

(No Model.)

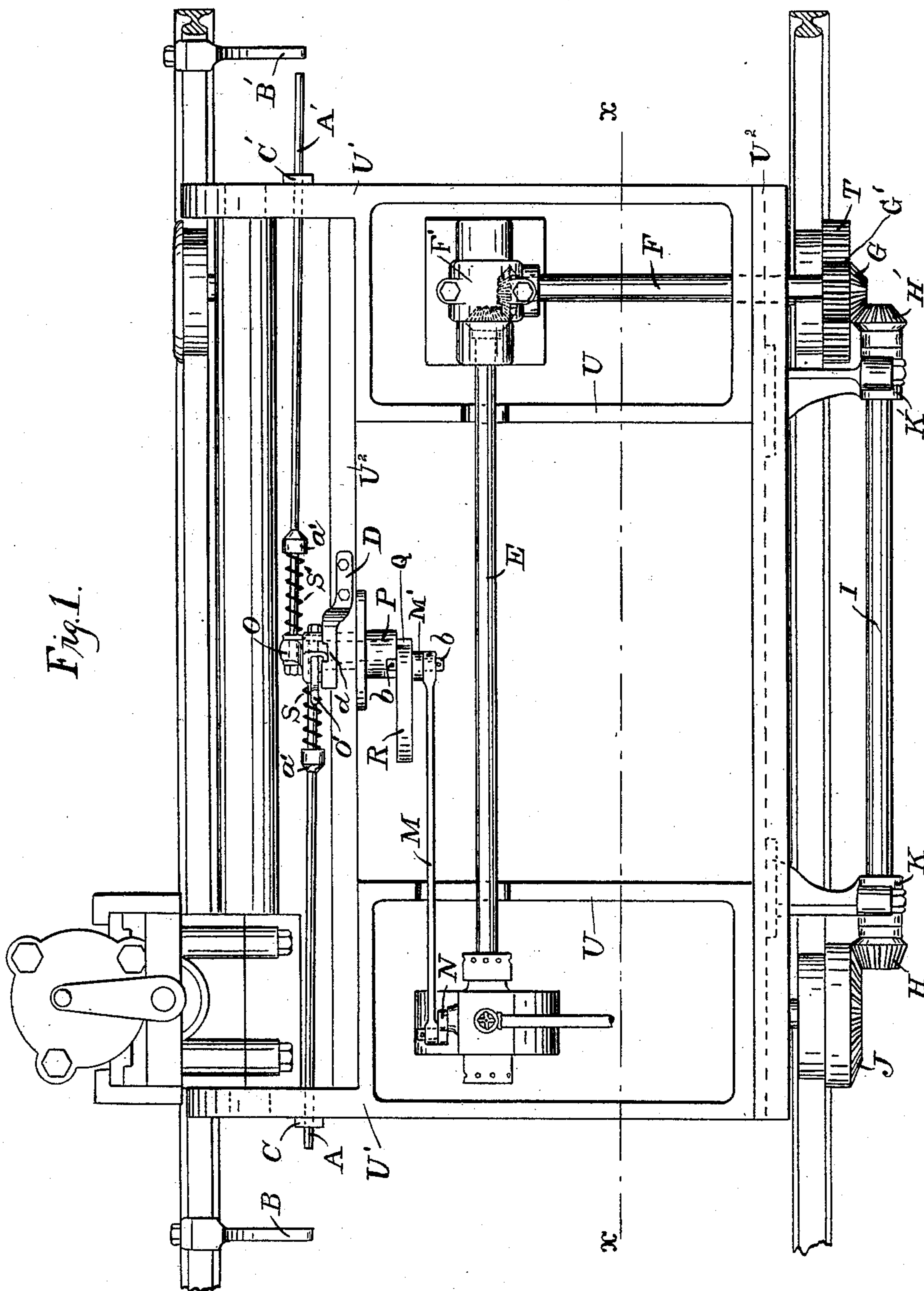
2 Sheets—Sheet 1.

A. BALL.

GANG DRILL CHANNELING MACHINE.

No. 452,355.

Patented May 19, 1891.



WITNESSES:  
Arch. M. Catlin  
E. R. Comer

INVENTOR:  
Albert Ball  
by  
Ray. R. Catlin ATTORNEY

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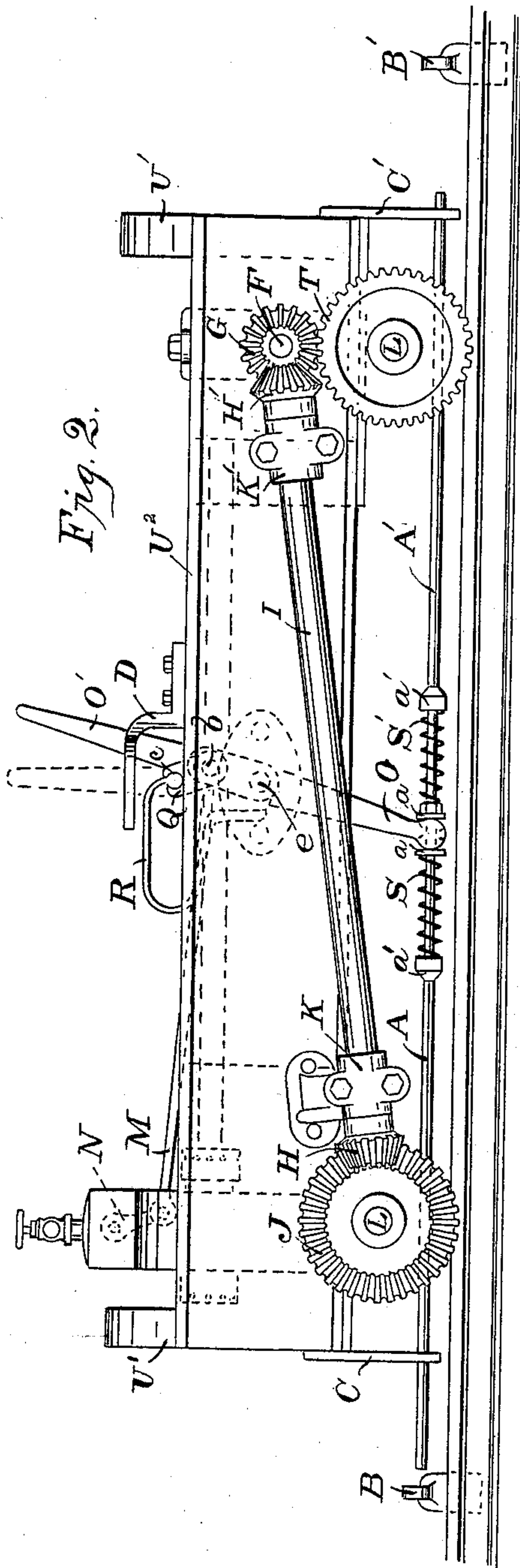
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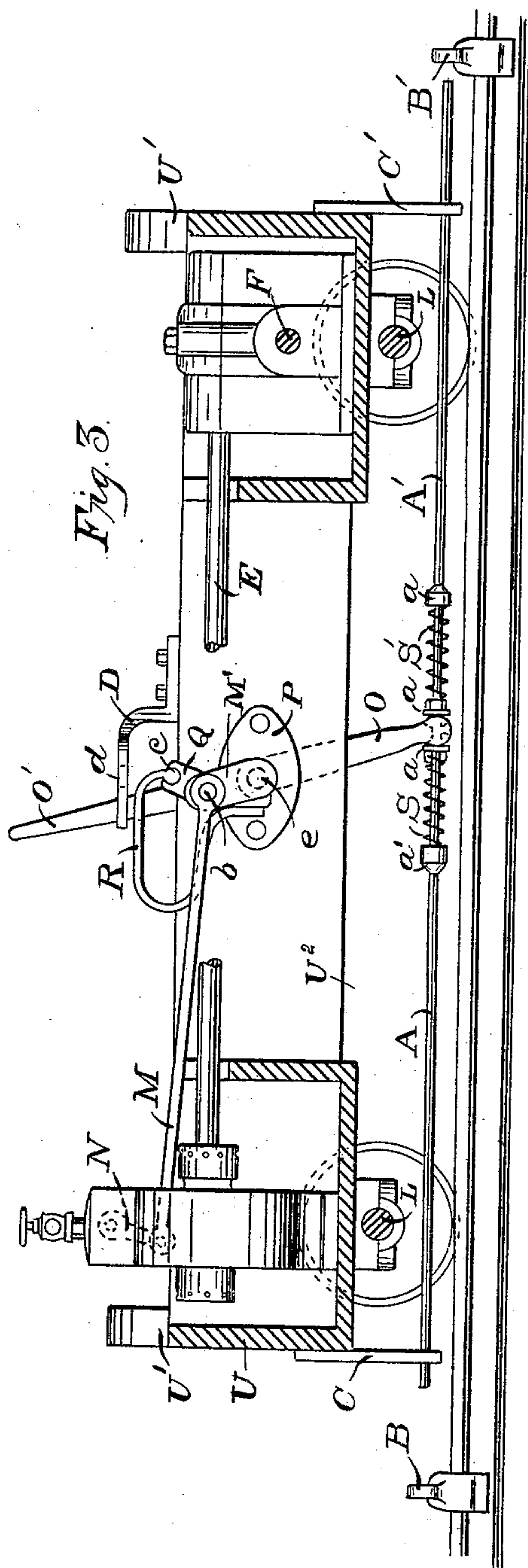
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WITNESSES

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# UNITED STATES PATENT OFFICE.

ALBERT BALL, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR TO THE  
SULLIVAN MACHINE COMPANY, OF SAME PLACE.

## GANG-DRILL CHANNELING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 452,355, dated May 19, 1891.

Application filed June 23, 1890. Serial No. 356,478. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT BALL, a resident of Claremont, in the county of Sullivan and State of New Hampshire, have invented certain new and useful Improvements in Gang-Drill Channeling-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to gang-drill rock-channeling machines and to devices for moving the car that carries the drilling mechanism; and it has for its objects to apply the driving-power simultaneously to both car-axles for the purpose of distributing the strain, to reverse the car-driving engine automatically and provide for its instantaneous reversal, and to provide means for securely holding the reversing mechanism in position to keep the engine at rest; and the invention consists in the devices and combinations hereinafter described and pointed out.

In the accompanying drawings, Figure 1 is a plan, Fig. 2 a side elevation, and Fig. 3 a longitudinal section on line  $x x$  of Fig. 1, of a gang-drill car and mechanism embodying my improvements.

The car-frame in the present instance is composed of parallel bars  $U^2$ , of angle-iron, fastened to opposite ends of open rectangular castings  $U'$ , provided with bracket-extensions  $U$  for the support of drill mechanism. (Not shown.)

Within one of the tank-shaped castings  $U$  is supported the engine that moves the car.

$N$  indicates a crank that is connected to the steam-valves, and  $M$  a rod connecting said crank to a reversing-lever  $O'$ .

$E$  denotes the driving or engine shaft, and  $F$  a counter-shaft driven by shaft  $E$  by means of gears (not shown) located at  $F'$  within one of the castings  $U$ . Upon the outer end of shaft  $F$  is a pinion  $G'$  and a bevel-gear  $G$ . The former gears with a spur-wheel  $T$ , made fast to a car-wheel  $W$ , whose axle is indicated by  $T$ . The bevel-gear  $G$  engages and drives a similar one on shaft  $I$ , journaled in brackets  $K$ , secured to the frame-bar  $U^2$ . On the opposite end of shaft  $I$  is a bevel-gear  $H$ , that engages and drives the gear  $J$ , fixed upon a car-wheel

$W'$ . This shaft  $I$  is arranged at an inclination, as shown, and with its gears is combined with the particular gears  $G$  and  $J$ , the effect of the arrangement and construction being such that power is transmitted from the main shaft through the counter-shaft to a third shaft provided with gears that mesh with large gears fixed directly upon the wheels upon the two axles.

I am aware that both axles of a car have been positively driven, and my improvement is limited to the construction shown and described, and hereinafter particularly pointed out, whereby the inclined shaft  $I$  is supported on the car-body, and in such manner as to be directly geared with the car wheels or with gears fixed thereon, power being transmitted through said wheels to the axles. The construction is very simple and efficient.

Letters of reference  $A A'$  denote automatically-operated reversing-rods provided with bearings in the brackets  $C$  and  $C'$  pendent from the extensions  $U'$ .

$B$  and  $B'$  denote stops fixed upon the track in the path of rods  $A$  and  $A'$ , and  $S S'$  are springs held between fixed keepers  $a'$  and movable washers or keepers  $a$ . When the car is moved toward one of the stops, as  $B'$ , for example, (see Fig. 3,) until a rod  $A'$  engages it, the rod is pressed back and its springs  $S'$ , compressed between its fixed keeper  $a'$  and the movable keeper or washer  $a$ . The lower part  $O$  of a reversing-lever  $O'$  is loosely secured on the rods  $A A'$  between the washers  $a$  and the ends of the rods. The lever  $O$  is fulcrumed upon the axis  $e$ , which extends through the frame-bar  $U'$  and through a plate or washer  $P$ .

$M'$  is a short crank-arm connected to the pin or axis  $e$ , and also loosely connected to the rod  $M$ .

$R$  is a counter-spring fixed at  $c$  to an arm  $Q$ , loosely placed on pin  $b$  and having its free end arranged in the path of said pin and of arm  $M'$  in such manner that it opposes the spring  $S$ , (or  $S'$ ), and being made stronger than either of said springs it resists the movement of pin  $b$  and arm  $M'$  until the spring  $S$  (or  $S'$ ) is compressed, whereupon its resistance being overcome the pin  $M'$  is moved and also the rod  $M$  and the crank  $N$  that controls



the reversing steam-valves. The effect of the spring R is at first to oppose this movement and after its tension is overcome to accelerate it, so that the reversal is instantaneous.

5 I do not herein broadly claim reversing mechanism applied to a drill-car, nor mechanism for reversing an engine by moving its valves, as such matters are well known. It is characteristic of the present improvement  
10 that the movements of the valve and the reversal of the engine or the arrest of its movement are instantaneous and entire, a distinct provision for this purpose being made in the present instance by a spring R.

15 The reversing operation can be effected by the hand and the lever O'. d is a retaining-notch formed in a bracket D for the purpose of holding said lever in a vertical position or on the center, which position corresponds  
20 with the position of the engine-valve midway between the steam-ports, the engine being at rest.

It will be understood that a separate engine is used for working the drills, and that the  
25 above-described devices afford means for driving the car without unnecessary strain, and also for reversing the engine that drives the car, and also means for positively holding it at rest.

30 Having thus described my invention, what I desire to secure by Letters Patent is—

1. In a gang-drill channeling-machine, the car, the engine, the shaft and counter-shaft, said counter-shaft having a pinion geared  
35 with a spur gear-wheel T, rigidly fixed to a car-wheel and provided also with a miter-gear

G, a wheel J, rigidly fixed to a second car-wheel and having a bevel-gear, and an intermediate shaft supported in brackets attached to the side of the car and geared with wheel  
40 T and with said miter-gear on the counter-shaft, both car-wheels being driven by the counter-shaft, one directly and the other by an intermediate shaft supported adjacent to the side of the car, all in combination, sub-  
45 stantially as set forth.

2. In a gang-drill channeling-machine, the combination of the car, the engine, the connecting-rod operating its reversing-valves, the reversing bars or rods, a spring acting be-  
50 tween the rods and the valves adapted to retard the reversal of the valves and subsequently to accelerate it, and the stop whereby the engine is reversed automatically, substantially as set forth.

3. In a gang-drill channeling-machine, the combination of the car, the engine, the connecting-rod operating the reversing-valves, the reversing-rods, the springs on the rods, and the secondary spring pivotally-connected  
60 to the connecting-rod and adapted to oppose a spring on a reversing-rod until the latter has been put under tension by the movement of said rod, substantially as set forth.

In testimony whereof I have signed this  
65 specification in the presence of two subscribing witnesses.

ALBERT BALL.

Witnesses:

FRANK A. BALL,  
C. B. RICE.