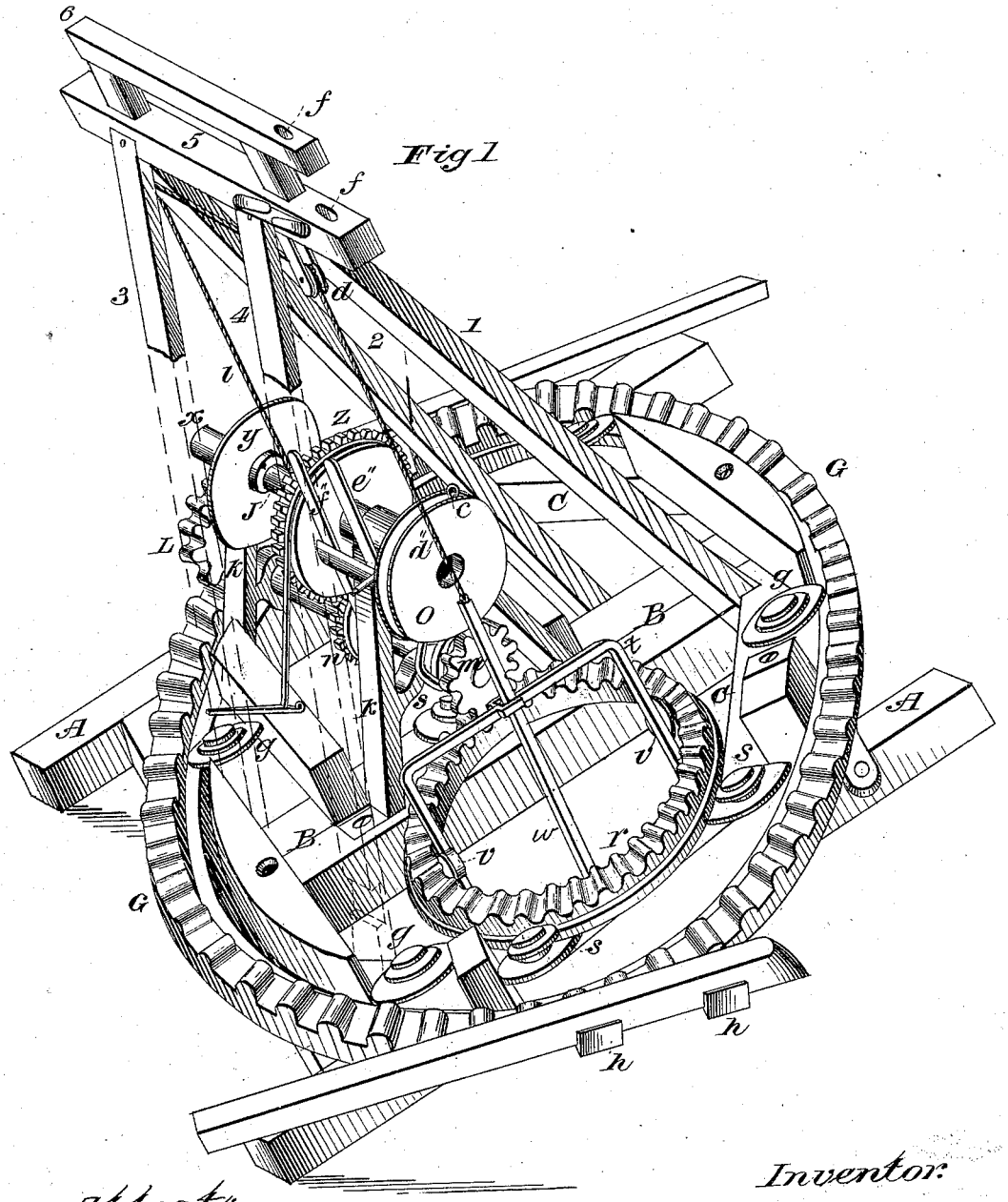
2 Sheets—Sheet 1.

O. MARTIN.

Apparatus for Boring and Drilling Wells.

No. 209,347. Patented Oct. 29, 1878.

Fig 1



Attest:

Frank W. Mears

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Inventor:

Orin Martin

By Thomas & Orwig. Attys.

2 Sheets—Sheet 2.

O. MARTIN.

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Fig 2

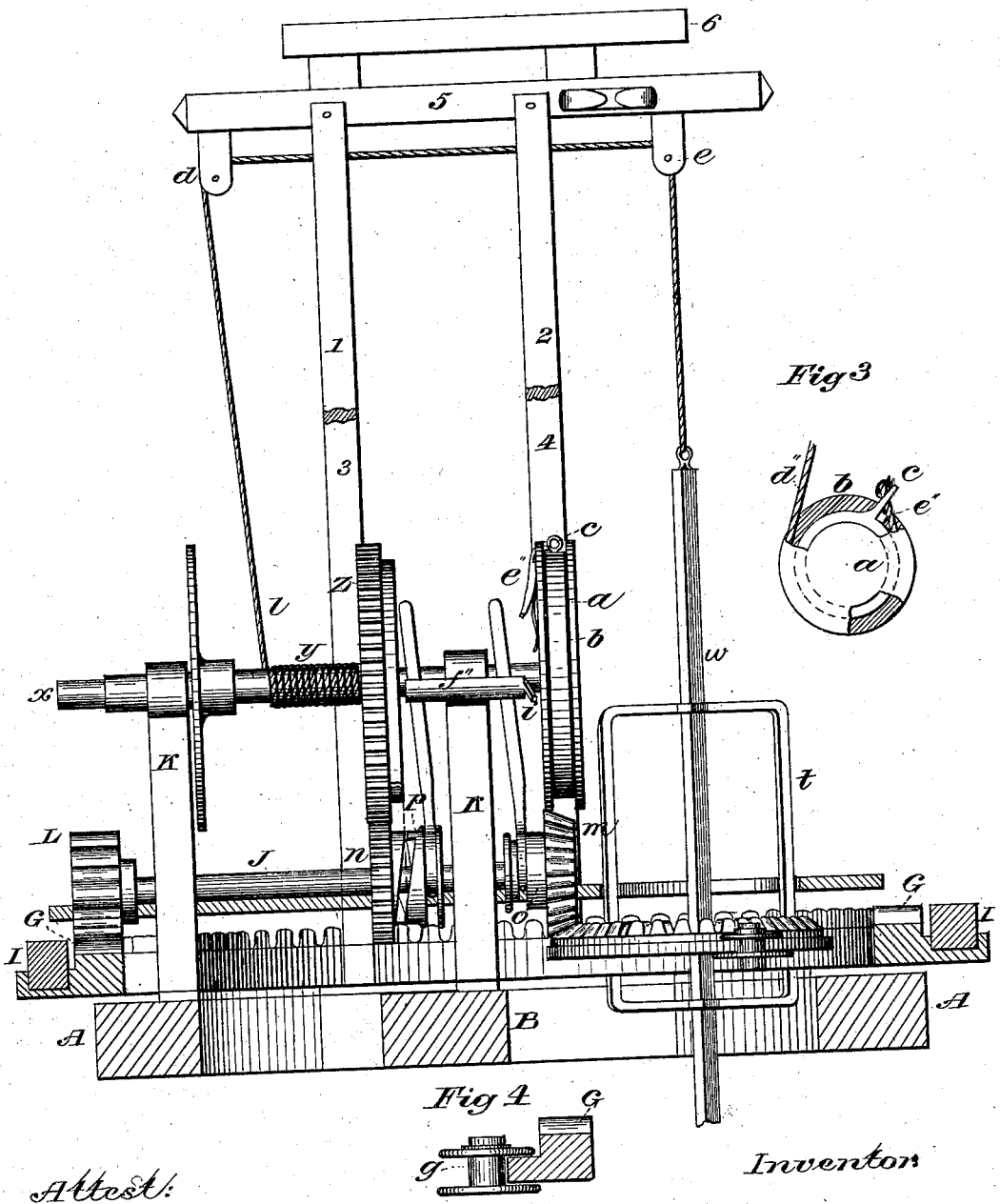

Fig 3

Fig 4

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UNITED STATES PATENT OFFICE.

ORIN MARTIN, OF BLOOMFIELD, IOWA.

IMPROVEMENT IN APPARATUS FOR BORING AND DRILLING WELLS.

Specification forming part of Letters Patent No. **209,347**, dated October 29, 1878; application filed February 18, 1878.

To all whom it may concern:

Be it known that I, ORIN MARTIN, of Bloomfield, in the county of Davis and State of Iowa, have invented an Improved Well Boring and Drilling Apparatus, of which the following is a specification:

My invention relates to that class of machinery that is used to alternately actuate an auger and a drill by means of horse-power to bore a well. Heretofore the derrick for supporting the auger-shaft and the dirt-elevating and drill-operating mechanism have been formed separately from the horse-power-driving mechanism, or constructed in such a manner as to elevate the driving mechanism to the top portion of the derrick.

My object is to combine a horse-power and a derrick in such a way that the driving machinery will be at the base of the structure and the derrick extend above the horse-power, and the entire apparatus be a compact, strong, durable, and portable machine, that is adapted to be operated immediately over the site of the well, to alternately bore and drill and elevate dirt by means of power applied by horses walking in a circle, and always in the same direction to actuate all the operative mechanism of the complete apparatus.

My invention consists in the manner of forming a detachable auger-operating device and combining it with the auger-shaft and the driving mechanism in forming a drill-operating device, and combining it with the driving mechanism and the derrick, and in the manner of arranging and combining the auger-operating mechanism, the drill-operating mechanism, and the dirt-elevating mechanism, so as to allow them to be used successively by means of the same horse-power and derrick, all as hereinafter fully set forth.

Figure 1 of my drawing is a perspective view of my complete machine. Fig. 2 is a central elevation. Fig. 3 is a side elevation of the rotating device by means of which a reciprocating motion is imparted to the drill. Fig. 4 is a section of the master-wheel and a flanged anti-friction roller.

These figures, collectively considered, illustrate the construction and operation of my complete invention.

Like letters of reference denote like parts in the different figures.

A A are the side pieces of a rectangular frame that forms the base. B is a central beam, rigidly framed or otherwise fixed to the end pieces of the frame. C C represent triangular blocks, fixed in the corners of the frame, to strengthen it and to form an enlarged base-surface for supporting the horse-power. 1 2 3 4 are four derrick-posts rigidly fixed to the end pieces of the base at their bottom ends and to a horizontal ridge-piece, 5, which piece is extended in opposite directions to support rope-bearing pulleys *d* and *e*, and also to form an auger-shaft support at one end. 6 is an auxiliary ridge-plate fixed on top of the plate 5. Each of the projecting pieces 5 and 6 has a bearing, *f*, formed in or attached thereto, to guide the auger-shaft and to retain it perpendicular while in operation.

G is a master-wheel, having an annular shoulder at its inside top edge. It rests and revolves upon and is kept in place by the flanged anti-friction rollers *g*, (see Fig. 4,) which rollers have their bearings projecting upward from the base A. *h h* represent ears projecting from the periphery of the master-wheel G. They are formed integrally with the wheel, and serve as a means of securing the arms I to the wheel by means of bolts.

J is a horizontal shaft, mounted in upright bearers K, that are fixed to the base A B C. L is a pinion rigidly fixed on the outside end of the shaft J to engage the master-wheel G. *m* is a sliding pinion on the opposite end of the same shaft, designed to engage the auger-shaft driving-wheel *r*, located under the pinion *m*. *n* is a loose pinion on the central portion of the same shaft, designed to engage the driving-wheel Z of the drill-operating and dirt-elevating devices. *o* is a collar on the sliding pinion *m*, to which an operating-lever is attached. *p* is a clutch on the same shaft, designed to engage the loose pinion *n*.

The minor driving-wheel *r* rests and revolves upon the flanges of the anti-friction rollers S, which have their bearings fixed to the base A B C.

t represents the detachable auger-shaft bearer, which is designed to slide vertically

on the anti-friction rollers *v v*, carried on the inside of the wheel *r*, and to rotate with the wheel to impart a rotary motion to the auger-shaft W passed through its center, for the purpose of operating an auger carried at the bottom of the shaft.

x is a horizontal shaft mounted immediately over the shaft J upon the bearers K K to support the windlass *y* and the drill-operating and dirt-elevating mechanism.

The gear-wheel Z forms one end of the windlass *y*, and is carried by the revolving shaft *x*. It meshes with the loose pinion *n* on the shaft J. It has a shoulder or flange on its outside face, upon which a flexible brake is applied when required. *a* is a grooved wheel fixed on the end of the shaft *x*, and *b* is a collar that slides in the groove. The collar has a projection, *c*, to which a rope, *d''*, is attached. *e''* is a spring-pawl fixed on the inside face of the wheel *a* in such a manner that in its normal position its end will extend through a perforation in the wheel and into the groove to engage the projection *c* of the collar *b*, and thereby lock the collar to the wheel, so as to cause the rope *d''* to wind upon the collar when the wheel is revolved. *f''* is a plate attached to one of the vertical bearers K, that support the horizontal shafts J and *x*. It has a lateral projection, *i*, that performs the function of a cam in operating the spring-pawl *e''*. This plate *f''* also serves as a means of supporting the handles of the clutches *o* and *p* that slide on the shaft J.

In the practical operation of my invention my combined horse-power and derrick, and the boring, drilling and dirt-elevating mechanism co-operating therewith, can be readily moved about upon a suitable truck and placed over the spot where a well is to be sunk. Horses are then hitched to the arms I of the master-wheel G, and the wheel rotated as the horses walk around in a circular path. By locking the sliding loose pinion *m* to the shaft J by means of a spline and feather, the said pinion *m* will engage the minor drive-wheel *r* and rotate it and the auger-shaft bearer *t*, and thereby operate the auger carried by the shaft *w* at its bottom, while the top end of the auger-shaft extends upward through the bearings *f* at the crown of the derrick. Any suitable auger may be thus advantageously operated by my boring mechanism.

To raise or lower the shaft and auger in its bore the sliding pinion *m* is unlocked from its shaft J and the pinion *n* locked to the same shaft by means of the clutch *p*, to engage the gear-wheel Z on the shaft *x* and rotate the windlass *y*, upon which the rope *l* is wound and unwound alternately, as required, to lengthen and shorten it, and to thereby raise and lower the auger-shaft, to which its end is attached, after passing over the directing-pulleys *d* and *e* at the top of the derrick. (See Fig. 2.) By attaching a bucket to the end of the rope *l* in place of the auger-shaft the dirt can be readily elevated from the bottom of the well. The bucket may be combined with the auger to move jointly therewith, or it may be formed separately to move independently.

To operate a drill attached to the bottom of the auger-shaft in place of the auger, I detach the rope *l* from the end of the shaft and attach the rope *d''*, which passes from the collar *b c* on the wheel *a* upward and over the directing-pulley *e*, at the top of the derrick. Every revolution of the shaft *x* and its wheel *a* causes the collar *b* to make a half-revolution forward and a half-revolution backward, to thereby impart a reciprocating motion to the drill-shaft attached to the end of the rope *d''*, which is alternately lengthened and shortened to lift and drop the drill. The spring-pawl *e''*, carried by the wheel *a*, engages the projection *c* of the collar *b*, and rotates the collar forward with the wheel until the end of the pawl strikes the cam *i*, and is thereby disengaged from the collar *b*, and when the collar *b* is thus disengaged the weight of the shaft and drill attached to the rope causes them to reverse the motion of the collar and to drop suddenly, as required, to penetrate a rock by force of gravity. A complete apparatus is thus provided for alternately boring and drilling in the operation of making wells, as frequently required in localities where strata of rock and other hard substances are found to resist the descent of an auger.

I claim as my invention—

1. The detachable shaft-bearing and auger-operating device *t*, in combination with the minor driving-wheel *r*, substantially as and for the purposes shown and described.

2. The drill-operating device composed of the wheel *a*, having the collar *b c*, and carrying the spring-pawl *e''*, substantially as shown and described.

3. The master-wheel G, having arms I, mounted upon the base A B C by means of the flanged anti-friction rollers *g*, the shaft J, mounted on the bearers K, and having the fixed pinion L and the adjustable pinion *m*, and the minor drive-wheel *r*, mounted upon the base A B C by means of anti-friction rollers *s*, all arranged and combined to operate substantially as and for the purposes shown and described.

4. The master-wheel G, the shaft J, having the fixed pinion L and the loose pinion *n*, and the shaft *x*, having the fixed gear-wheel Z, the drill-operating device *a b c e''*, and the fixed cam *i*, all arranged and combined to operate substantially as shown and described.

5. The master-wheel G, the shaft J, having the fixed pinion L and the loose pinion *n*, and the shaft *x*, having gear-wheel Z, the fixed windlass *y*, and the rope *l*, passed over the directing-pulleys *d* and *e* at the top of the derrick, arranged and combined substantially as and for the purposes set forth.

6. The base A B C, the derrick 1 2 3 4 5 6, having the rope-directing pulleys *d* and *e* and the shaft-bearings *f f*, the master-wheel G, having the arms I mounted upon the flanged

anti-friction rollers *g*, the minor drive-wheel *r*, mounted upon the flanged rollers *s* and carrying the shaft-bearer *t*, the bearers K, fixed to the base A B C, the shaft J, having the fixed pinion L, the adjustable pinion *m* and loose pinion *n*, the shaft *x*, having the fixed gear-wheel Z, the fixed windlass *y*, and carrying the drilling device *a b c e''*, and the ropes *l* and *d''*, the several parts being arranged, combined, and organized, substantially as shown and described, to form a complete apparatus that is adapted to be alternately used to bore, drill, and elevate dirt in the manner and for the purposes set forth.

ORIN MARTIN.

Witnesses:
WILL. S. SMITH,
J. I. EARHART.