

No. 667,080.

Patented Jan. 29, 1901.

**B. GALLAGHER.
DRILLING MACHINE.**

(Application filed Apr. 16, 1900.)

(No Model.)

2 Sheets—Sheet 1.

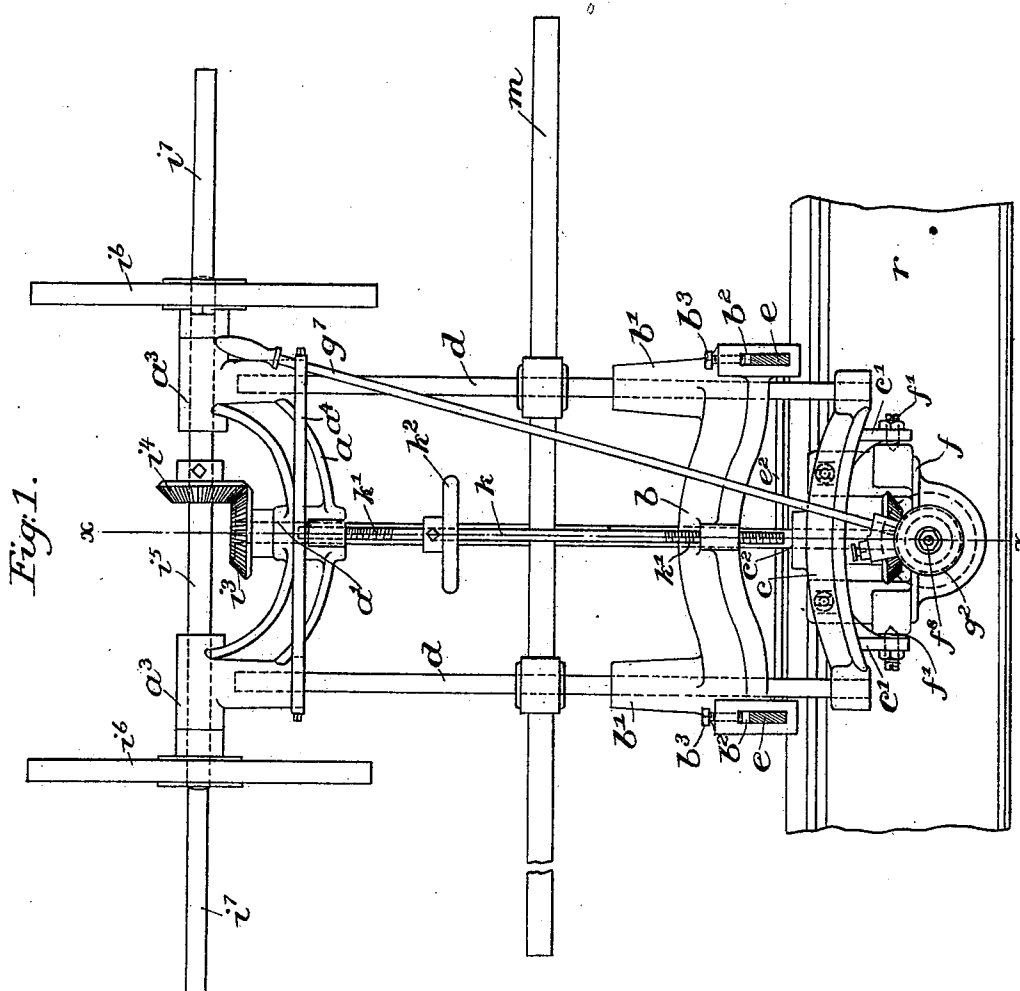


Fig. 1.

Witnesses:

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Inventor.

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By his attorney
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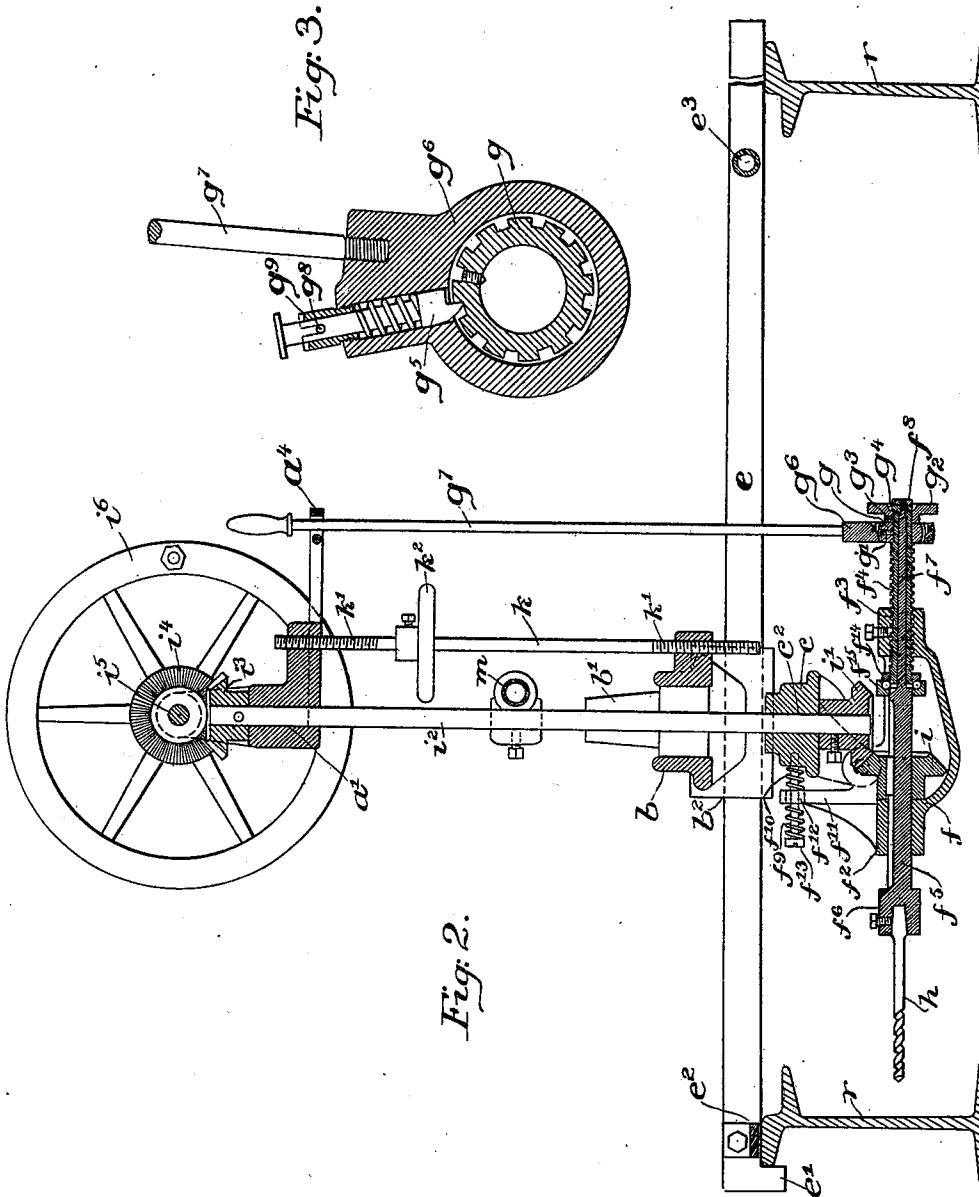
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UNITED STATES PATENT OFFICE.

BERNARD GALLAGHER, OF LYNN, MASSACHUSETTS.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 667,080, dated January 29, 1901.

Application filed April 16, 1900. Serial No. 12,970. (No model.)

To all whom it may concern:

Be it known that I, BERNARD GALLAGHER, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Drilling-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 present invention relates to drilling-machines, and more particularly to drilling-machines for drilling holes in the webs of steel rails, girders, and similar structures.

In all drilling-machines of the prior art for drilling steel and iron the opposing strains placed upon the frame and drill as the drill enters the steel have a tendency to lift the frame and cause the drill to bend in the bore, thus greatly increasing the labor of drilling and often causing the drill to break off.

The object of the present invention is to produce a drilling-machine which will be so supported that it may maintain its proper alinement no matter how much its frame may have a tendency to lift, thus doing away with the tendency of the drill to bind in the hole being drilled and removing the breaking strains therefrom.

To the above end the present invention consists of the devices and combinations of devices, which will be hereinafter described and claimed.

The present invention is shown in the accompanying drawings, in which—

Figure 1 shows in front elevation a drill embodying the same. Fig. 2 shows a vertical section taken on the line $x x$, Fig. 1, and Fig. 3 shows a sectional detail of the drill-advancing mechanism.

Similar letters of reference will be employed throughout the specification and drawings to designate corresponding parts.

The machine of the drawings comprises a suitable supporting-frame comprising yokes a , b , and c and side standards d . The side standards d are supported by the yoke a and have a sliding movement in guides b' of the yoke b and at their lower ends, beneath the yoke b , support the yoke c . The yoke b has suitable slots or bearings b^2 , in which are received the supporting-bars e , which, as shown

in Fig. 2, are of a length to extend across and rest on the upper surface of two adjacent rails r to support the drill in proper position, the said supporting-bars e being provided with hook-shaped ends e' to take over the top of the rail and resist the thrust of the drill. The supporting-bars e are connected by suitable cross-bars e^2 and e^3 and the drill-frame may be adjusted along said supporting-bars, as will be clearly apparent from the drawings, and held in its adjusted position by means of set-screws b^3 .

Supported by the yoke c is a drill-supporting carriage f , which is pivotally connected at f' to the depending lugs c' of the yoke c , the arrangement being such that no matter what strains may be placed on the frame of the machine the drill-carriage may always maintain the drill in proper alinement with the hole being bored, and thus prevent the binding of the drill therein.

The drill-supporting carriage f carries bearings f^2 and f^3 , the bearing f^3 supporting a hollow threaded shaft f^4 , the threads of which fit corresponding threads in the bearing f^3 , and the bearing f^2 supports, so that it may freely turn and slide therein, the chuck-shaft f^5 , carrying the drill-chuck f^6 . The chuck-shaft f^5 has a reduced portion f^7 , which passes through the hollow shaft f^4 , and said shaft f^4 at its rear end receives a ratchet g , secured thereto by a set-screw g' , and also a hand-wheel g^2 , secured thereto by a set-screw g^3 , the said hand-wheel being preferably recessed, as shown at g^4 , to receive a nut f^8 , screwed on the end of the reduced portion f^7 of the chuck-shaft f^5 .

The drill-supporting carriage is yieldingly held in position by means of springs f^9 and f^{10} , bearing against the opposite faces of upwardly-projecting lugs f^{11} , which are apertured, as at f^{12} , to permit the passage of the headed studs f^{13} , fastened in the yoke c , and which studs support the springs f^9 and f^{10} .

The drill h is secured in any suitable manner in the chuck f^6 , and the chuck-shaft is rotated to rotate the drill h by means of a bevel-gear i , which is splined to the chuck-shaft f^5 and through which said shaft may freely move, and a bevel-gear i' , which is secured to the lower end of a vertical shaft i^2 , mounted to turn in suitable bearings c^2 and a' , respectively, of the yokes c and a , and which

shaft at its upper end carries a bevel-gear i^3 , which meshes with a bevel-gear i^4 , carried by a horizontal shaft i^5 , mounted to turn in bearings a^3 of the yoke a and provided at its 5 opposite ends with wheels i^6 , each of which is provided with a crank i^7 , all as usual in machines of this character.

The above arrangement is such that a rotation of the shaft i^5 will through the connecting mechanism just described impart a 10 rotary movement to the chuck-shaft f^3 and the drill h .

The hollow shaft f^4 carries a head f^{14} , which bears against a collar f^{15} of the chuck-shaft 15 f^5 , and a turning of the shaft f^4 in its bearings f^3 will cause a movement of the chuck-shaft f^5 through its bearing f^2 . This longitudinal movement of the chuck-shaft to carry the drill against the work is usually an incremental movement produced by the engagement 20 of the ratchet-wheel g by means of a spring-pressed pawl g^5 , carried by a pawl-carrier g^6 , supported to turn on the ratchet-wheel g , the pawl-carrier being rocked from side to 25 side by means of a long lever g^7 , which extends up vertically through a guide-frame a^4 , supported by the yoke a . The engaging surfaces on the ratchet-wheel and pawl-carrier are curved to form a universal joint, so that 30 said wheel and the pawl mounted in said carrier shall be maintained in operative relation to each other independent of the angle between the shaft f^4 and the hand-lever g^1 .

When the pawl g^5 is in engagement with 35 the ratchet-wheel g , a rocking of the pawl-carrier g^6 from side to side by means of the hand-lever g^7 will cause an incremental advancement of the chuck-shaft and drill toward the work.

By lifting the pawl and turning it so that 40 the pin g^8 will engage the notches g^9 its lower end will be disengaged from the ratchet-wheel, so that the hollow shaft f^4 may be rapidly turned by the hand-wheel g^2 to draw 45 back the chuck-shaft and drill.

The point of operation of the drill may be vertically adjusted by raising or lowering the yoke c , which may be conveniently accomplished by means of the vertical shaft k , which 50 is threaded at its opposite ends, as at k' , and engages threaded bearings in the yoke a and the supporting-yoke b , said shaft being provided with a hand-wheel k^2 , whereby it may be turned as desired.

For the purpose of facilitating the transfer 55 of the machine from point to point along the rails r or otherwise moving it it may be provided with a horizontal bar m long enough to project some distance at opposite sides thereof and fastened to the side bars d in any 60 suitable manner.

The operation of my machine has been sufficiently described in connection with the foregoing description of its form and arrangement, and further description thereof is 65 deemed unnecessary.

Having described the construction and mode of operation of my invention, I claim as new and desire to protect by Letters Patent 70 of the United States—

1. In a drilling-machine, the combination with a drill, of a pivotally-supported carriage therefor arranged to tip with relation to the plane of the work to automatically maintain the drill in proper alinement with the work, 75 substantially as described.

2. In a drilling-machine, the combination with a drill, of a spring-controlled pivotally-supported carriage therefor arranged to tip with relation to the frame of the machine, 80 substantially as described.

3. A rail-drilling machine, having, in combination, a frame, adapted to rest upon the rails, a drill-carriage pivotally supported on said frame, a drill and mechanism for driving 85 it, substantially as described.

4. A rail-drilling machine, having, in combination, a frame adapted to rest upon the rails, a drill-carriage supported on said frame, means for vertically adjusting said carriage 90 with respect to said frame, and a drill and mechanism for driving it, substantially as described.

5. A rail-drilling machine, having, in combination, a frame adapted to rest upon the 95 rails, a drill-carriage pivotally supported thereon, a drill and driving and feeding mechanisms therefor, and an actuating device for said feeding mechanism, connected therewith by a universal joint, substantially as described. 100

In testimony whereof I affix my signature in presence of two witnesses.

BERNARD GALLAGHER.

Witnesses:

HORACE VAN EVEREN,
ALFRED H. HILDRETH.