A. & F. A. BALL.

QUARRYING MACHINE.

APPLICATION FILED JUNE 29, 1907.

1,113,531.

Patented Oct. 13, 1914.

2 SHEETS—SHEET 1.

Fig. 2.

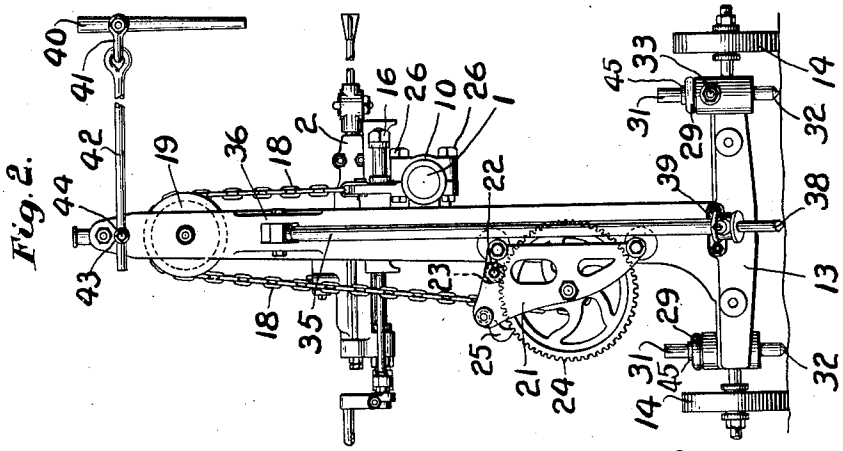
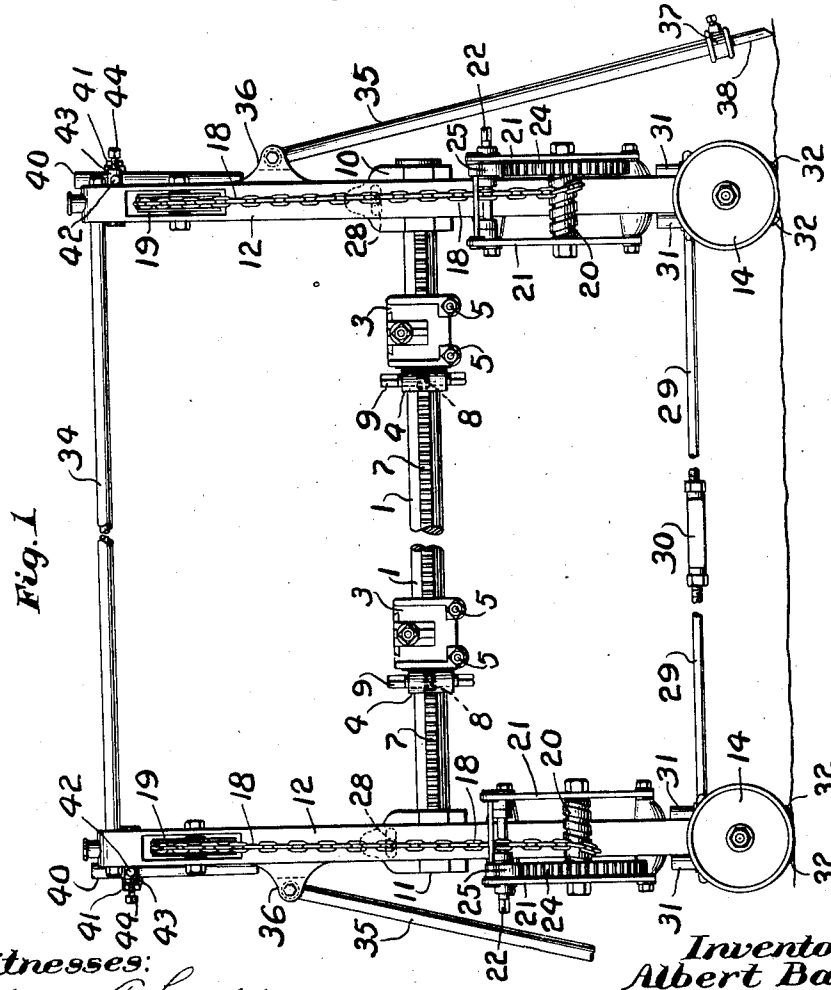


Fig. 1.



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2 SHEETS-SHEET 2.

Fig. 3.

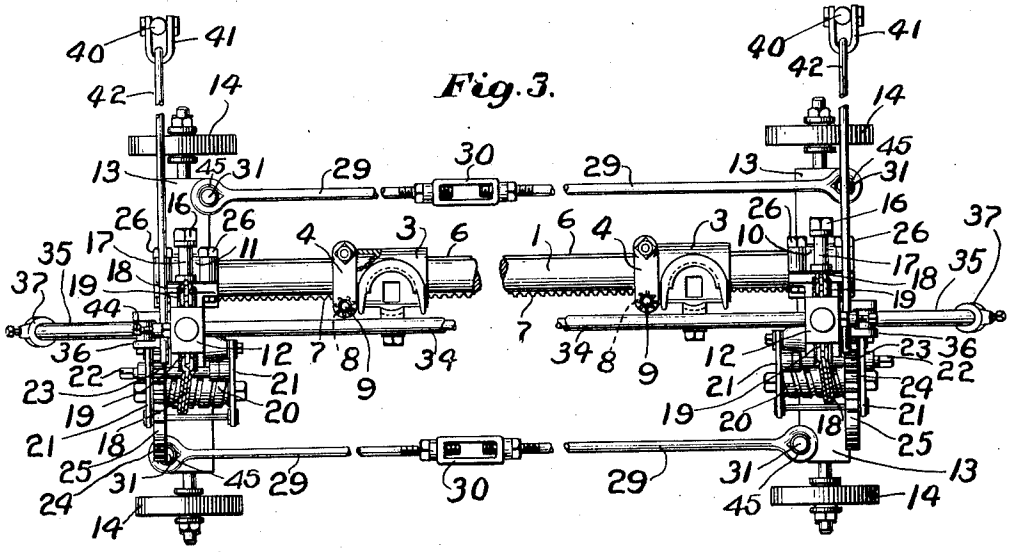


Fig. 4.

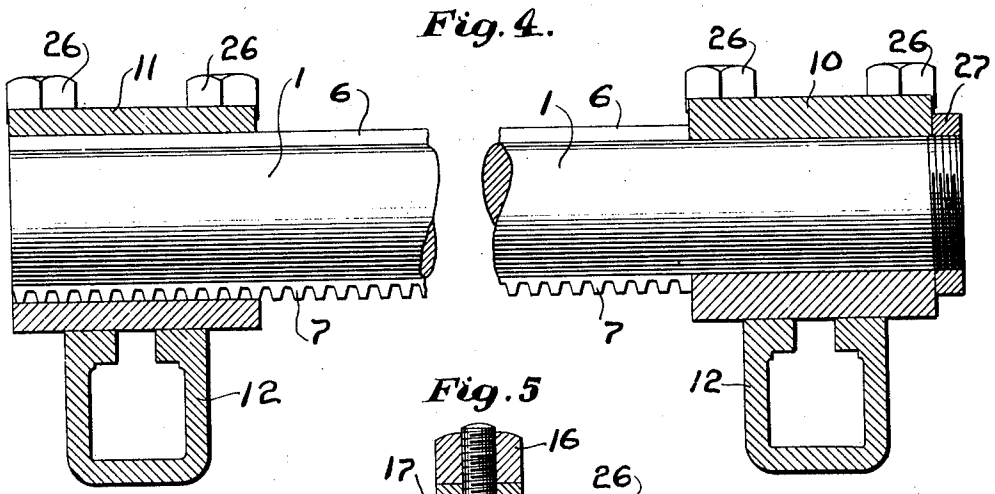


Fig. 5

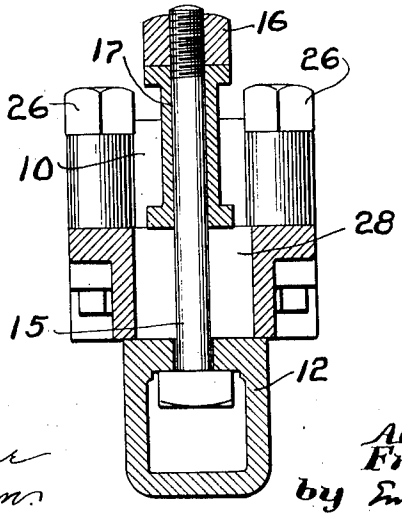
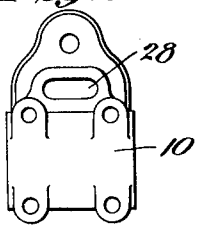


Fig. 6.



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UNITED STATES PATENT OFFICE.

ALBERT BALL AND FRANK A. BALL, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNORS, BY MESNE ASSIGNMENTS, TO SULLIVAN MACHINERY COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

QUARRYING-MACHINE.

1,113,531. Specification of Letters Patent. **Patented Oct. 13, 1914.**

Application filed June 29, 1907. Serial No. 381,403.

To all whom it may concern:

Be it known that we, ALBERT BALL and FRANK A. BALL, both citizens of the United States, and residents of Claremont, in the county of Sullivan and State of New Hampshire, have invented an Improvement in Quarrying-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Our invention relates to machines for quarrying or mining use, and while capable of application to other uses and appliances, is herein shown as embodied in a drill carrying quarry bar.

Our invention will be best understood by reference to the following description when taken in connection with the accompanying drawing showing one illustrative embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings:—Figure 1 shows in rear elevation a truck mounted, adjustable quarry bar embodying one form of our invention; Fig. 2 shows the same machine in end elevation; Fig. 3 shows the same machine in plan; Fig. 4 is an enlarged plan in section taken through the quarry bar and hanger blocks, with the quarry bar partially broken away; Fig. 5 shows an enlarged section in plan taken through the hanger block and standard where the former is clamped to the latter, Fig. 6 is a front elevation of one of the two hanger blocks.

Referring to the drawings and to the embodiment of our invention which we have there selected for illustration, we have shown a quarry bar 1 adapted to support one or more drilling or other stone working machines 2 (shown only in Fig. 2) in operative relation to the work, which bar is supported upon trucks by means of a skeleton frame work, such that the bar may be raised or lowered to any desired height and there rigidly held while the drill or drills are at work, while, on the other hand, the entire machine may be moved about the irregular surface of a quarry with flexibility and ease.

The drill or drills 2, which are shown as rock drills of standard conventional form, are mounted each upon a saddle 3 of any ordinary or usual construction, of which two are shown in the drawings, although one or any number may be employed according to the number of drills which it is desired to place in simultaneous operation.

In order that the drills may be adjusted to cut in any desired plane or at any desired angle, and also for the object of independently adjusting the drills so that, if not alined or supported in just the same way, they may be accurately adjusted to work in the same plane, each saddle 3 is preferably mounted upon a quill or sleeve 4, about which it may be adjustably clamped by means of the clamping bolts 5 at any selected angle. The drill may be therefore worked in a horizontal plane or vertical plane or at any other intermediate angle.

Each quill or sleeve is mounted to fit and slide along the quarry bar, the latter being provided at one side with a spline 6 and at the opposite side with a toothed rack 7, by means of which parts the quills are prevented from turning.

Each quill with its attached drilling machine may be moved or adjusted lengthwise the bar by means of the pinion 8 meshing with the rack 7 and secured to an upright shaft 9 journaled in the quill, to either squared end of which shaft a crank handle may be applied to turn the pinion and longitudinally adjust the drill.

The quarry bar is supported at one end by the hanger block 10 and at the opposite end by the hanger block 11, each provided with removable caps, said blocks, during the operation of the machine, being each rigidly clamped to the face of an end standard 12. Each standard is provided with the base portion 13, having at opposite ends the trucks 14, upon which the entire machine may be wheeled along the quarry bottom.

The body of the standard is of box-like cross-section (seen in Figs. 4 and 5) having a flat front face provided with a slot in which the clamping bolt 15 is adapted to work, the head of the bolt engaging the inner walls of the standard portion and the outer threaded end of the bolt being engaged by a clamping nut 16 resting on the spacing spool or washer 17, the latter engaging the body of the block. By means of the clamping nut 16 either block may be clamped

rigidly to the standard or loosened thereon, so that it may be raised or lowered. The slot in the face of the standard is of sufficient length to permit the necessary range of vertical adjustment of the quarry bar and is provided at its upper and lower ends with an enlargement through which the head of the bolt 15 may be withdrawn.

Each block at its upper end is attached to the end of a suspension chain 18 which passes up and over a guiding wheel 19 journaled near the top of the standard and thence down to and about the winding drum 20 journaled between frame pieces 21, the latter bolted one at either side of the standard. The chain may be wound about or unwound from the winding drum by means of a hand crank (not shown) which may be applied to the squared end of a shaft 22, the latter connected with a pinion 23 meshing with a gear 24 fixed to the chain winding drum 20. A pivoted pawl 25 engaging the teeth of the gear 24 may be employed as shown to hold the bar against descent during and after the winding in of the chain. After the bar has been raised or lowered to the selected position, the bolts 15 are tightened and the hanger blocks clamped rigidly in position.

In order to make the machine as light as possible, while, at the same time, permitting it to be wheeled over the rough, irregular surface of the quarry without injuriously wrenching the various parts of which it is composed, the latter are preferably constructed with a view to allowing considerable flexibility in the position assumed during transportation and until the drills are started in operation, when the parts may be clamped rigidly in the position which they naturally assume in the selected position of the machine.

During the working of the drills, the ends of the quarry bar are rigidly clamped within the clamping blocks 10 by means of the clamping bolts 26, but during transportation the clamping bolts for the block 10 are unloosened so that the smooth end of the bar may turn within the said block if needs be, the key way and rack, however, being preferably extended through the opposite block 11 to prevent the turning of the bar therein. Endwise movement of the bar relatively to the block 10 is prevented by means of the enlarged cap or collar 27.

Where the clamping bolts 15 pass through the hanger blocks, the latter are preferably provided with a somewhat elongated slot 28 shown in dotted lines in Fig. 1, in plan in Fig. 5 and in front elevation in Fig. 6, which latter shows the detail of the block with the bolts and other parts removed. During the wheeling of the machine from one place to another as well as in the raising or lowering of the bar, the clamping bolts 15 are preferably loosened, so that if the machine settles down at one corner and the standards therefore become thrown out of line, not only can the bar turn in the block 10 to adapt itself to this condition, but each block can swing sidewise or move up or down within a certain limited range. This provides a very flexible frame support, which can readily be transported over very rough surfaces without straining the connecting parts. On the other hand, when the selected position is reached, the clamping bolts may be set up and the bar held rigidly by its supports, which latter, however, are in the position which they naturally assume with reference to the irregularities of the quarry supporting surface.

In order to tie the standards and their bases together without at the same time decreasing the flexibility of the machine, there are preferably provided the lower distance rods 29, one at each side of the machine, said rods being preferably provided with adjustable devices, such as the turn buckles 30. The distance rods 29 are provided at their ends with eyes which engage the projecting upper ends of hubs 45, the latter being secured to the base piece. In order to hold the machine steady while the drills are working, there is preferably provided some means in addition to the trucks. Such means may consist of suitable clamping devices or the like, but herein the pins 31 pass through the standard and are provided with preferably hardened ends 32 adapted to engage the surface of the rock. When the machine is positioned, these pins may be driven down into the rock and fastened by set screws 33.

At the top of the machine there is also preferably provided a distance rod or member 34 extending from one standard to the other, the upper distance member serving to maintain the proper distance between the standards when the bar is lowered and the lower distance members 29 serving the same object when the bar is up and when the machine is moved about the quarry.

When the bar is loosened from the standards for raising or lowering, it is desirable to provide some additional support other than the steel pins 31 to keep the standards in position, and we have therefore shown each standard provided with a lateral brace rod 35 hinged to a pair of ears 36, each brace being preferably made up of a length of tubing provided with a clamping collar 37 and an extensible steel or other hardened point 38. When not needed the points 38 may be telescoped within the tubing portion of the brace and the latter swung up and fastened to the side of the standard by means of the locking device 39. When the machine is positioned and it is desired to adjust the bar, the braces may be swung out

and the points extended as represented in Fig. 1.

In order to brace the top of the machine against the reaction of the drill, any suitable means may be employed, such, for example, as the anchor wedge 40, which is adapted to be driven into a cut in the block which is to be drilled. This wedge is connected by means of the strap or clevis 41 with the stay rod 42, the latter passing through the swiveled clamping block 43 in the top of the standard, to which block it may be fixedly secured by the set screw 44. An anchor wedge is preferably employed for each standard as shown, although a single anchoring device only may be used.

While we have shown one embodiment of our invention and described the same in detail for the purposes of illustration, it is to be understood that our invention broadly may be applied to other forms of machines than the specific one herein shown and independently of and apart from the disclosed details of construction and form and relative arrangement of parts, which it is to be understood may be widely deviated from without departing from the spirit of the invention.

Claims:

1. A quarrying machine comprising, in combination, a quarry bar, a supporting structure therefor having three or more supporting points for contact with the quarry bottom, means flexibly uniting the ends of said quarry bar to said supporting structure to permit the machine to flex and accommodate itself to the inequalities of the quarry bottom, and means for rendering said supporting structure rigid when in position for work.

2. A quarrying machine comprising, in combination, a quarry bar, a supporting structure therefor comprising standards each having a plurality of supporting parts for contact with the quarry bottom, means flexibly supporting said quarry bar upon said standards to permit the latter to assume different angular positions with respect to said quarry bar so that said supporting parts may all rest firmly upon an uneven surface of the quarry bottom, and means for rendering said supporting structure rigid in the position thus assumed.

3. A quarrying machine comprising, in combination, a pair of end standards, supporting trucks therefor each having a pair of truck wheels, a quarry bar, independent flexible means for vertically adjusting the ends of said bar upon said standards while permitting the latter to assume positions in different planes owing to inequalities of the surface on which the wheels rest, and means for clamping said quarry bar to said standards to rigidly secure the parts in the relative positions which they have assumed owing to such inequalities.

4. A quarrying machine comprising, in combination, a pair of end standards, supporting trucks therefor each having a pair of truck wheels, a quarry bar, means flexibly uniting each end of said quarry bar to its respective standard and permitting the parts thus united to accommodate themselves to the positions assumed by the wheels upon the inequalities of the quarry bottom, and means rigidly to secure said parts in the position thus assumed.

5. The combination with a quarry bar of a truck supported frame therefor, means for flexibly supporting the bar upon the frame for purposes of transportation, means for vertically adjusting said bar on said frame, and means available during operation for fixedly holding the bar upon the frame and said frame in its assigned position upon the quarry bottom.

6. A quarrying machine having end supporting standards, supporting trucks for said standards, a quarry bar, means for clamping the ends of said quarry bar to said standards, means for flexibly supporting said quarry bar to permit its movement relatively to said standards during the transportation of the latter.

7. A quarrying machine having end supporting standards, a quarry bar, hanger blocks for the end of said quarry bar, adjustable flexible connections for said hanger blocks, and means for clamping said hanger blocks to said standard while permitting their relative, lateral movement when unclamped.

8. A quarrying machine comprising end standards, one or more distance members connecting the bases and tops of said standards, supporting trucks, a quarry bar, vertically adjustable hanger blocks and clamping means for clamping the latter about the ends of said bar, said bar being free to turn in one of the blocks when unclamped, but held against turning in the other.

9. A machine of the class described comprising end frame members having each a base and a standard, distance members connecting the bases and a distance member connecting the upper end of the standards, truck upon which said bases are mounted, anchoring pins carried by the machine and adapted to be driven into the quarry bottom, a quarry bar, a hanger block for each end of the bar, means for clamping said blocks each to its respective standard, a chain or other flexible connection for each block, said clamping means permitting relative, lateral movement between the standard and the block when unclamped, a guiding sheave at the top of each standard for the chain, a chain winding drum near the bottom of each standard, said quarry bar being secured against turning movement in one hanger block, while free to turn in the opposite

block, a toothed rack upon said bar, a drill quarrying saddle supported by said bar, a quill upon which said saddle is adapted to be clamped, a pinion carried by said quill and meshing with said rack, means for turning said pinion, lateral brace members for said standards, and anchoring means for anchoring the tops of said standards.

10. A quarrying machine having end supporting standards, supporting trucks for said standards, a quarry bar, means for holding said bar fixed at any one of a plurality of heights on said standards, said means permitting, for transportation purposes, the turning of the bar at one end and its sliding movement relatively to the standard at the opposite end, and means for clamping said bar to prevent either said turning or said sliding movement.

11. A quarrying machine having end supporting standards, supporting trucks for said standards, a quarry bar, means for fixedly securing the ends of the quarry bar to said standards during the operation of the machine, and means available during transportation thereof for permitting independent tipping movement of the standards from inequalities in the surface over which the apparatus is moving, while still causing the same to support the quarry bar.

12. A quarrying machine having end supporting standards, a quarry bar, a hanger block for each end of the quarry bar, means to clamp the hanger blocks each to its standard, and means permitting the swinging movement of one of said blocks relatively to its standard, while still causing it to sustain its end of the quarry bar.

13. A quarrying machine having end supporting standards, a quarry bar, hanger blocks, and means for clamping said hanger blocks each to its standard, comprising a bolt for each block and a coöperating slot in the corresponding standard with which said bolt engages, one of said blocks being provided with a laterally elongated slot to receive the clamping bolt.

14. A quarrying machine having end supporting standards, a quarry bar, means for clamping the ends of said bar to said standards, means for flexibly supporting said quarry bar to permit its movement relatively to said standards during the transportation of the latter, and flexible hoisting means at each end of the bar for the vertical adjustment of the latter.

15. A quarrying machine having end supporting standards, a quarry bar, a hanger block for each end of the bar, means for clamping the blocks each to its standard, and means for clamping each end of the bar fixedly to its respective block, said means when unclamped permitting the turning of the bar in one block and its longitudinal movement relatively to the other.

16. The combination with a quarrying bar, end standards for supporting the same, flexible means to adjust the bar vertically thereon, means for supporting a drilling tool adjustably lengthwise the bar, and means for supporting said tool holding means adjustably about the bar.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

ALBERT BALL.
FRANK A. BALL.

Witnesses:
J. A. BRUCE,
E. J. BURCHARD.