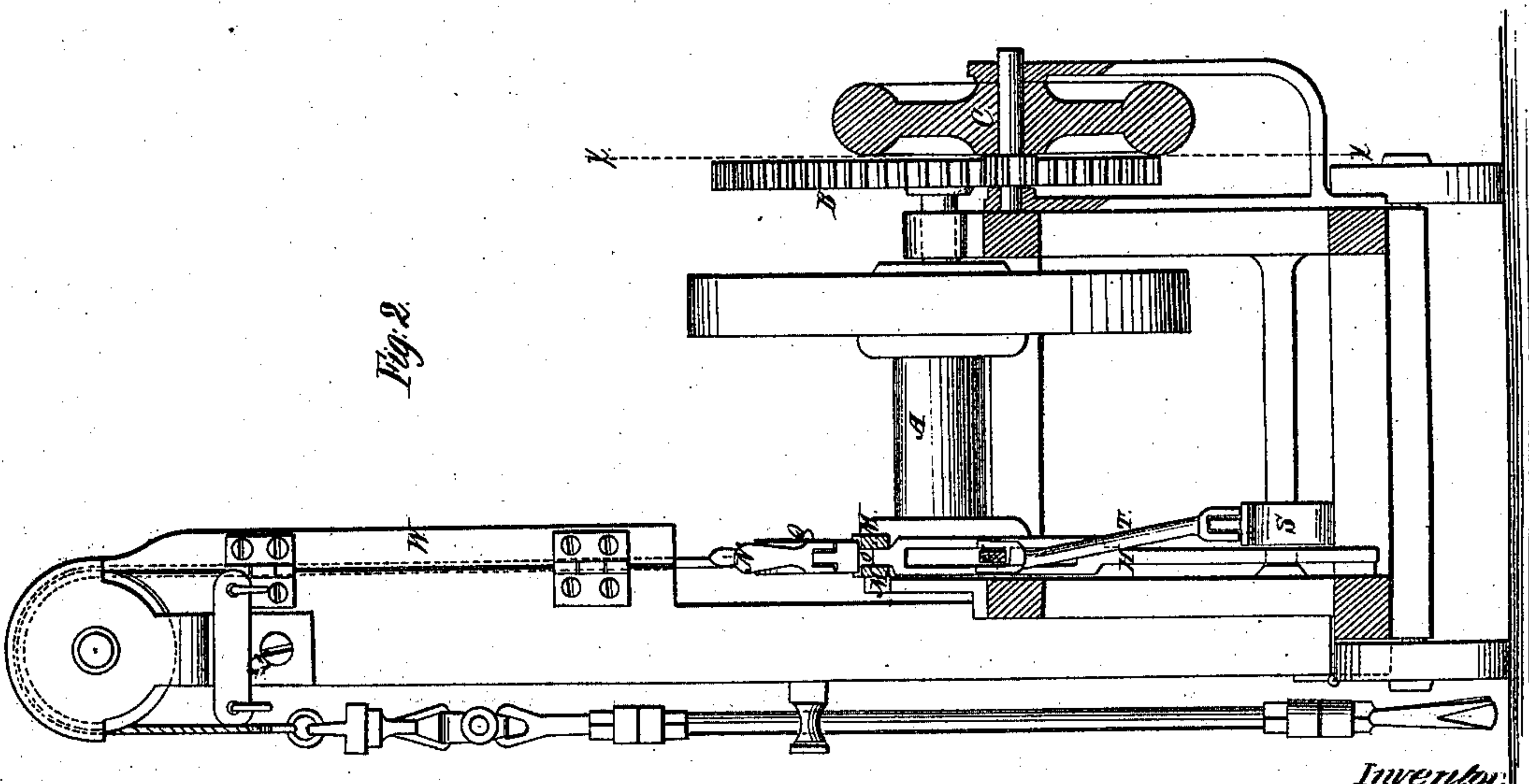
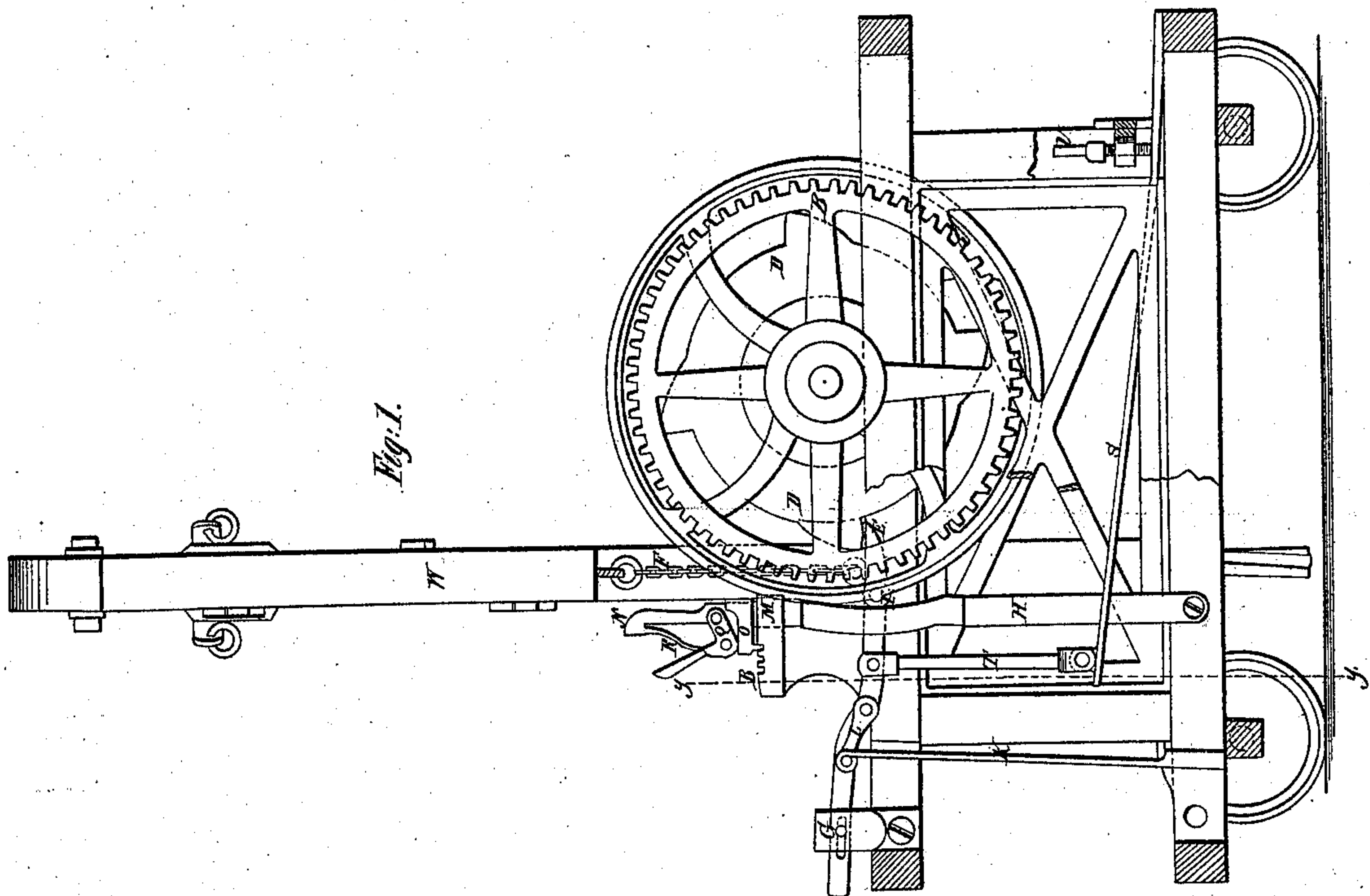


J. H. Roberts,

Rock Drill.

No. 82,944.

Patented May 11, 1869.



Witnesses:
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Alex. J. Roberts

Inventor:
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United States Patent Office.

JOHN H. ROBERTS, OF NASHVILLE, TENNESSEE.

Letters Patent No. 89,944, dated May 11, 1869.

IMPROVED ROCK-DRILLING MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOHN H. ROBERTS, of Nashville, in the county of Davidson, and State of Tennessee, have invented a new and improved Drilling-Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to improvements in machinery for operating drills for drilling artesian wells, designed to provide an improved arrangement of driving-mechanism, calculated to lessen the unequal strains upon the engine and other parts, arising from the sudden lifting and discharging of the drill-rods.

Also, certain improvements in the trip-motion, calculated to provide a more smooth and easy-working device.

Also, to provide a convenient and simple device for throwing the trip-mechanism into or out of gear with the driving-cam, or for varying the effect of the same upon the drill.

And also, certain improvements in guide-apparatus for the drill-rope.

Figure 1 represents a longitudinal sectional elevation of my improved machine, taken on the line *x x* of fig. 2; and

Figure 2 represents a transverse sectional elevation of the same, taken on the line *y y* of fig. 1.

Similar letters of reference indicate corresponding parts.

Owing to the great shocks and strains caused upon the driving-mechanism of well-drilling apparatus, it is exceedingly difficult to drive them faster than about thirty or forty strokes per minute, with the best-arranged driving-mechanism now in use, without excessive wear and frequent breakage, the common method of counteracting the said strains being the employment of a balance-wheel on the driving, or cam-shaft, in which arrangement the size of the wheel is necessarily limited, and it does not, therefore, attain sufficient momentum to give the best results.

To obtain this result in the said drill-operating mechanism, instead of arranging the balance-wheel on the cam-shaft A, I provide a large gear-wheel, B, thereon, and drive it with a counter-shaft, c, carrying the balance-wheel, under such an arrangement that it shall have a speed at the rim equal to or greater than that of the piston of the engine, by which, I find, the shocks and jars are very greatly taken off the engine, and other parts, and I am enabled to operate my machine as high as sixty strokes per minute, as I have demonstrated, without additional wear.

I am aware that it is not new to gear a balance-wheel at high speed, but I am not aware that this arrangement has heretofore been applied to machinery of this character.

The tappet, or cam-wheel D, is cast solid, and pro-

vided with steel-faced tappets, and arranged to act upon a trip-catch, E, to which the drill-chain, F, is attached, in the usual manner.

This trip-catch is supported, according to my improvement, at G, on an axis, and so arranged that it is free to slide to or from the cam-shaft, for gearing or ungearing with it, without stopping the driving-power.

The end near the cam passes through a vertical-slotted lever, H, having a surface, slightly concave, fronting the cam, and at the point where the trip-catch emerges from it.

The latter, at this point, is provided with small steel friction-rollers, I, supported, at each side, on a stud, or pin, and constantly borne against the said concave surface of the lever H, by a spring, K, connected to the trip-catch, by a link, L, and provided with any suitable fixed support.

This spring withdraws the trip-catch from contact with the cam.

For placing and holding the said trip-catch in gear with the cam, the lever H rises through a slotted guide, M, terminating in a handle, N, and is provided with a spring-actuated dog, O, for engaging either of three or more notches, P, in the guide M, whereby the said trip-catch may be held in gear with the cam, to receive a full movement therefrom, or so as to receive a movement of less extent, or wholly out of gear.

The said dog O slides vertically on the lever H, and is connected to a bell-crank, Q, pivoted to the said lever, and provided with a spring, R, arranged to keep the said dog engaged in the notches.

The trip-catch E is also connected to a spring, S, by a connecting-rod, T.

This spring is employed for restraining the trip-catch from rising too suddenly, under the action of the weight of the drill, after being disengaged from the tappets, thereby preserving a smooth and easy movement of the said trip-catch.

It is provided with a tempering-screw, U, whereby its tension may be varied, as the weight of the drill-rod varies, by the additional sections applied as the depth increases.

The spring S, to a considerable extent, keeps the drill-rope steady; but as a further means of steadying it, I provide the rope-case W, upon the post, which supports the pulley over which it works, and as a convenient arrangement, I hinge the said case to the said post. Without this case, the rope swings and jerks about considerably, when the drill strikes.

By this improved arrangement of devices, I am able to provide a more rapidly-operating machine, with less jarring and rattling than those now in use.

The arrangement for producing a short throw of the drill, by gearing the trip-catch less deeply with the cam, is especially advantageous in times when the drill becomes fast, as it frequently does. For loosening it, the movements may be so shortened as to

amount only to blows or jars on the drill, which may be continued until loosened, whereas a full throw, in many cases, would instantly break the rods.

Having thus described my invention,

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

1. The combination, with the trip-catch E, arranged to operate the drill of the cam-driving shaft, gear-wheel B, and balance-wheel, geared thereto, when all arranged as specified.

2. The trip-catch E, arranged to slide on its axis, and provided with the friction-rollers I, spring K, and

combined with the lever H, substantially as specified.

3. The combination, with the lever H, of the spring-dog O, and notched guide M, substantially as specified.

4. The combination, with the trip-catch, of the adjusting-spring S, substantially as specified.

5. The arrangement of the rope-case W on the drill-rope post, substantially as specified.

Witnesses:

JOHN H. ROBERTS.

HUGH CARROLL,

ED. FIELD.