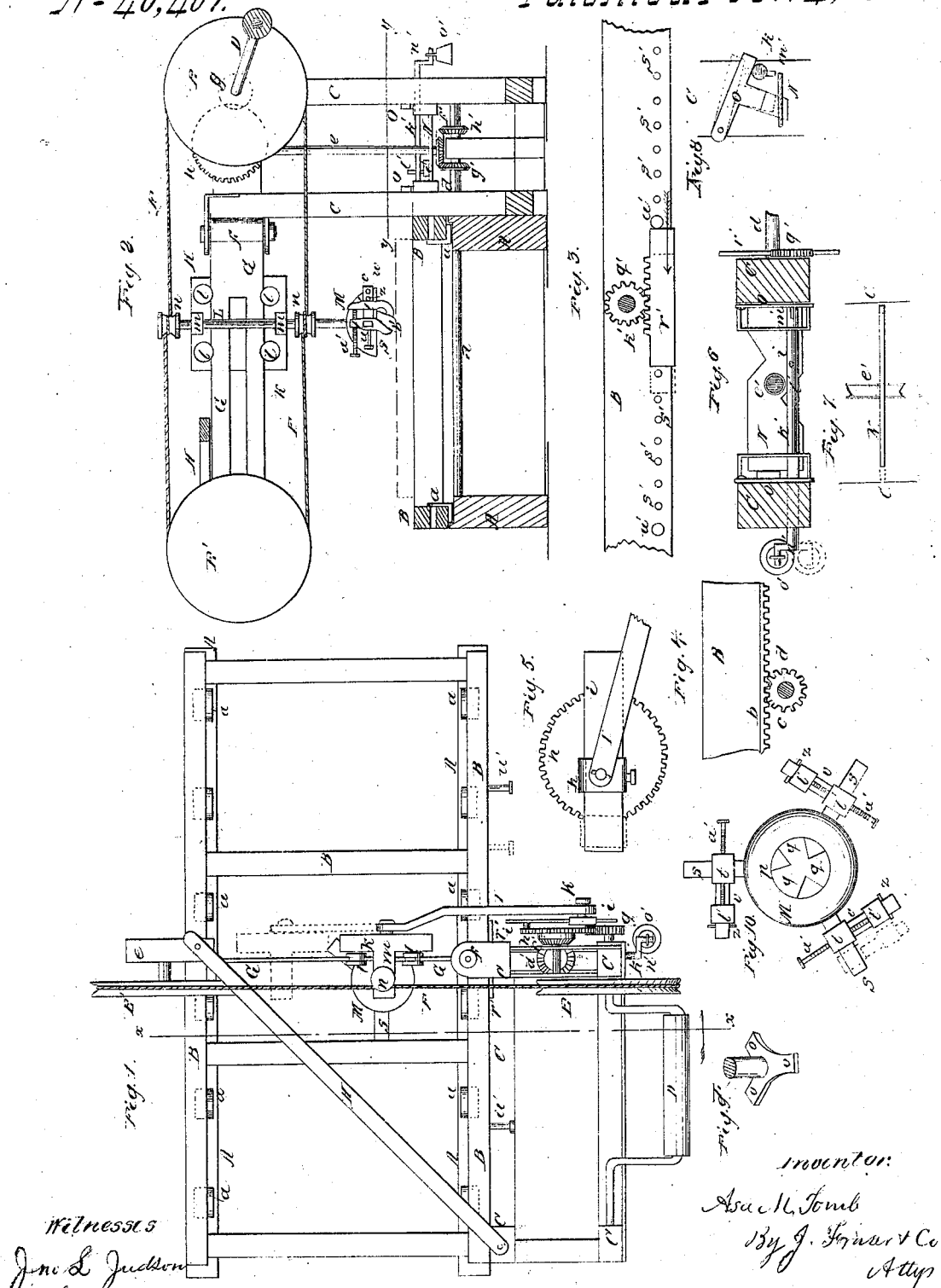
A. M. Tomb,

Polishing Marble.

No. 46,407. Patented Feb. 14, 1865.



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UNITED STATES PATENT OFFICE.

ASA M. TOMB, OF LYONS, NEW YORK.

IMPROVED MACHINE FOR POLISHING MARBLE.

Specification forming part of Letters Patent No. **46,407**, dated February 14, 1865.

To all whom it may concern:

Be it known that I, ASA M. TOMB, of Lyons, in the county of Wayne and State of New York, have invented certain new and useful Improvements in Machines for Polishing Marble and other Stone; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

Figure 1 is a plan of my improved machine; Fig. 2, a vertical section thereof in the plane of line *x x*, Fig. 1; Fig. 3, a view of one side of the carriage for holding the stone with the adjusting-holes therein, and also the device for changing the motion of the carriage; Fig. 4, a view showing the device for giving motion to the carriage; Fig. 5, a view of the crank device for operating the pitman that actuates the polishing-carriage; Fig. 6, a plan of the apparatus for shifting the motion of the carriage that holds the stone, the posts of the frame being shown in section of plane *y y*, Fig. 2; Fig. 7, a diagram representing the adjustability of the bar or plate that supports the shaft of the shifting-pinion; Fig. 8, a view of one of the dogs that retains the shifting bar or plate, and showing its connection with the other operating devices; Fig. 9, a perspective view of the lower end of the polishing-shaft that fits in the socket or head; Fig. 10, a plan of the polishing socket or head.

Like letters of reference indicate corresponding parts in all the figures.

As represented in the drawings, A is a suitable bed or support, on which rests a sliding carriage, B, for supporting the stone to be polished, said carriage being provided with friction-rollers *a a*, as usual in ordinary carriages for similar or other purposes. This carriage may be moved forward and back to present the stone properly to the polishing device by any suitable device—such, for instance, as racks *b b*—under its opposite sides, into which gear pinions *c c*, situated on a shaft, *d*, Fig. 4, extending out and connected in any suitable manner with the gearing that operates the machine.

On one side of the bed and carriage above described is situated a frame, C, in which is mounted the operating apparatus. Under ordinary circumstances I design that my improved machine shall be operated by hand. In such case a hand-crank, D, of ordinary construction, is mounted at a suitable position, having secured to its axis a pulley, E, around which passes a band, F, extending transversely at a proper height over the carriage B, and passing at the opposite end around a similar pulley, E, whose only office is to keep the band straight and in position. The pulley E is secured to a way or guide, G, substantially of the form shown in Figs. 1 and 2, which is jointed or hinged at the inner end, as shown at *f*, in such a manner that it may be swung around sidewise at pleasure. When fixed, the way or guide is kept in position by means of a removable brace, H, that connects its outer end with one of the posts of the frame. On the outer end of the axis of the hand-crank D is situated a pinion, *g*, Fig. 1, gearing into a cog-wheel, *h*. To the outer face of this wheel the end of a pitman, I, is jointed, the opposite end being similarly jointed to a sliding block or carriage, K, provided with rollers *l l*, moving on the way or guide G. This sliding block is provided with projections *m m*, which sustain a shaft, L, having fixed pulleys *n n* in such positions as to correspond with the opposite sides of the band F, which is wound once around each pulley, as shown in Fig. 2. By this means not only is motion imparted to the shaft by the band, thereby avoiding a complicated arrangement of gearing for the purpose, but, most important, while this effect is produced there is no impediment whatever to the forward and backward reciprocations of the sliding block K, as the pulleys *n n* move freely through the band while it is in motion, the only effect being to impart a more rapid revolution to the shaft L by the combined movement of the band and block, and not to create great friction, as would be the case if the band merely came in contact at opposite sides with the pulleys *n n* and were not wound around them. In the latter case, since the two opposite sides of the band move in opposite directions, it is obvious that in coming in contact with the two opposite pulleys the effect would be to counterbalance, and therefore there would be no revolution of the shaft L. By my arrangement of double pulleys I not only accomplish the free forward and back motion of the sliding block, and give a posi-

tive and rapid motion to the shaft, but by gearing the band with the shaft on both sides I am enabled to impart considerable power to the shaft, which is necessary in polishing. I am not aware that such an arrangement as I have above described has ever before been employed, and such I consider a novel feature of my invention.

The lower end of the shaft L terminates in two, three, or more arms, *o o*, Fig. 9, which engage with a head, M, Figs. 2 and 10, by means of a socket, P, or equivalent, in its top, provided with corresponding depressions, *q q*, made beneath the level of the socket. In this manner, when the head rests upon the stone to be polished, its engagement with the shaft will cause it to receive a revolving motion, and at the same time allow it to adapt itself to any inequality in the stone, which would not be the case if the head were secured rigidly to the shaft. In other words, the head has a free and independent action to adapt itself to any position, while at the same time the revolving motion is secured necessary for polishing.

The head M is provided with a suitable number of radial arms, *s s*, Fig. 10, three only being represented in the drawings. On each of these arms slides or adjusts a stationary jaw, *t*, being fixed in any desirable position by means of a set-screw, *u*. This jaw in turn is provided with a similar arm, *v*, at right angles to the other, and on this arm slides a movable jaw, *t'*, which is adjusted out and in at a greater or less distance from the other by means of a set of holes, *w w*, Fig. 2, into any one of which fits a pin, *z*. A pressure-screw, *a'*, serves to press the tops of the jaws apart, and therefore close their opposite ends, thereby grasping the polishing material *b'*, which may be a piece of grindstone or any other substance employed for polishing.

It will be seen by the use of this device that I am enabled to adjust the respective pairs of jaws *t t'* at varying distances from the head, so that each may have a separate path of its own over the stone. In other words, one pair of jaws may be near the head, the next a little farther off, and the third still farther. By this means I am enabled to polish the surface uniformly and equally.

On the same shaft with the cog-wheel *h*, Fig. 1, is situated a bevel-pinion, *c'*, gearing with a similar pinion, *d'*, whose shaft *e'* extends downward, having also a bevel-pinion, *f'*, at its lower end, swinging between pinions *g' h'*, Fig. 2, of the horizontal shaft *d*, and gearing into either, according to which side it stands. The shaft *e'* passes through an adjusting bar or plate, N, Figs. 2, 6, and 7, which has an end motion of just such extent as will throw pinion *f'* from engagement with one pinion, *g'*, to the other, *h*, and vice versa. By this means the direction in which the stone-carriage B moves is reversed, going forward when *f'* is in engagement with one pinion and backward when in engagement with the other. The bar N receives this alternate end movement by means of an inclined cam projection, *i'*, on its upper surface, over which rests a shaft, K', having a pin, *l'*, projecting from both sides in the proper position.

When turned in one position, the pin strikes on one side of the cam and throws the bar in one direction, and when turned the opposite way it strikes on the opposite side of the cam and moves it in the opposite direction.

Jointed to the posts of the frame C a little distance above the ends of the bar N are dogs O O, Figs. 6 and 8, of just such size that when the said bar is thrown to its fullest extent in one direction the dog at the opposite end will fall down past the end of the bar and hold it to that position till the reverse motion is ready to commence, when it rises and the opposite dog falls. The dogs are raised at the desired moment by means of cams *m' m'* on the shaft *k'*.

On one end of the shaft *k'* is a small crank, *n'*, to which is hung a weight, *o'*, and at the other end it is provided with a pinion, *q'*, Figs. 3 and 6, which gears into a small cog-rack, *r'*, that rests close to one side of the carriage B. This side of the carriage is provided with a set of adjusting-holes, S' S', Fig. 3, at suitable distance apart, nearly its whole length, into any of which, on opposite sides of the rack *r'*, fit, respectively, gage-pins *u' u'*, which, as the carriage moves forward or backward, strikes against the end of the rack, thereby moving it in the same direction, and consequently turning the pinion *q'* and its shaft *k'*. As soon as the shaft *k'* is turned sufficiently to carry the crank *n'* past the dead point, the weight *o'* will throw it over, thereby moving the bar N endwise by the means before described, and changing the gear of the pinion *f'* from one to another of the pinions *g' h'*. By this means, changing the pins *u' u'* from one position to another in the holes S' S', it will be perceived that the length of stroke of the carriage B may be made longer or shorter, according to the length of the stone required to be polished, and that the said carriage is automatic in its reciprocations.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The arrangement and combination of the sliding block K, way G, shaft L, double pulleys *n n*, and the band F, wound around said pulleys on opposite sides, in such a manner that while said sliding block is allowed a free reciprocating motion without unusual friction the shaft is revolved by the band, substantially as herein set forth.

2. The hinged way G, so arranged as to swing aside to enable the stone to be adjusted on the carriage, and to serve as the guide to the sliding block K, substantially as herein described.

3. The polishing device consisting of the head M, radial arms S S, and jaws *t t*, so ar-

ranged that each set of jaws can be adjusted at varying distances from the head, substantially as and for the purpose herein specified.

4. Connecting the head M with the shaft L by means of the depressions *q q q* and arms *o o* in such a manner as to produce a free joint, so that the polishing device will adapt itself to the surface of the stone, substantially as herein described.

5. Shifting the engagement of the pinion *f'* with the pinion *g' h'* by means of the bar N, provided with cam *i'*, the dogs O O, and the shaft *k'*, provided with the pins *l'*, crank and weight *n' o'*, and cams *m' m'*, the whole arranged, combined, and operating substantially as herein set forth.

6. The holes S' S' in the carriage B, and the shifting-pins *u' u'*, when used in combination with the rack *r'*, pinion *q'*, and shaft *k'*, for gaging the stroke of the carriage to the length of the stone, substantially as herein set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ASA M. TOMB.

Witnesses:

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JNO. L. JUDSON.