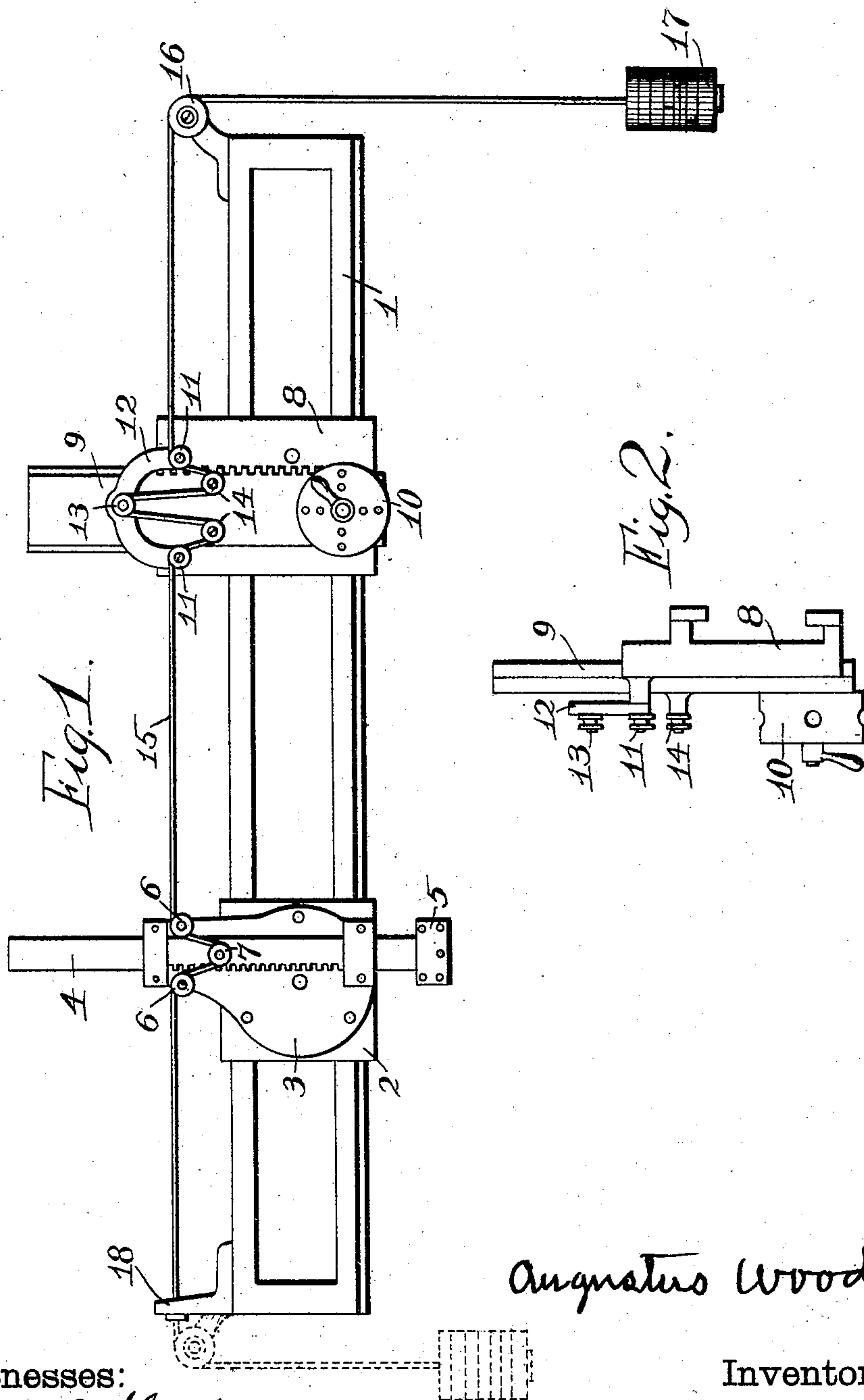


No. 842,288.

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A. WOOD.
BORING MILL.

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Witnesses:
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UNITED STATES PATENT OFFICE.

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BORING-MILL.

No. 842,288.

Specification of Letters Patent.

Patented Jan. 29, 1907.

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To all whom it may concern:

Be it known that I, AUGUSTUS WOOD, a citizen of the United States, residing at Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Boring-Mills, (Case A,) of which the following is a specification.

This invention pertains to boring-mills, and relates particularly to the mechanism for counterbalancing the tool-carrying devices.

The invention will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a front elevation of a rail of a boring-mill provided with my improvement, and Fig. 2 is a side elevation of one of the saddles and its immediate accessories.

In the drawings, 1 indicates the rail of a boring-mill; 2, the saddle thereon for the boring-bar; 3, the swing; 4, the boring-bar, mounted for vertical adjustment in the swing; 5, the tool-holder of the boring-bar; 6, a pair of sheaves carried by the swing, one at each side of the boring-bar; 7, a sheave carried by the boring-bar below the level of the sheaves 6; 8, a saddle mounted on the rail for the turret-bar; 9, the turret-bar, mounted for vertical adjustment in saddle 8; 10, the tool-holding turret, carried by the turret-bar, all of the parts thus far described being as usual in boring-mills, having one saddle carrying a boring-bar and another saddle carrying a turret-bar; 11, a pair of sheaves carried by the turret-bar saddle, one at each side of the turret-bar; 12, an arch or bridge rigidly carried by the turret-bar saddle; 13, a sheave supported by this arch or bridge above the level of the sheaves 11; 14, a pair of sheaves carried by the turret-bar below the level of sheaves 11; 15, a rope or chain engaging all of the sheaves which have been referred to; 16, a sheave supported at one end of the rail and engaged by the rope or chain; 17, the counterbalancing-weight on that portion of the rope or chain depending from sheave 16, and 18 an anchor supported at the opposite end of the rail and engaged by the end of the rope or chain opposite the end carrying the weight 17.

Giving attention to the left-hand saddle and its accessories, the rope or chain lies over sheaves 6 and under sheave 7, the conse-

quence being that boring-bar 4 may be counterbalanced by a counterweight half as heavy as the boring-bar, as usual in this class of machines.

Giving attention now to the right-hand saddle, the chain or rope passes over the vertically-stationary sheaves 11 and under the vertically-moving sheaves 14 and over the vertically-stationary sheave 13, the result being that turret-bar 9 and parts moving vertically with it may be counterbalanced by a weight one-quarter as heavy as those parts.

Analyzing the entire organization, it is seen that if the vertically-moving parts carried by saddle 8 have twice the weight of the vertically-moving parts carried by saddle 2 all these vertically-moving parts may be counterbalanced by a single counterweight half as heavy as the vertically-moving parts carried by saddle 2. In machines of this class the turret-bar and parts moving vertically with it are much heavier than the boring-bar and parts carried by it, and it is in practice found quite feasible to so proportion the parts that one saddle will carry vertically-moving parts having half the weight of the vertically-moving parts carried by the other saddle.

In moving either saddle along the rail no moving effect is had upon the counterweight; but in moving either the boring-bar or the turret-bar vertically in its saddle the counterweight is of course raised or lowered correspondingly. When the system is organized as illustrated in Fig. 1, the vertical movement of that one of the bars which is nearer the counterweight has no moving effect at the sheaves pertaining to the more distant bar. In other words, there is no rope or chain movement at the left-hand saddle when the turret-bar is raised or lowered; but when the bar which is farther from the counterweight—the boring-bar—is raised or lowered then the rope or chain has movement at all of the sheaves pertaining to the turret-bar without, however, having any moving effect on the turret-bar. This idle movement of the sheaves of the turret-bar group when the boring-bar is moved vertically is objectionable only on account of the sheave friction imposed upon the chain or rope, and if seriously objectionable it can be overcome by dispensing with the rigid anchorage 18 and substituting a sheave and second counter-

weight, as indicated in dotted lines, in which case the second counterweight forms a movable anchorage for the rope or chain, and the vertical movement of either bar has no moving effect at the sheaves pertaining to the other bar.

Boring-mill parts which have not been particularly referred to may be as usual, my invention consisting merely of an improvement on the old machine, the drawings illustrating only so much of the old structure as will suffice to show the connection of the invention therewith.

I claim—

1. A boring-mill comprising a rail, a first saddle mounted to slide thereon, a first tool-carrying bar and accessories mounted for vertical movement thereat, a pair of sheaves supported by said saddle, a sheave carried by said bar below the first-mentioned sheaves, a counterbalancing rope or chain passing over the first-mentioned sheaves and under the last-mentioned sheave, a second saddle mounted to slide on the rail, a second tool-carrying bar and accessories mounted for vertical movement at the second saddle and having a weight substantially double that of the first tool-carrying bar and its accessories, a pair of sheaves carried by the second saddle and engaging under the counterbalance rope or chain, a sheave supported by the second saddle and engaging below the rope or chain, a pair of sheaves carried by the second tool-carrying bar and engaging over the rope or chain, a counterbalance-weight at the end of the rope or chain, a sheave supported by the

rail between said counterbalance-weight and the saddle nearest to it, and an anchorage at the opposite end of the rope or chain, combined substantially as set forth.

2. A boring-mill comprising a rail, a first saddle mounted to slide thereon, a first tool-carrying bar and accessories mounted for vertical movement thereat, a pair of sheaves supported by said saddle, a sheave carried by said bar below the first-mentioned sheaves, a counterbalancing rope or chain passing over the first-mentioned sheaves and under the last-mentioned sheave, a second saddle mounted to slide on the rail, a second tool-carrying bar and accessories mounted for vertical movement at the second saddle and having a weight substantially double that of the first tool-carrying bar and its accessories, a pair of sheaves carried by the second saddle and engaging under the counterbalance rope or chain, an arch or bridge supported by the second saddle, a sheave supported by the arch or bridge and engaging below the rope or chain, a pair of sheaves carried by the second tool-carrying bar and engaging over the rope or chain, a counterbalance-weight at the end of the rope or chain, a sheave supported by the rail between said counterbalance-weight and the saddle nearest to it, and an anchorage at the opposite end of the rope or chain, combined substantially as set forth.

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