J. W. HYATT.

Apparatus for Grinding and Shaping Slate.

No. 204,151. Patented May 28, 1878.

Fig. 1.

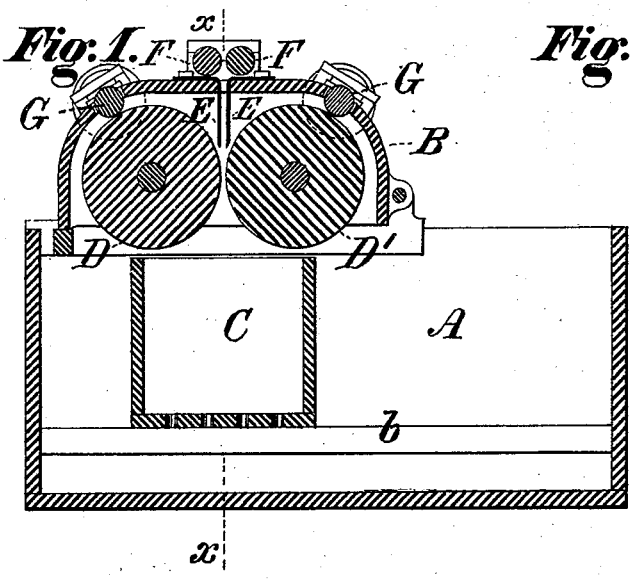


Fig. 2.

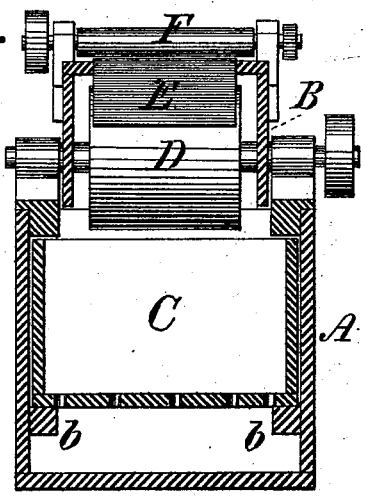


Fig. 6.

Fig. 3.

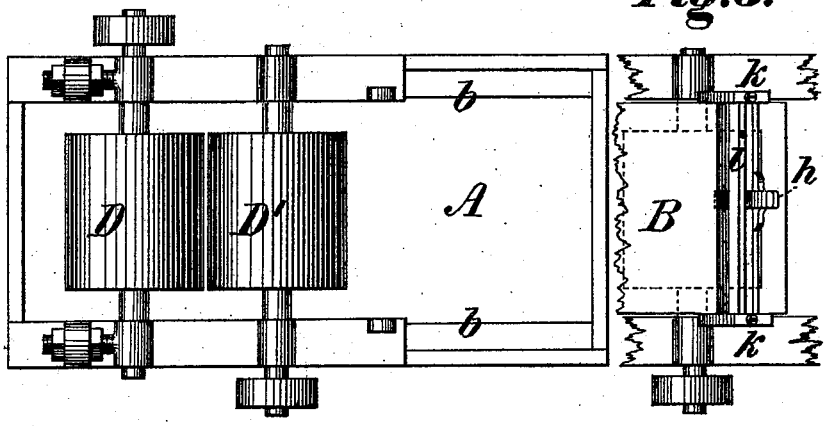


Fig. 4.

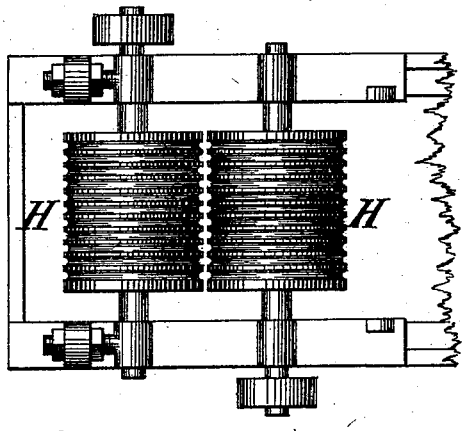
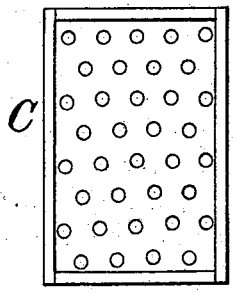


Fig. 5.



WITNESSES

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JOHN W. HYATT, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN APPARATUS FOR GRINDING AND SHAPING SLATE.

Specification forming part of Letters Patent No. **204,151**, dated May 28, 1878; application filed September 20, 1877.

To all whom it may concern:

Be it known that I, JOHN W. HYATT, of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in a Method of and Apparatus for Grinding and Shaping Slate, of which improvements the following is a specification, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal central section through the apparatus; Fig. 2, a transverse section through the apparatus at the line *x x* of Fig. 1; Fig. 3, a plan of the apparatus with the hood and its appendages removed, the grinding-rolls shown in these three figures having plain surfaces adapted to grinding only; Fig. 4, a plan showing my improved grooved rollers for shaping as well as grinding; Fig. 5, a plan view of the receiving-box, and Fig. 6 a plan of an improved roll-surfacing device.

It is the object of my invention to subdivide slabs of slate and shape the pieces into slate-pencil blanks, and also to grind slates which are to be framed to a uniform thickness and smooth surface.

To these ends my invention consists in an improved apparatus in which, for grinding and shaping pencil-blanks, the slab of slate is fed between small feed-rolls and guide-plates to two grinding and shaping rolls, the surfaces of which are grooved, so as to present a continuous series of grinding-edges and grinding and shaping depressions, the edges subdividing the slab into pieces longitudinally and the grooves shaping the pieces into pencil-blanks, as will presently be described. For grinding and surfacing slates the apparatus is the same, except that I substitute for the grooved rolls rolls having plain surfaces. In all cases, however, the rolls, whether plain or grooved, have their entire surfaces coated with a preparation of emery or other grinding material or compound, such preparation or compound having the properties requisite for use in water.

As I propose to grind and surface the slates in water, and as the grinding-surface of the rolls wears rapidly in places under this operation, it is a further object of my improvement to provide means for restoring to the rolls the requisite true and even surface whenever such wearing occurs, and without stopping the rolls to dress them; and to this end my invention consists in combining with the plain-surfaced rolls, a pair of truing-rolls made to bear upon the surface of the grinding-rolls, so as to produce the desired effect. For a more positive action in this respect, I also propose using, instead of the truing-rolls, a carbon point or the end of a bar of hardened steel, adjustable or self-adjusting, and traversing along the surface of the grinding-rolls, so as to restore their surface when it becomes uneven. These truing-rolls or truing-points are applicable to the plain grinding and surfacing rolls, but not to the grooved grinding and shaping rolls.

In the operation of my apparatus, the slate fed to the rolls passes from them down into a receptacle having a perforated bottom, which is placed beneath the rolls in a water-trough, and which is supported in the trough on ways, along which it can be slid in or out as desired. The trough is filled with water, so that the grinding-rolls constantly dip therein.

The trough A is a water-tight box, open at top, at one end of which the feeding, truing, and grinding mechanism is mounted and supported in a hood, B, which is secured to the top of the trough A by hinges or screws, so as to be readily opened or removed. A receiving-box, C, open at top and having a perforated bottom, is fitted to slide along the ways *b*, secured upon the inner sides of the trough and near the bottom thereof. The trough is filled with water, so that the grinding-rolls will constantly dip therein.

The grinding-rolls D D′, properly coated, as already mentioned, are mounted in bearings secured to the side pieces of the trough, and at least one of the rolls has a range of movement in its bearings longitudinally to the trough, so that it may be adjusted toward or from the other roll, as may be required, for grinding thinner or thicker slate; and it will be observed, as shown in the drawings, that the bearings of the grinding or grinding and shaping rolls are at the proper height above the trough to permit the lower part of the rolls to be immersed in the water in the trough

when the trough is filled. These rolls are rotated toward each other by means of belts and pulleys or gearing.

The hood or cover B extends over and incloses the grinding-rolls, affording bearing for the feed-rolls and the truing-rolls or truing-points, as will presently be more fully described. This hood also prevents the splashing of water from the grinding-rolls, which would otherwise occasion inconvenience to the operator.

Across the center of the hood B a slot is cut, coinciding with the space between the grinding-rolls, and having such length and width as to admit of the passage of such slabs of slate as are to be operated upon by the apparatus. In this slot two guide-plates, E E, are properly secured, depending from the hood directly over the space between the grinding-rolls. Above the slot, and coinciding with the guide-plates, are mounted a pair of small feed-rolls, F F, which should have such adjustability toward and from each other as may be necessary in feeding different thicknesses of slate. These feed-rolls are made of or covered with vulcanized rubber, as in wringing-machines, so as to bear upon the slate being fed between them. The feed-rolls are also driven by pulleys or gearing and rotate toward each other. In order to maintain a uniformly plain surface upon the grinding-rolls, I mount in the hood a pair of metal truing-rolls, G G, each of which bears upon the surface of one of the grinding-rolls at a point slightly below its vertical center-line, and acts as an evener upon the surface of the grinding-roll, restoring such surface where it is ridged or worn in the grinding operation. These truing-rolls are respectively adjustable toward or from the grinding-rolls, so as to regulate their bearing upon the grinding-surfaces, as desired, and they are rotated by pulleys and belts or gearing at a slow speed, each in a direction contrary to that of the rotation of the grinding-roll upon which it bears. Where the wear is too rapid or too great to be restored by these truing-rolls, I use for the purpose of restoring the surface of the grinding-rolls a carbon point or the end of a bar of hardened steel for each grinding-roll. These truing-points are mounted in holders *h*, Fig. 6, traveling in guides *i*, supported upon the hood in bearings *k*, and having screws and rubber springs for regulating the bearing of the carbon points upon the surface of the grinding-rolls. The movement of the truing-point along the surface of the roll may be effected by hand, or by any of the well-known devices for giving a reciprocating traverse to a holder along the guides. I have specified the carbon point or the hardened steel as the best means known to me for obtaining the positive action mentioned; but I contemplate using any other equivalent in lieu of the truing-rolls. As already mentioned, these truing-rolls or truing-points cannot be used with the grooved grinding and shaping rolls.

The grooved grinding and shaping rolls H H, Fig. 4, are mounted and rotated as already described, and can be substituted for the plain-surfaced grinding-rolls when it is desired to form slate-pencil blanks. Their surfaces are coated with a similar preparation or compound of emery or other grinding material, such preparation or compound having the properties requisite for its use in water.

The grooves in each roll are of semicircular section, corresponding in number, depth, width, and relative position with those in the other, and the plain grinding-surfaces between the grooves in each roll are of such width as will insure the best abrading action upon the slate without spalling it off at the edges of the divisions.

The operation of my improved apparatus is as follows: For grinding and shaping slate-pencil blanks, the slabs of slate are, as usual, prepared of uniform size, and, as near as may be, of uniform thickness. The grooved rolls H H, Fig. 4, are substituted for the rolls D D′, Fig. 1, the truing-rolls G G or truing-points being moved up in their bearings, so that they will not touch the surface of the grooved rolls. The box C is placed in the trough and slid along the ways *b* until it is beneath the grooved rolls, as in Fig. 1. The trough A is filled with water up to such a height that the under side of the rolls H H will be constantly immersed.

The machine being started, a slab of slate is inserted between the feed-rolls F F, and passes down between the guide-plates E E until it is taken between the rolls H H, which have been adjusted at the proper distance from each other to insure the desired action, and which rapidly abrade the slab at those points immediately acted upon by the surfaces between the grooves, and, secondarily, by the surfaces of the grooves, until the slab is subdivided into longitudinal pieces, each of which is a slate-pencil blank, with a slight fin upon each side, these blanks gradually passing down between the rolls until finished, when they drop into the receiving-box C. To convert these blanks into slate-pencils, the fins are removed in any suitable manner, by hand or by tumbling.

To grind and smooth without subdividing slabs of slate, the plain rolls D D′ are substituted for the grooved rolls H H, and these rolls D D′ reduce the surface of the slab on both sides to a uniform plane and smoothness, this uniformity extending from edge to edge and from side to side, which, so far as I know, has not been the case with any apparatus prior to my invention. The slab is fed to and delivered from these rolls as already described, except that it is delivered in one piece instead of in pencil-blanks.

When the plain-surfaced rolls D D′ are substituted for the grooved rolls H H, the truing-rolls G G or the truing-points are moved down in their bearings, so as to bring them in contact with the surfaces of the grinding-rolls, as hereinbefore explained.

I have found in practice that both the plain-surfaced and the grooved rolls act more effectively by the above-described mode of grinding in water, and this I believe has not been heretofore done in any machine of this class; nor am I aware that any slate-grinding apparatus prior to my invention could form pencil-blanks from a slab of slate, as above described, by passing the slab between a pair of grinding-rolls revolving in opposite directions and acting simultaneously on opposite sides of the slab, so as to form pencil-blanks by a single passage of the slab between the rolls, in contradistinction to the only previous way known to me of cutting first one side of the slab and then the other by two sets of cutters acting successively against a slab supported on a stationary bed.

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

1. The method hereinbefore described of grinding and shaping a slab of slate into pencil-blanks by passing the slab between grooved grinding and shaping rolls, which act simultaneously on opposite sides of the slab to cut the slab into blanks while passing between a single set of rolls.

2. The combination, in a slate-grinding machine, of the trough and the receiving-box with the grinding and shaping or grinding rolls, substantially as and for the purposes set forth.

3. The combination, with the trough and the grinding and shaping or grinding rolls, of a hood, substantially as and for the purposes set forth.

4. The combination of the feed-rolls, the guide-plates, and the grinding and shaping or the grinding rolls, substantially as and for the purposes set forth.

5. The combination, with the grinding-rolls, of truing rolls or points, substantially as and for the purpose set forth.

J. W. HYATT.

Witnesses:
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