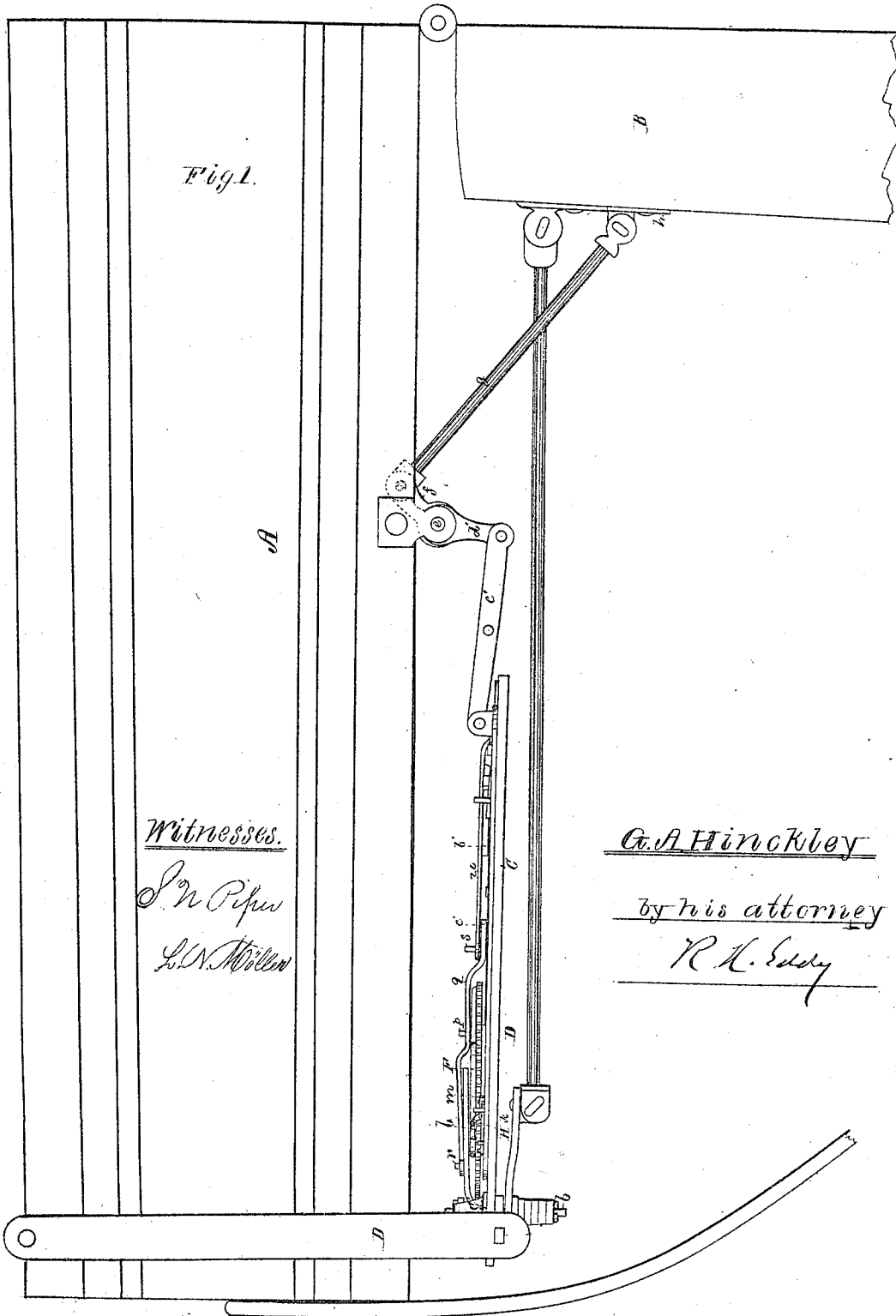


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Mechanism for Rotary Oil-Well Drills.

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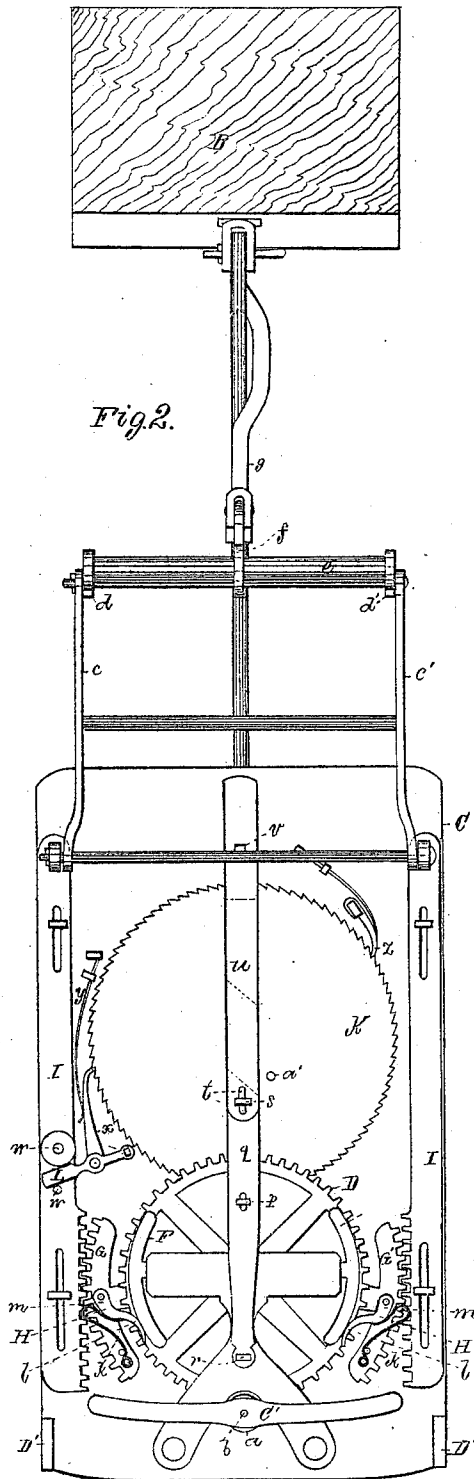


Fig. 2.

Witnesses.

J. N. Piper.
L. W. Möller.

G. A. Hinckley.

by his attorney

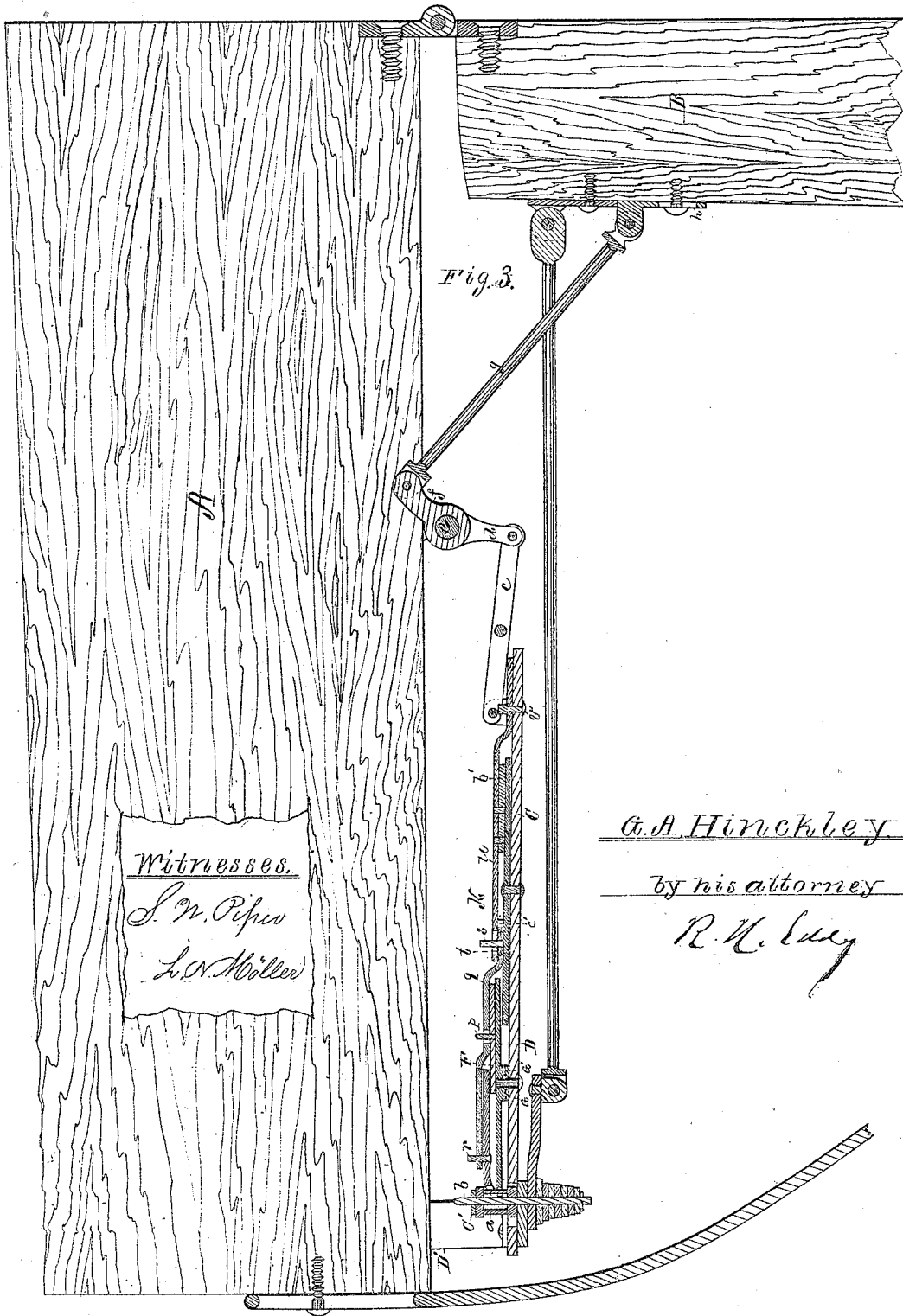
N. H. Loring.

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Fig. 4.

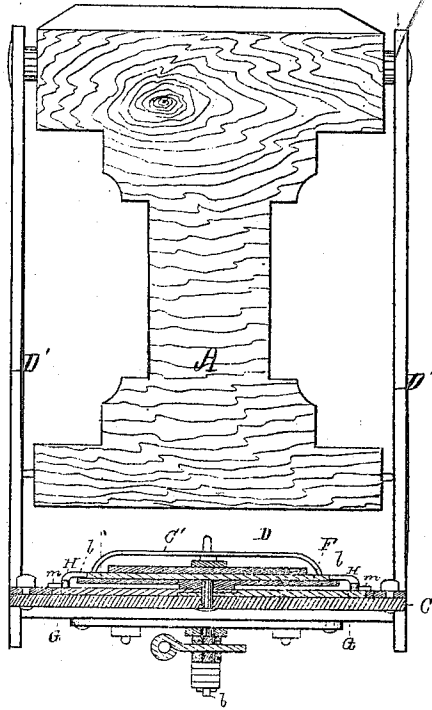
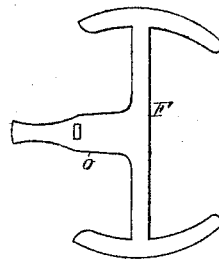


Fig. 5.



Fig. 6.



Witnesses.

S. N. O'Neil

L. N. Miller

G. A. Hinckley

by his attorney

R. M. Eddy

UNITED STATES PATENT OFFICE.

GUSTAVUS A. HINCKLEY, OF PIT HOLE, PENNSYLVANIA.

IMPROVEMENT IN MECHANISMS FOR ROTATING OIL-WELL DRILLS.

Specification forming part of Letters Patent No. 131,280, dated December 24, 1872.

To all whom it may concern:

Be it known that I, GUSTAVUS A. HINCKLEY, of Pit Hole, of the county of Venango, of the State of Pennsylvania, have invented a new and useful "Drill-Rotator," or mechanism for effecting rotary motion of an oil-well drill while such may be in operation; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawing, of which—

Figure 1 is a side elevation of such mechanism applied to a "walking-beam" and its "samson-post." Fig. 2 is a top view of the mechanism below the beam. Fig. 3 is a longitudinal section; and Fig. 4, a transverse section of such mechanism.

In the process of drilling an oil-well it becomes indispensable for the drill to be revolved on its axis, for the reason that several blows in the same place tend to produce what drillers term a "flat hole," or, in other words, a hole not circular in transverse section, it being desirable to have the hole truly or practically cylindrical in form.

Oil-wells are generally drilled by a tool weighing, irrespective of the cable, from eighteen hundred to twenty-five hundred pounds, the tool being fixed to a cable of one and one-half to one and three-quarters of an inch in diameter, the whole being suspended from a "walking-beam" about twenty-five feet in length supported by and pivoted to a "samson-post" about twelve feet in height, the same being worked by a steam-engine.

In turning the tool the slack part of the cable—that is, the part not suspended, but lying loose on the derrick-floor—will wind around the suspended part, so as to limit the number of revolutions in a manner well understood, such limitation being secured in my mechanism by means of pawls moved in on the one side and out on the other of the crown-wheel. Another important consideration is to turn the tool preparatory to the blow thereof, it being necessary to have the tool make a limited number of revolutions in one direction, and next, though not invariably, a corresponding number in the opposite way.

These requirements are obtained by my invention, which I will now proceed to explain.

In the drawing, the walking-beam is shown at A and its supporting or "samson post" at

B. Arranged underneath and parallel to the beam A is a bed-plate, C, fixed to the beam by connections D' D'. On this bed-plate is a pinion, *a*, the shaft *b* of which extends down through the plate. To the lower end of the said shaft the drilling-tool is to be attached. A brace or arch, C', extended over the pinion and springing up from the bed-plate, serves to support the pinion-shaft. A crown-wheel or gear, D, engages with the pinion, and is arranged over the bed-plate and between two slide-racks or rack-bars, I I, applied to the bed-plate, so as to be slid longitudinally and rectilinearly thereon. These rack-bars are connected by joint-links *c c'* to the arms *d d'* of a rocker-shaft, *e*, supported in hangers projecting down from the walking-beam. From this shaft an arm, *f*, is extended upward and pivoted to the upper end of a rod, *g*, whose lower end is jointed to an adjustable bracket, *h*, fixed to the "samson-post," all being as shown. Two toothed sectors, G G', are disposed below the crown-wheel and turn on its shaft, they being arranged as shown, and to engage with the rack-bars I I. These sectors support or carry two lever-pawls, H H', to operate with the crown-wheel, one only of them being in operation with it at one time, the other being kept out of action upon it by mechanism to be described. Each pawl is provided with a spring, *k*, to force it toward the crown-wheel. An edge view of one of the said pawl-levers or lever-pawls is given in Fig. 5, it being furnished with an arm, *l*, extended from the pawl part *m* of it, as shown. These lever-pawls are to be alternately thrown off the crown-wheel, whereby it will first be caused to turn one way and next the other. Between the arms *l l* of the lever-pawls is the shipper F, which is arranged over the crown-wheel, as shown. A top view of the shipper is represented in Fig. 6. It is supported by a bracket, *o*, so as to be capable of being moved rectilinearly in directions transversely of the bed-plate, and is pivoted, as shown at *p*, to a lever, *q*, which is placed on and pivoted to the bracket, the pivot or fulcrum of the lever being at *r*. Near the rear end of the said lever *q* a stud, *s*, is extended upward into a slot, *t*, made in another lever, *u*, pivoted to the bed plate at *v*, and formed as shown, and arranged diametrically over a ratchet-wheel, K, placed upon and piv-

oted to the bed-plate. A lever, *L*, pivoted to the bed-plate and extended between two studs, *w*, of one of the rack-bars *I*, all as shown, carries a pawl, *x*, to engage with the ratchet-wheel *K*. The pawl has a spring, *y*, to keep it up to the ratchet-wheel. A retaining-pawl, *z*, is applied to the bed-plate and against the periphery of the ratchet-wheel. A stud, *a'*, projects up from the ratchet-wheel, and, during each entire revolution of it, is first moved against a cam, *b'*, fixed to the lever *u*, and next against another such cam, *c'*, formed on the rear end of the lever *g*, such cams being formed and arranged as shown.

While the stud *a'* may be working against one cam it will cause the levers *g* and *u*, with the shipper, to be moved simultaneously in one direction, they being moved in the opposite way while the pin may be moving against the other cam.

While the walking-beam is in operation reciprocating rectilinear movements will be imparted to the rack-bars, whereby an intermittent rotary motion will be given to the ratchet-wheel, thereby causing the shipper to be moved in a manner to throw the lever-pawls in succession out of action upon the crown-wheel, the one in action with it at any time operating to revolve it with an intermittent motion.

From the above it will be seen that the drill-shaft will be revolved first in one direction and next in the opposite way.

I claim as my invention, the following, viz:

1. The combination, substantially as described, for effecting the reciprocating rotary motions of the drill or its shaft *b*, such consisting of the crown-wheel *D*, (or such and the pinion *a*,) the pawls *H H'*, and the toothed sectors *G G'*, shipper *F*, rack-bars *I I*, ratchet-wheel *K*, stud *a'*, levers *g u*, cams *b' c'*, lever *L*, and pawl *x*, and the rod *g*, shaft *e*, its arms *d f*, and connection *c*, all being arranged and connected together, and applied to the walking-beam and samson-post, and provided with springs, essentially as and to operate as explained.

2. The combination of the connecting-rod *G* and the parts *d e f*, or the equivalent thereof, with the samson-post *B* and the walking-beam *A*, such being for obtaining reciprocating motions of the arm or arms *d* while the walking-beam may be in operation.

GUSTAVUS A. HINCKLEY. [L. S.]

Witnesses:

D. W. BAILEY,
WHIT. BRIGGS.