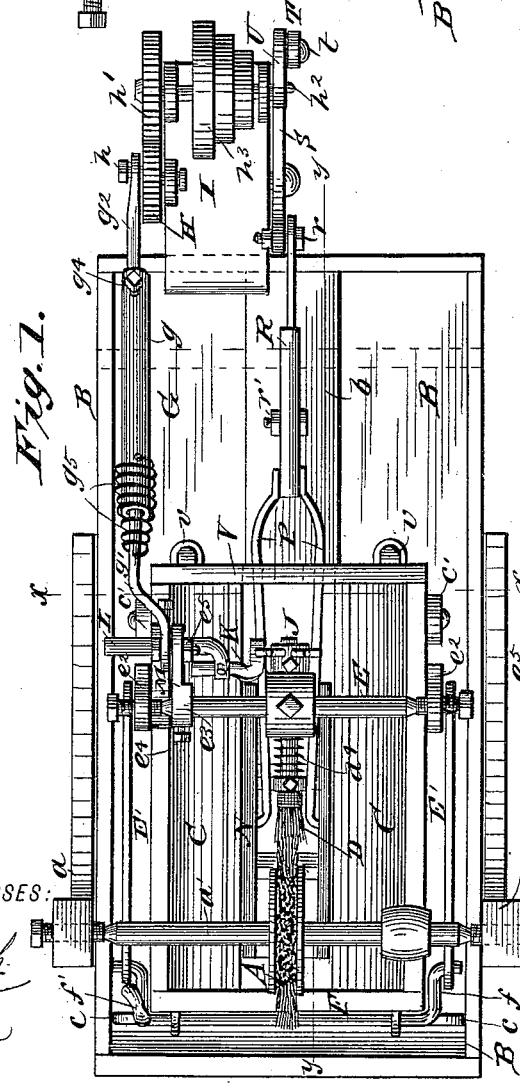
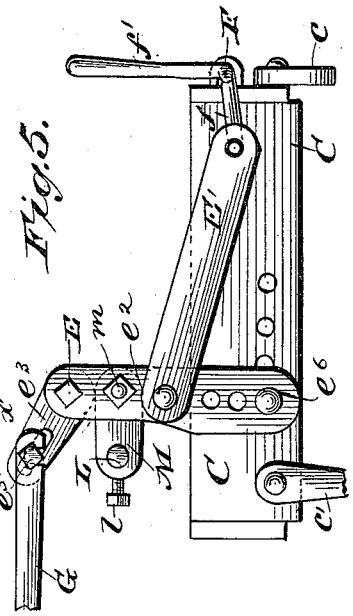


Fig. 5.



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(No Model.) 3 Sheets—Sheet 2.

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## APPARATUS FOR SUPPLYING ABRADING AND POLISHING MATERIAL TO CUTTING AND POLISHING TOOLS.

No. 419,346. Patented Jan. 14, 1890.

Fig. 7.

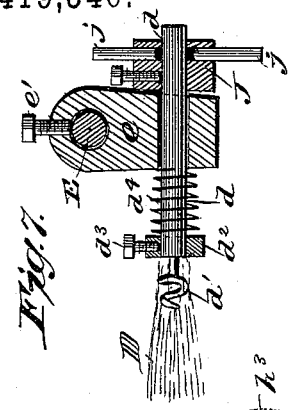

Fig. 6.

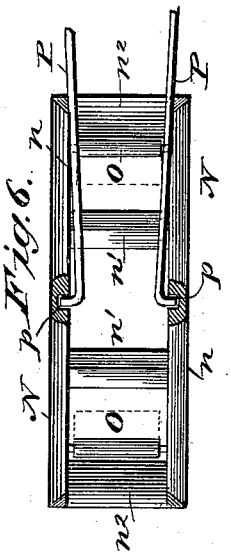

Fig. 8.

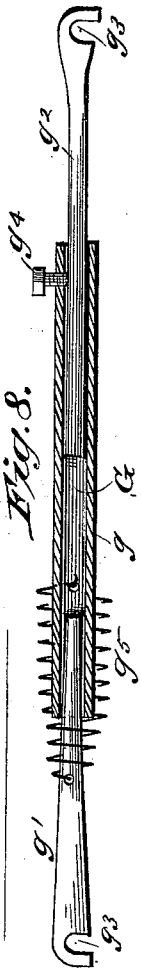

Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

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## APPARATUS FOR SUPPLYING ABRADING AND POLISHING MATERIAL TO CUTTING AND POLISHING TOOLS.

No. 419,346. Patented Jan. 14, 1890.

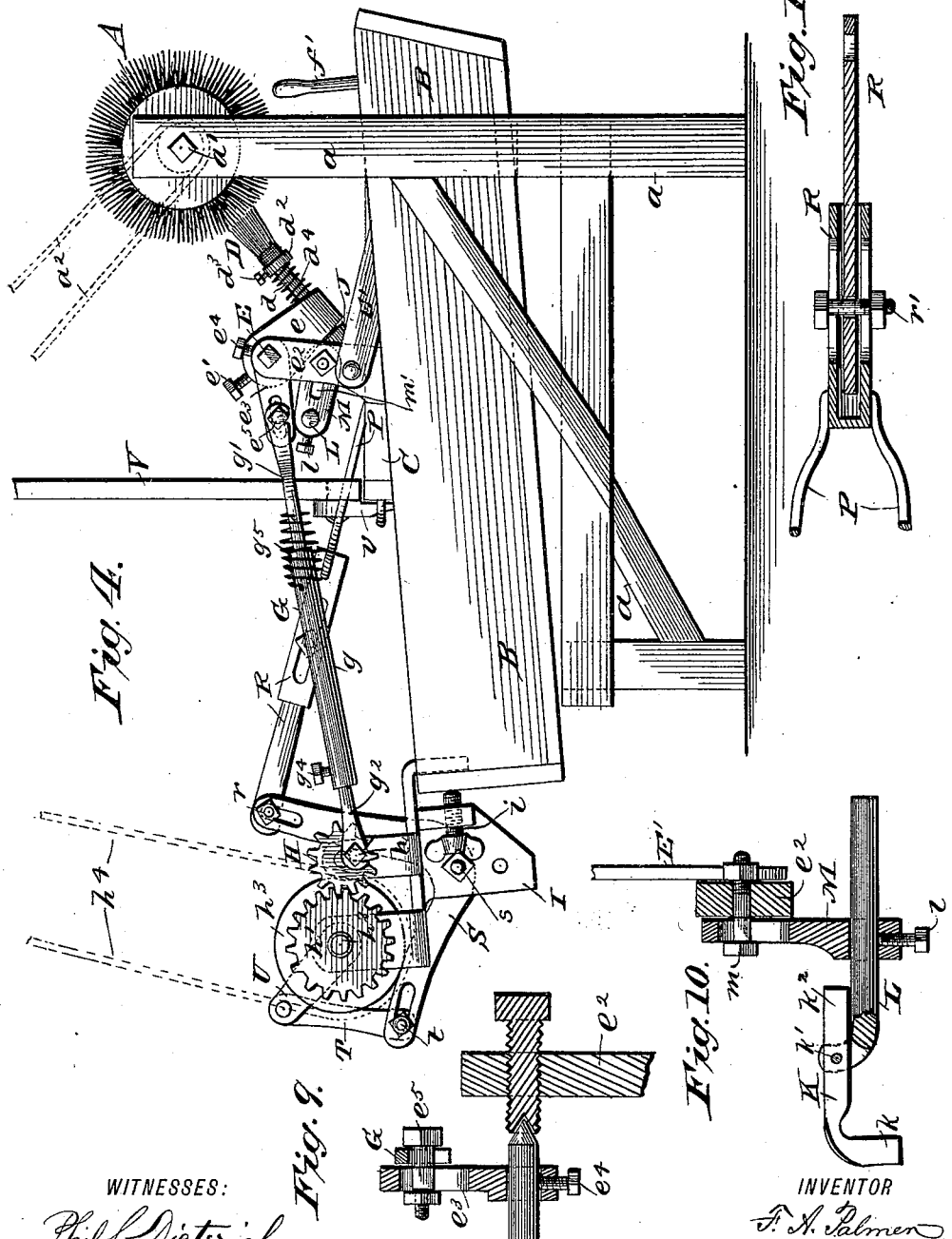

Fig. 4.



Fig. 11.



Fig. 10.



Fig. 9.

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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR SUPPLYING ABRADING AND POLISHING MATERIAL TO CUTTING AND POLISHING TOOLS.

SPECIFICATION forming part of Letters Patent No. 419,346, dated January 14, 1890.

Application filed January 15, 1889. Serial No. 296,402. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERIC A. PALMER, of Port Jervis, in the county of Orange and State of New York, have invented a new and Improved Apparatus for Supplying Abrading and Polishing Material to Cutting and Polishing Tools, of which the following is a full, clear, and exact description.

My invention relates to an apparatus or machine for automatically supplying abrading or polishing material or paste to brushes or tools used for cutting and polishing purposes, and more particularly to rotating brushes used in cutting and polishing glass-wares; and the invention has for its object to provide a convenient and efficient apparatus of this character.

The invention consists in certain novel features of construction and combinations of parts of the apparatus, as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of my improved apparatus. Fig. 2 is a vertical transverse section taken on the line $x\,x$ in Fig. 1. Fig. 3 is a central longitudinal section taken on the line $y\,y$ in Fig. 1. Fig. 4 is an elevation of the machine as seen from the left-hand side. Fig. 5 is a detail side view of the paste-box and a few connected parts. Fig. 6 is a plan view, partly broken away and in section, of the paste-agitator which reciprocates in the paste-box. Fig. 7 is a detail longitudinal section of the paste-supplying brush. Fig. 8 is a longitudinal section of the adjustable endwise-yielding pitman or rod which connects the operating mechanism with the paste-brush shaft. Fig. 9 is a detail vertical sectional view of one end of the paste-brush shaft and its adjacent bearing. Fig. 10 is a detail sectional plan view of the trip device by which the paste-brush is intermittently rotated, and Fig. 11 is a detail sectional plan view of portions of the paste-agitator pitman.

The cutting or polishing wheel A is journaled by its shaft $a'$ to front uprights of a suitable frame $a$, on which is supported a trough B, in which the polishing-paste box C is held stationary at the front end of the trough and below the polishing-wheel by means of a rear brace bar or stay $b$, set between the box and the back end of the trough. The paste-box is preferably provided with pivoted laterally-adjustable front legs $c\,c$ and longitudinally-adjustable pivoted rear side legs $c'\,c'$, by setting which the box may be stayed laterally at the front end of the trough and may also be given any desired downward inclination toward its front end and the polishing-wheel.

The brush D, by which the cutting or polishing paste or material is supplied to the wheel A from the box C, is turned onto a screw-wire $d'$ at the forward end of a shaft $d$, which is held loosely in an arm $e$, which is adjustably held by a set screw $e'$ to a transverse shaft E, which is journaled in the upper ends of two uprights $e^2\,e^2$, pivoted at their lower ends to opposite sides of the paste-box. Arms or rods E′ E′ connect the uprights $e^2\,e^2$ with the wrists of cranks $f\,f$, formed at opposite ends of a transverse shaft F, which is hung to the front end of the paste-box, and has an arm or handle-lever $f'$ in reach of the operator at the polishing-wheel, who may by actuating the lever swing the brush D toward or from the polishing-wheel, as may be required, to accommodate the wear of the brush and wheel or different-sized wheels which any particular style of work may require. This adjustment of the paste-applying brush relatively to the polishing-wheel A is effected not by the forward and backward movement of the pivoted uprights $e^2$ alone, but also through the medium of an arm $e^3$, held adjustably to the brush-shaft E by a set-screw $e^4$ and connected to the forward end of a rod or pitman G, the rear end of which is attached to a crank wrist-pin or bolt $h$ on a gear-wheel H, which is journaled on a detachable frame or bed-plate I, held by a clamp or set-screw $i$ or otherwise to the back end of the relatively-stationary trough B of the machine. This gear-wheel H is rotated by meshing with another gear-wheel $h'$ about twice its diameter and fixed on a shaft $h^2$, journaled in the frame I, and carrying a cone-pulley $h^3$, from which a belt $h^4$ leads to a pulley on an overhead counter-shaft, (not shown,) and from which the cutting or polishing wheel is also

driven by a belt $a^2$, running to a pulley on the wheel-shaft.

It is obvious that as the gear-wheel H is rotated the paste-brush shaft E will be rocked by the connecting-rod G, to cause the brush D to dip into the paste or abrading or polishing material in the box C, and then rise and touch the rotating brush A, to supply it with paste automatically, and that by setting the pivoted uprights $e^2$ forward or backward by operating the lever $f'$ of the cranked shaft F the brush D may be properly adjusted to cause it to come in contact with the polishing-wheel.

To assure the utmost nicety of adjustment of the paste-brush to feed the paste to the wheel, as above described, the brush-holding arm $e$ is adjustable around the brush-shaft E, to which it may be held at any required angle or radius by the set-screw $e'$, and the arm $e^3$ is slotted where the bolt $e^5$, which attaches the pitman G, passes through it, to allow the pitman to be adjusted nearer to or farther from the shaft E to impart a greater or less extent of rocking or oscillatory motion to the paste-brush. Fig. 5 of the drawings shows that the lower ends of the pivoted uprights $e^2$ and the sides of the paste-box C have series of holes to receive the pivots $e^6$, to provide for bringing the brush-shaft E considerably nearer the polishing-wheel shaft and lower down also to accommodate different wheels and work, connecting-rods E' of different lengths being used as circumstances may require.

It will be seen in Figs. 1, 3, 4, and 7 of the drawings that the paste-brush shaft $d$ is free to rotate and also to move endwise in the arm $e$, by which it is connected to its rock-shaft E, and on the shaft $d$ is placed a collar $d^2$, held adjustably by a set-screw $d^3$, and between this collar and the arm $e$ is placed on the shaft $d$ a spring which normally presses forward—preferably a spiral spring $d^4$—and offers a greater or less resistance to the backward bodily movement of the brush in the arm, accordingly as the collar is set nearer to or farther from the arm. The spring is prevented from forcing the brush-shaft forward out of the arm $e$ by a tappet-wheel J, which is held to the brush-shaft $d$ by a set-screw and is intermittently rotated to correspondingly turn the paste-brush as it rises from the box C by contact of one of its pins or tappets $j$ with the bent end $k$ of a trip-arm K, which is pivoted at $k'$ to the bent end of a rod L, which is held by a set-screw $l$ in the outer end of an arm M, which is held at its other end by a bolt or screw $m$ to the adjacent upright $e^2$ of the paste-brush frame. The bolt $m$ passes through a slot $m'$ in the arm M, thus allowing the rod L and trip-arm K to be set bodily forward, and the rod L, when its set-screw $l$ is loosened, may be shifted endwise or laterally of the machine, and may also be turned in its bearing in the arm M, thus permitting accurate adjustment of the trip-arm K relatively with the radial pins or tappets of the wheel J to cause proper engagement of the tappet-wheel with the trip-arm. To intermittently rotate the paste-brush, however, it may be adjusted with relation to the polishing-wheel A.

It will be understood that as the brush D swings downward to the paste in the box C the tappets of the wheel J strike the trip-arm K and simply swing it on its pivot $k'$, and that as the brush rises and the tappet-wheel consequently descends and swings forward one of its tappets will strike the end $k$ of the trip-arm, and as the tail $k^2$ of said arm now stops against the side of its supporting-rod L the resistance of its end $k$ against said tappet will give a partial rotation to the tappet-wheel and the paste-brush, and as this takes place at every oscillation of the brush the latter will wear evenly and effect a uniform distribution of the paste onto the polishing-wheel. By regulating the position of the brush-collar $d^2$, and consequently controlling the resistance of the spring $d^4$, the backward yielding of the brush to regulate the force or pressure of its impact on the polishing-wheel may be controlled to a nicety, and this function of the brush also promotes uniform feed of paste to the wheel.

The construction of the pitman or connecting-rod is important. In Fig. 8 of the drawings it will be seen that in its preferred form the pitman is made in three parts, or a central tube or bar $g$ and opposite end rods or parts $g'$ $g^2$, which are fitted to slide in or on the part $g$, and are provided with open hooks $g^3$ at their outer ends to make readily-detachable connection with the bolts or studs $e^5$ $h$ on the paste-brush-shaft arm $e^3$ and the driving gear-wheel H. A set-screw $g^4$ in the tube or bar $g$ serves to bind the end rod $g^2$ fast to the part $g$, however it may be adjusted therein, to regulate the average length of the pitman to allow the paste-box C and the frame or bed-plate I, carrying the driving-gearing, to be operated at or on troughs B of different lengths; but this endwise adjustability of the pitman by the sliding part $g^2$ and set-screw $g^4$ is its least important feature, which may be dispensed with. In other words, the rod $g^2$ may be fixed permanently to the part $g$, if preferred.

The most important feature of the pitman G is its construction to allow its endwise expansion and contraction or lengthening and shortening to permit the paste-brush D, when brought in contact with the polishing-wheel A, to "dwell" or stop thereat for a longer or shorter time, to more completely control the distribution of the paste to the wheel, as different classes of work being operated on may require. The preferred construction of the pitman to attain this end is to make one part of it—say the rod $g'$—movable endwise on or in the adjacent part or tube $g$, and to connect both parts by a spring, preferably a spiral spring $g^5$, which normally contracts and tends

to shorten the pitman, but allows it to lengthen while the end connecting-bolt or wrist-pin $h$ on the gear-wheel H is approaching and passing its outer dead-center and while the arm $e^3$ of the brush-shaft E rests against a stop or detent after the paste-brush has touched the wheel. In the preferred construction of the machine I make the arm M, which holds the trip-arm K, serve this purpose, as will clearly appear in Fig. 4 of the drawings, which shows the paste-brush rock-shaft arm $e^3$ down in contact with the arm M, while the brush D touches the wheel, and that the wrist-pin $h$ on the wheel H has not yet reached its outer dead-center of movement; hence it is obvious that while the pin $h$ is passing around its outer dead-center of motion the spring $g^5$ of the pitman G will allow the latter to expand and contract, it being understood that this spring has sufficient stiffness to assure the simple oscillatory motion of the paste-brush at all other times, or when the arm $e^3$ is not in contact with the detent-arm M. It is manifest that by adjusting the arm $e^3$ to different radial positions on the paste-brush shaft E the instant of contact of the arm with the relatively stationary detent, as M, may be regulated to a nicety to accordingly regulate the extent of the dwell or stoppage of the paste-brush at the polishing-wheel to lay the paste thereon while the wrist-pin $h$ is making its outside half-revolution. I here remark that the bodily endwise motion or yielding of the paste-brush, due to its spring $d^4$, is of special value in this connection, as the brush, while dwelling or stopping at the polishing-wheel, is free to yield a little to accommodate itself to any wabbling of the periphery of the wheel.

I prefer to journal the polishing-wheel and paste-brush shafts by conical end bearings in set-screws fitted in their supports, as clearly shown in Figs. 1, 2, and 9 of the drawings.

In combination with the paste-box, the paste-brush, and the mechanism operating the latter, I have provided an agitator for the paste, which works in the paste-box and thoroughly mixes the paste and carries it to a central point or place in the box, where the paste-brush descends to it for its supply until the paste is quite used up.

I particularly describe the paste-agitator as follows: The paste-box C has a bottom or floor ranging lengthwise and sloping from each side of the box toward a central longitudinal trough $c^2$, which ordinarily will be fitted with prepared paste or abradant, and in which the agitator N reciprocates lengthwise of the machine. The agitator is in the form of an open frame, comprising opposite side bars $n$ $n$, preferably beveled inward at the top and connected by a series of cross-bars, preferably four, the two inner or central ones $n'$ $n'$ being sharpened or beveled upward and inward toward their centers, and the two outer or end ones $n^2$ $n^2$ are sharpened or beveled downward from their inner vertical sides to their outer edges. All of the cross-bars have flat bottom faces in the plane of the lower edges of the side bars; hence, as the agitator is reciprocated in the paste-box by mechanism presently explained both edges of the center cross-bars $n'$ and the outer edges of the end cross-bars $n^2$ will constantly scrape the paste from the bottom of the box and lift and mix or thoroughly agitate it, and also tend to work the paste toward the center of the box, whereto the paste-brush D descends for its supply. To positively assure the working of the paste toward the center of the box, where the brush can take it up easily and certainly, flap-valves or gates O O are pivoted to the agitator, one at or across each end, so as to close downward against the inner edges of the end cross-bars $n^2$ $n^2$; hence during movement of the agitator either way in the paste-box one of the valves will open to allow passage of paste over the adjacent cross-bar $n^2$, while the other valve will close to its adjacent cross-bar $n^2$ to force or carry toward the center of the box C the paste which has previously passed over this bar on the prior stroke or half-stroke of the agitator; hence it will be seen that as long as there is any reasonable quantity of paste in the box C it will be automatically carried or heaped up at the center of the box by the agitator and in easy reach of the paste-brush.

To operate the paste-agitator, I employ a somewhat elastic wire or rod yoke P, which has bent ends $p$ $p$, which spring into notches or holes made in the sides of the agitator, (see Fig. 6,) and this yoke is connected by a rod R and pin or bolt $r$ with one arm of an elbow-lever S, which is pivoted at its angle by a pin or bolt $s$ to the gearing-frame or bed-plate I, and at the extremity of its other arm is connected by a pin or bolt $t$ with one end of a link T, the other end of which is connected to the wrist-pin of a crank-arm U, which is fixed to the driving-shaft $h^2$ of the gearing; hence as the paste-brush is actuated the agitator will also be operated from the same driving-belt $h^4$, leading from any convenient motor. The bolts or pins $r$ $t$ are held in slots in the elbow-lever S, which allows adjustment to secure variation in the stroke of the agitator as circumstances may require. When the brush-operating pitman G is made lengthwise adjustable by the set-screw to accommodate troughs B of different lengths to which this apparatus is to be applied, the connecting-rod R will also be made in two lengthwise-adjustable sections held by a set-screw $r'$, and as will be understood from Figs. 1, 3, and 11 of the drawings. The rod R has a hook end engaging the elbow-lever bolt or pin $r$, substantially as the hook ends of the pitman G engage the bolts or pins $h$ $e^5$, thus allowing quick and easy disconnection of the parts at any time.

A board or plate V, held by pins and staple-connections $v$ $v$ to the rear end of the paste-box, catches the paste and damp dust thrown

off from the polishing-wheel and conducts it back to the paste-box, while protecting the back driving-gearing against spatterings from the wheel. This spatter-board has a couple of openings through which the yoke P moves in operating the agitator in the paste-box.

In so far as some of the features of my invention hereinafter claimed are concerned, it is immaterial whether the brush which applies the paste to the polishing-wheel be arranged to oscillate or to rotate, provided it touches the polishing-wheel after dipping into the paste box or reservoir.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with a polishing-wheel and a reservoir of polishing material, of an oscillating brush dipping into the reservoir and touching the wheel and an agitator working in the reservoir to carry the polishing material to the brush, substantially as herein set forth.

2. The combination, with a polishing-wheel and a reservoir of polishing material, of a brush dipping into the reservoir and touching the wheel and sustained elastically to yield bodily after contact with the wheel, substantially as described, for the purposes set forth.

3. The combination, with a polishing-wheel and a reservoir of polishing material, of an oscillating brush journaled for independent axial movement and provided with a tappet-wheel, and a trip-arm intermittently rotating the brush as it is oscillated between the reservoir and polishing-wheel, substantially as herein set forth.

4. The combination, with a polishing-wheel and a reservoir of polishing material, of an oscillating brush journaled for independent axial movement and supported elastically endwise and provided with a tappet-wheel, and a trip-arm intermittently rotating the brush as it is oscillated between the reservoir and polishing-wheel, substantially as herein set forth.

5. The combination, with a polishing-wheel and a reservoir of polishing material, of an oscillating brush dipping into the reservoir and touching the wheel, an expanding and contracting pitman connecting the brush with a motor, and a stop or detent limiting the oscillation of the brush before the pitman finishes the farther half of its stroke, substantially as described, whereby after the brush touches the polishing-wheel it will dwell or stop for a time thereat, as and for the purpose set forth.

6. The combination, with a polishing-wheel and a reservoir of polishing material, of an oscillating brush dipping into the reservoir and touching the wheel and supported elastically to yield bodily after contact with the wheel, an expanding and contracting pitman connecting the brush with a motor, and a stop or detent limiting the oscillation of the brush before the pitman finishes the farther half of its stroke, substantially as described, whereby after the brush touches the polishing-wheel it will dwell or stop thereat for a time and may also have limited endwise play, as and for the purposes set forth.

7. The combination, with a polishing-wheel and a reservoir of polishing material, of a shaft E and arm $e$ held thereto for radial adjustment, an arm $e^3$ on the shaft, a brush held to arm $e$, and a pitman connecting the arm $e^3$ with a motor for oscillating the brush between the reservoir and polishing-wheel, substantially as herein set forth.

8. The combination, with a polishing-wheel and a reservoir of polishing material, of a shaft E and arm $e$ held thereto, an arm $e^3$ on the shaft E, a brush held to the arm $e$, an expanding and contracting pitman connecting the arm $e^3$ with a motor for oscillating the brush, and a detent or stop, as M, for the arm $e^3$ on the brush-shaft, substantially as described, for the purposes set forth.

9. The combination, with a polishing-wheel and a reservoir of polishing material, of a rock-shaft E and arm $e$ thereon, a pitman oscillating the shaft, a brush held to the arm $e$ and having bodily endwise motion therein, and a spring normally projecting the brush and yielding under pressure of the brush on the polishing-wheel, substantially as herein set forth.

10. The combination, with a polishing-wheel and a reservoir of polishing material, of a rock-shaft E, having an arm $e$, a brush journaled to said arm and carrying a tappet-wheel, a rod L, fitted for endwise and axial movement in an adjacent support, and a pivoted trip-arm K, held to the rod and on which the brush tappet-wheel acts to rotate the brush as it is oscillated, substantially as herein set forth.

11. The combination, with a polishing-wheel and a reservoir of polishing material, of a rock-shaft E, having an arm $e$, a brush held to said arm by a shaft $d$, having endwise and axial movement therein, a spring normally projecting the brush and yielding under pressure of it on the polishing-wheel, a tappet-wheel on the brush-shaft, and a pivoted trip-arm on which the tappet-wheel acts to rotate the brush as it is oscillated, substantially as herein set forth.

12. The combination, with a polishing-wheel and a trough or support, of a paste-box held in the trough below the wheel and provided with laterally-adjustable legs $c$ and longitudinally-adjustable legs $c'$, substantially as herein set forth.

13. The combination, with a polishing-wheel, a trough, and a polishing material or paste box, of arms $e^2$, pivoted to the box, a cranked rod F $f$, journaled on the box, rods connecting the cranks and arms, and a brush sup-

ported in the arms and operating between the paste-box and polishing-wheel, substantially as described, for the purposes set forth.

14. The combination, with a polishing-wheel, a trough or support, a polishing material or paste box, and a brush operating between the box and wheel to supply the latter with paste, of an agitator reciprocating in the paste-box, substantially as herein set forth.

15. The combination, with a polishing-wheel, a trough or support B, a polishing-paste box, and a brush operating between the box and wheel to supply the latter with paste, of an agitator fitted in the paste-box, a yoke or rod P, connected to the agitator, an elbow-lever S, gearing, substantially as specified, operating said lever, and a rod connecting said yoke and lever, substantially as herein set forth.

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