(No Model.)

D. C. STOVER & F. W. HOEFER.

DRILLING MACHINE.

No. 542,694. Patented July 16, 1895.

Fig. 1.

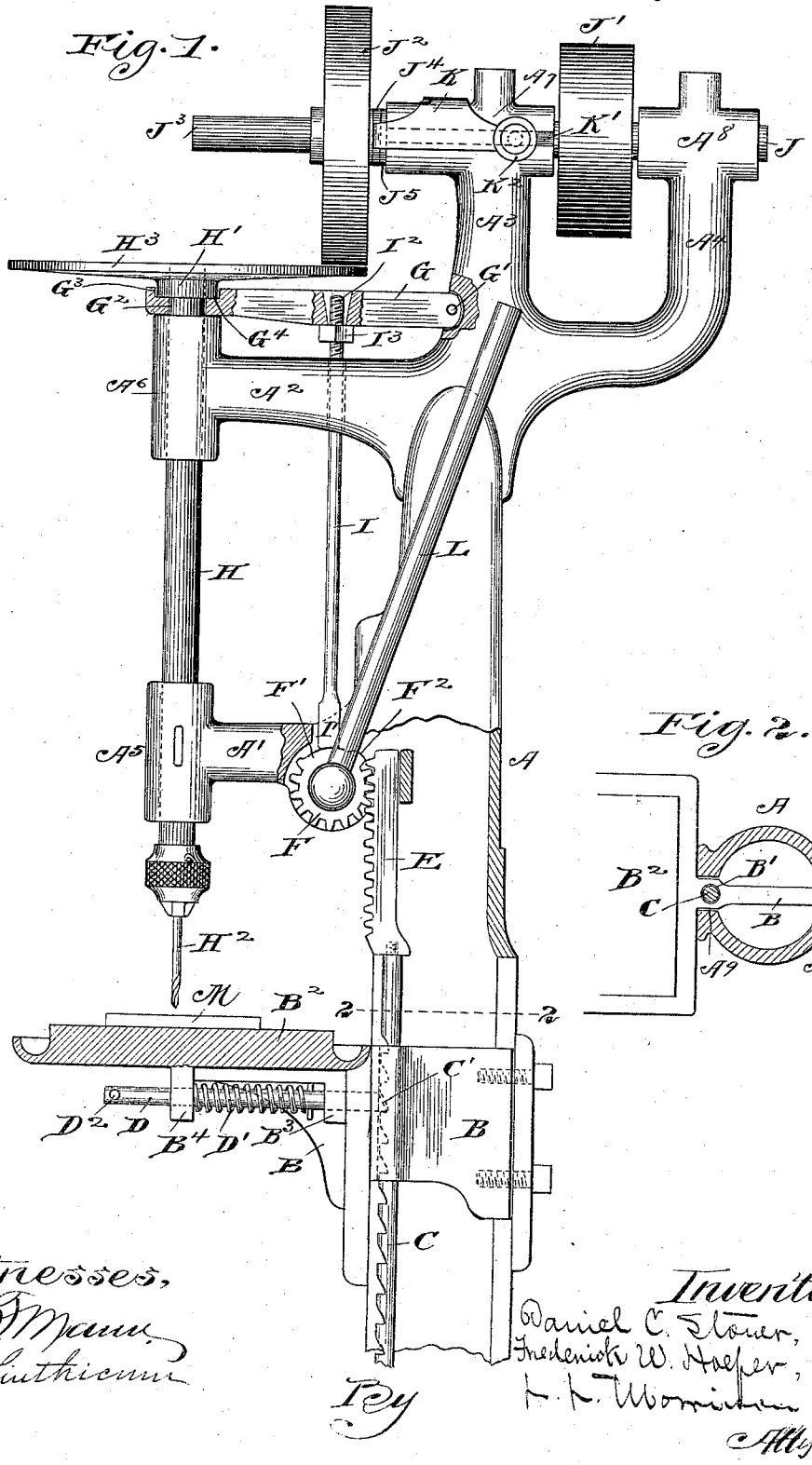

Fig. 2.

Witnesses,
F. G. Mann,
C. C. Linthicum.

Inventors
Daniel C. Stover,
Frederick W. Hoefer,
by L. L. Morrison
Atty.

UNITED STATES PATENT OFFICE.

DANIEL C. STOVER AND FREDERICK W. HOEFER, OF FREEPORT, ILLINOIS, ASSIGNORS TO THE STOVER NOVELTY WORKS, OF SAME PLACE.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 542,694, dated July 16, 1895.

Application filed December 26, 1893. Serial No. 494,665. (No model.)

To all whom it may concern:

Be it known that we, DANIEL C. STOVER and FREDERICK W. HOEFER, citizens of the United States, residing at Freeport, in the county of Stephenson and State of Illinois, have invented a certain new and useful Improvement in Drilling-Machines, of which the following is a specification.

Our invention relates to the class of drilling-machines commonly known as "sensitive drills;" and it consists of certain new and useful features of construction and combinations of parts hereinafter fully described, and specifically pointed out in the claims.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 is a side elevation of the drill, partly in central vertical section. Fig. 2 is a horizontal section at the dotted line 2 in Fig. 1 of parts there shown.

Like letters of reference indicate corresponding parts throughout the two views.

A is the column of the machine-frame.

A' A^2 and A^3 A^4 are two pairs of bifurcations integral with the column A and provided with bearings A^5 A^6 and A^7 A^8 at their free ends for supporting parts to be described hereinafter.

B is a platen-bracket extending through the slot A^9 in the column A, wherein it is vertically movable.

B' is a circular opening extending vertically through the platen-bracket B, the use whereof will be explained hereinafter.

B^2 is a platen integral with or mounted on the platen-bracket B and is vertically movable therewith.

B^3 B^4 are bearings for a part to be described hereinafter.

C is a ratch of suitable diameter to be easily passed through the opening B' in the platen-bracket B.

D is a sliding detent mounted in the bearings B^3 B^4, actuated by and normally held into engagement with any of the interdental spaces C' in the ratch C by the spring D'.

D^2 is a pin passed transversely through the free end of the detent D to serve as a handle by which to disengage the latter from the ratch C.

E is a rack connected with the ratch C and forming an upward prolongation thereof.

F is a pinion mounted on the bifurcation A', meshing with the rack E, having a portion of its periphery F' F^2 constructed without teeth and fashioned into a cam.

G is a spindle-supporting arm pivot-jointed to the bifurcation A^3 at G', provided at its free end with a vertical opening G^2 and being enlarged in diameter at G^3, so as to form a horizontal annular bearing G^4 therein.

H is a drill-spindle having free endwise reciprocatory motion in the vertical bearings A^5 A^6, mounted by means of the fast collar H' on the annular bearing G^4 and provided at its lower end with a drill H^2 and at its upper end with a friction-disk H^3, concentric therewith and fast thereto.

I is a rod having its lower end I' resting upon the cam portion F' of the pinion F and its upper end I^2 impinging, through the adjusting-nut I^3 thereon, against the lower side of the spindle-supporting arm G.

J is a shaft horizontally mounted in the bearings A^7 A^8.

J' is a driving-pulley fast to the shaft J.

J^2 is a friction-wheel that may be freely slid to regulate the speed of the drill along the projecting portion J^3 of the shaft J, wherewith it revolves by reason of a spline connection therewith.

J^4 is an annulus set into a counterpart annular groove in the hub J^5 of the friction-wheel J^2.

K is a yoke fast at one end to the annulus J^4 and adapted to slide in two like and opposite ways K' in the outer portion of the bearing K^7, wherewith it is connected by means of counterpart flanges (not shown) projecting from the inside of the yoke K into the ways K' therein.

K^2 is a thumb-screw for setting the yoke at any desired point along the bearing A^7.

L is a lever projecting from and rigidly connected with the pinion F, and it performs, through its connections, the double function of regulating the platen B^2 by raising and lowering the same and of maintaining the friction-disk H^3 in operative contact with the friction-wheel J^2 whenever the point of the drill H^2

strikes a sand-hole or other cavity in the work being drilled.

M is a piece of work on the platen B^2.

The platen B^2 may be so adjusted as to adapt it to receive work of any desired thickness by disengaging the detent D from its ratch C, afterward raising or lowering the same, as the case may require, and then permitting the detent D to re-engage with its ratch C, and whenever the platen B^2 is low and it is desired to raise the same, the operator may support it with one hand and with the other press the lever L toward the column A, which, operating through the rack and pinion E F, will push the ratch C downward through the opening B′ in the platen-bracket B, when a reverse motion of the lever will raise the platen.

The use and operation of our invention are as follows: Supposing all the parts of the machine to be in the positions shown in Fig. 1 and the shaft J in rotation, then, if the lever L be moved toward the drill-spindle H sufficiently, the platen B^2 will be thereby caused to move upward until the work M thereon comes in contact with the point of the drill H^2. The pressure thereby produced, being transmitted through the drill H^2, will cause the drill-spindle H and its friction-disk H^3 to slide upward, thereby throwing the latter into and maintaining it in engagement with the friction-wheel J^2. Simultaneously with the operations just described the connecting-rod I, passes upward from the less-elevated portion F′ to the more-elevated portion F^2 of the cam on the pinion F, thereby causing the spindle-supporting arm G to travel upward until it would normally maintain the friction-disk H^3 in engagement with the friction-wheel J^2 without reference to the upward pressure of the work M against the point of the drill H^2. In using the machine it will be found that the upward pressure of the work M against the point of the drill H^2 will always be sufficiently great to force the collar H′ upward and slightly out of contact with its bearing G^4, except when the point of the drill H^2 strikes a sand-hole or other cavity in the work being drilled, in which event the drill H^2, drill-spindle H, and friction-disk H^3 will descend sufficiently to break the engagement existing between the latter and the friction-wheel J^2, and as a result the drill H^2 would instantly cease revolving were it not for the bearing G^4 in the arm G, which will still maintain the friction-disk H^3 and friction-wheel J^2 in operative contact until the point of the drill H^2 shall have passed downward through the sand-hole or other cavity and again come in contact with the solid metal, when upward pressure of the work against the point of the drill H^2 will again force the drill-spindle H and friction-disk H^3 upward, the collar H′ will go upward out of contact with the bearing G^4, and the functions of the cam portion of the pinion F, connecting-rod I, and spindle-supporting arm G will become and remain suspended until the point of the drill H^2 shall again encounter a sand-hole or other cavity in the work.

In this machine the frictional contact between the friction-disk H^3 and the friction-wheel J^2 is always proportionate to the resistance met by the drill H^2 in drilling. The greatest power is attainable thereby when its speed is lowest, and obviously vice versa. Slight movements of the platen-regulating lever L will automatically start and stop the same. Its operator can quickly change the speed thereof with one hand by turning the thumb-screw K^2 and sliding the yoke K and friction-wheel J^2 thereby, and afterward tightening the same.

We claim—

1. In a drilling-machine, in combination, a drill-spindle provided with a friction driving-device, the members whereof are normally out of contact, a drill-spindle-supporting-arm, a cam, a rod adapted to communicate motion from the cam to the spindle-supporting-arm, and means for oscillating the cam, whereby through the members of the friction-driving device may be maintained in operative contact independently of the application of upward pressure to the point of the drill-spindle by work on the platen, substantially as and for the purpose specified.

2. In a drilling-machine, in combination, a drill-spindle provided with a friction driving-device, the members whereof are normally out of contact, a cam, the devices connecting the cam with one member of the friction-driving-device, and means for operating the cam, whereby the members of the friction-driving device may be maintained in contact independently of the application of upward pressure to the drill-spindle, substantially as and for the purpose specified.

3. In a drilling-machine, in combination, a drill-spindle provided with a friction-driving-device, the members whereof are normally out of contact, a combined pinion and cam, the devices connecting the cam with one member of the friction-driving-device, the platen-bracket, the ratch passed through the platen-bracket, and provided with a detent, the rack forming an upward prolongation of the ratch and meshing with the pinion, and means for operating the combined pinion and cam, all of said parts being constructed and arranged substantially as and for the purpose specified.

DANIEL C. STOVER.
FREDERICK W. HOEFER.

Witnesses:
W. A. MERRIFIELD,
L. HUGHES.