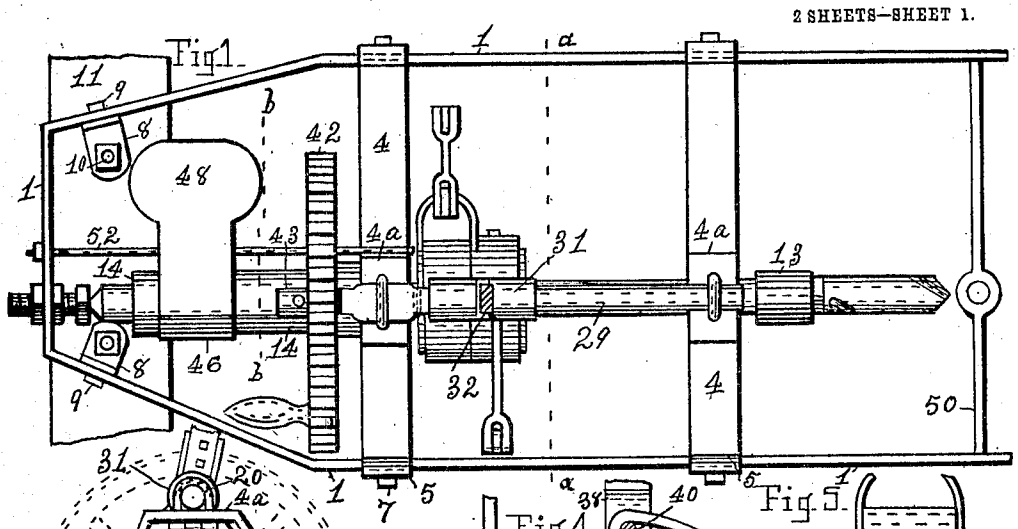
No. 856,473. PATENTED JUNE 11, 1907.

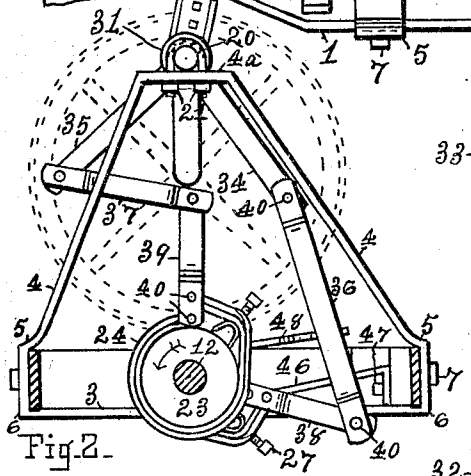
D. E. KRAUSE.

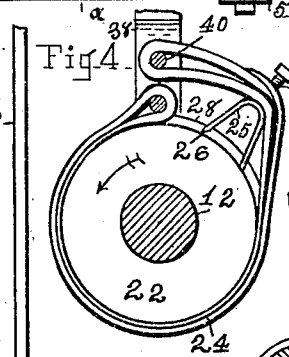
DRILLING MACHINE.

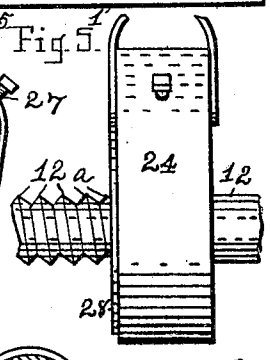
APPLICATION FILED MAY 21, 1906.

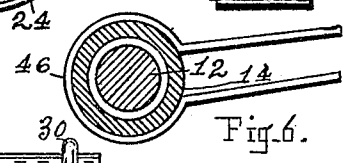
2 SHEETS—SHEET 1.

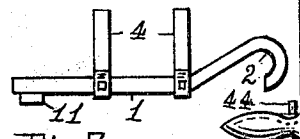












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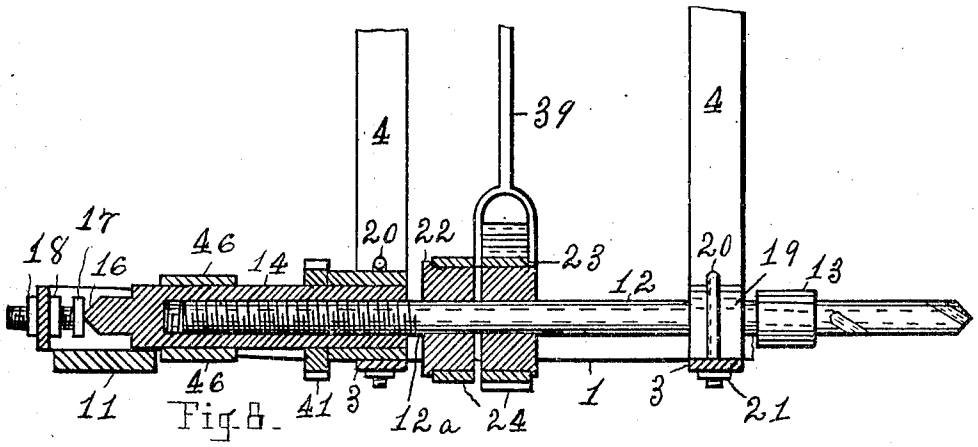

Fig. 8.

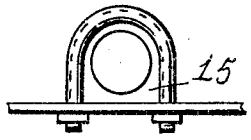

Fig. 9.

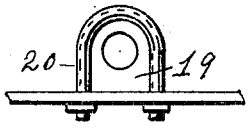

Fig. 10.

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UNITED STATES PATENT OFFICE.

DANIEL E. KRAUSE, OF CHASE, WISCONSIN.

DRILLING-MACHINE.

No. 856,473. Specification of Letters Patent. Patented June 11, 1907.

Application filed May 21, 1906. Serial No. 317,851.

To all whom it may concern:

Be it known that I, DANIEL E. KRAUSE, a citizen of the United States, residing at Chase, in the county of Oconto and State of Wisconsin, have invented a new and useful Improvement in Drilling-Machines, of which the following is a specification.

My invention relates to improvements in drilling machines for hand drilling, and is particularly applicable for drilling rail road rails when laid in a track, but by means of slight changes, more particularly in its frame, can be used for almost any kind of hand drilling, such changes as may be required for adapting the machine for other uses than rail drilling, I consider as within the scope of my invention.

The improvements consist in the manner of constructing the frame of the machine, in the construction of its clutching mechanism, for operating its drill, in a foot controlled feeding mechanism, a rapid drill advancing and receding mechanism, and a feed screw having uncommonly coarse threads for the rapid receding of the drill from a rail whenever the quick detachment of the machine from a rail is required by reason of the sudden approach of a train, said improvements being shown in the accompanying drawing, in which,—

Figure 1 is a top view of the drilling machine, a part of its frame being broken away at its right hand end and a part of the ends of its supporting plank at the left hand end being broken off. Fig. 2 is a vertical section of the machine on the line *a*, *a*, of Fig. 1. Fig. 3 is a side elevation of the machine, its frame near the right hand end being broken for want of room on the sheet for the full length of the frame, and along the entire length of its front for the better showing of its working mechanism. Fig. 4 is a vertical section of the clutch operating device, this being the left hand clutch, but in a different position from that shown in Figs. 1, 2 and 3. Fig. 5 is a side elevation of the clutch and a short section of its shaft. Fig. 6 is a transverse section of the feed screw shaft, its nut, and a side view of a part of its brake band, as seen in looking to the left of line *b*, *b*, of Fig. 1. Fig. 7 is a side elevation upon a reduced scale, of the machine frame. Fig. 8 is a longitudinal view along the line of the drill shaft, the right hand end being in elevation and the left hand end in section, the latter showing the drill shaft, its journal boxes, its thrust bearing, the feed screw, the nut thereon, a pinion for the rapid advancing and receding of the drill, the brake band for governing the rate of feed, and the clutch operating collars and clutch bands for revolving the drill. Fig. 9 is an end elevation of the left hand journal box for supporting the drill shaft upon a cross sill of the frame. Fig. 10 is an end elevation showing the right hand journal box in which the drill shaft is mounted for revolution. Figs. 4, 5 and 6 are upon an enlarged scale.

Similar numerals and characters indicate like parts in all of the views.

1, indicates the sills of the frame of the machine, which frame for the sake of having the greatest strength with the least weight of material, is preferably made of flat bar steel of a suitable size, placed on edge and bent at the rear end for forming the rear end sill, and at its front end for forming the hooks 2, for hooking the frame over a rail.

3, 3, are the transverse sills of the angular frames for supporting the upper works of the machine, they having uprights 4 and top rail 4^a. These uprights are provided near their lower ends with crimps, or short bends 5, which rest on the upper edges of side sills 1, and their extreme lower ends are provided with bends 6 which are bent under the lower edges of said sills so that they are held firmly between the bends 5 and 6, and a bolt 7 being inserted through said frames and sills, the frame is adapted to withstand any strain longitudinally of the frame which the operation of its upper works may impose. Another reason for the bends 5 in the angular frames is, to prevent the hooks 2 from working upward upon the rail during the operation of drilling.

Near the left hand or rear end of the frame are two brackets 8, which are secured to the frame with bolts 9 and to these brackets are attached with bolts 10, a plank 11 for providing a firm support for the frame on the road bed while drilling. Arranged lengthwise of the frame is a drill shaft 12, having a drill socket 13 in one end, and threads 12^a, from its rear end to near its mid-length, and having a round nut 14, engaging said threads and extending from the right hand end of said threads to about one inch beyond the end of said shaft, the nut having an extension with a hardened point 16 which is arranged to revolve against the thrust bolt head 17, the bolt being inserted through the end sill of the frame and having a jam nut 18 on

each side of the sill for its adjustment endwise. In the journal box 15, the nut 14 is mounted for revolution, the shaft 12 revolving in said nut and in the box 19, on the forward cross sill. These boxes may be secured to the sills in any convenient manner, in the present case, it is with bands 20, having nuts 21. When the drill socket is back against the journal box 19 of the forward cross sill, the threaded part of the drill shaft is to extend to just through the box 15. At this point are firmly secured two similar clutch collars, 22 and 23, each one being turned off round and provided with a band of spring steel, 24, (one collar wide enough for both bands would be just as good,) and with a dog, 25, formed of suitable material, it having one leg sharpened to a point for engaging the outer surface of the clutch collar, said dog being held in position within the band by means of a set screw, 27, which passes through the band and has its end pointed and entered slightly into the outer surface of the curve of the dog. These bands are preferably made of two thin leaves of spring metal, and when so made the two ends of the leaves may be connected together at any convenient point, in the present case it being by means of the set screw 27, which passes through their lapped ends and engages the dog. The two collars being arranged side by side, it is only necessary to provide a flange 28 upon but one end of each collar for the retention of the bands 24. These bands after being formed are connected at their ends to levers which are arranged to be operated in such a manner as to tighten and loosen alternately, said bands, during the oscillating motion of their operating handles, and in doing so to cause the sharp pointed leg of the dog to engage the outer surface of the collar to which it belongs and turn said collar and consequently, turn the drill shaft.

The clutches are similar in construction and operation, but their bands being arranged upon the collars in a different position circumferentially, and being connected to the operating levers by different lengths of connections, the oscillation of its operating lever in one direction will operate to turn its clutch in the direction of the arrow, while its oscillation in the opposite direction will act on the other clutch and turn it in the same direction, thus making the oscillation of its operating lever back and forth produce a continuous rotary motion in one direction, and without any lost motion. The mechanism for its operation consists of the following: Mounted upon the top of the angular frames is a non-rotating shaft 29, it being held in position upon said frames by means of bands 30, the ends of which pass through the rails 4^a, and are provided with nuts. Loosely mounted upon said shaft is a collar 31, having an arm 32 extending upward for the attachment of lever handle 33, and arms 34 and 35 extend ing downward upon opposite sides of the collar for their connection by means of links 36 and 37 with levers 38 and 39, which are connected with clutch bands 24. The several downward extending arms, links, levers and clutch bands are hinged together by means of pins 40.

For setting the drill up to the piece to be drilled, and also, for its quick withdrawal, a pinion 41, is secured to or made integral with the nut 14, the shaft 29 is bent downward and a gear wheel 42, mounted for revolution upon the extending end 43, the wheel having its teeth in mesh with those of the pinion 41, said wheel being retained in position upon the end 43 by means of a pin 44, and being provided with a handle 45. Upon the operator's grasping this handle and turning the wheel, the drill can be set up to the work or withdrawn from it. It should be noted that the journal box 15 is extended to the pinion, so that the nut 14 is prevented from endwise movement by being confined between the box 15 and bolt head 17, the pointed end 16, being a continuation of the nut 14.

The feed of the drill is made of any desired rate by mounting a band of thin steel or other suitable material, 46, upon the nut 14, one end being attached to the frame by bolt 47 and the other, carried around the nut and formed into a suitable form of lever for being pressed downward by the foot of the operator.

In applying the drill for drilling rails, as 49, a cross bar 50, is secured in a suitable manner, as by projecting its ends through the sills and heading them down. The cross bar is provided with a screw 51, which is arranged in a direct line with the axis of the drill shaft, by the turning of which, the forward end of the frame can be raised or lowered for bringing the point of the drill in the right position for drilling the rail. In operating the drill after it is applied to a rail as shown in Fig. 3, the operator is to stand in front of the gear wheel, with one foot on the brake lever, and with his right hand oscillate the handle 33, back and forth, the left hand being free for turning the wheel 42 as occasion requires. In turning the drill shaft by means of the oscillation of the handle 33, and of the action of the arms 34 and 35 upon the clutches, the nut if left free will revolve with the screw and no feed will be produced, but upon the operator's pressing downward upon the foot lever, more or less, the revolution of the nut can be retarded, and the feed thereby adapted to the requirements demanded by the size of the drill, the hardness of material, &c. Upon the completion of one hole, the wheel 42 is to be turned and the drill withdrawn, when it can be adjusted in position for another

hole or the machine removed from the rail as occasion requires.

I provide the drill shaft with treads cut only three to the inch in preference to more, for the purpose of the quick withdrawal of the drill from a rail upon the sudden approach of a train of cars. This has been found on trial to be better than a larger number, as much time is saved in its operation. The gear wheel may be used as a hand feed in using a small drill, as by turning the wheel forward, the feed can be governed as required.

Having described my invention, what I claim and desire to secure by Letters Patent, is,—

1. A frame for a drilling machine formed of three pieces of bar steel, comprising first, two longitudinal side sills placed on edge, a rear transverse sill, and a hook adapted to be hooked over a rail road rail at the forward end of each side sill, all in one piece, second, two similar continuous bands, bent flatwise, forming each a cross sill, two uprights and a top rail, the two uprights of each band having a crimp, or bend, near their cross sills adapted to receive between said crimps and the cross sills, the side sills of said first named piece, and suitable bolts through said uprights and side sills at the four connecting points thereof, substantially as described.

2. In a rail drilling machine, the combination of a frame therefor, a drill shaft arranged lengthwise of said frame, a bearing upon said frame for supporting the forward end of said shaft and in which it revolves, a second bearing arranged on said frame between the first named bearing and the rear end of said shaft, in which the shaft is supported, a screw thread upon said shaft extending from near its mid-length to its rear end, a nut mounted upon said threads, its forward end being round and revoluble in said second bearing and the rear one round for the action of a feed controlling means thereon, it extending beyond the rear end of said threads, a thrust bearing arranged to bear against said rear end, a pinion upon and revoluble with said nut intermediate its ends and arranged to hold said nut from endwise movement between said second named and the thrust bearing aforesaid, a brake band mounted for action upon the rear end of said nut for controlling the feed of the drill, and a gear wheel mounted for revolution above said pinion and in mesh therewith for setting the drill up to and its quick withdrawal from the work in hand, substantially as described.

3. In a rail drilling machine, the combination of a frame therefor, a drill shaft arranged lengthwise of said frame, a bearing upon said frame for supporting the forward end of said shaft and in which it revolves, a second bearing arranged on said frame between the first named bearing and the rear end of said shaft, in which the shaft is supported, a screw thread upon said shaft, extending from near its mid-length to its rear end, a nut mounted upon said threads, its forward end being round and revoluble in said second bearing, and the rear one round for receiving a feed controlling brake band and extending beyond the rear end of said threads, a thrust bearing arranged to bear against said rear end, a pinion upon and revoluble with said nut, between said round ends and adapted to hold said nut between said second named and thrust bearings aforesaid from endwise movement, mechanism engaging said pinion for setting the drill up to and for its quick withdrawal from the work in hand, and a brake band partially encircling a portion of the rear end of said nut and being arranged in a suitable position for being pressed downward by the foot of the operator for governing the rate of feed of the drill shaft, substantially as set forth.

4. In a drilling machine, a drill holding shaft mounted for revolution upon a suitable frame, and having mechanism for revolving said shaft, a screw thread formed upon the rear portion of said shaft, a nut, round upon the outside of each end, mounted upon said threads, a bearing arranged upon the frame in which the forward end of said nut is arranged for revolution, a thrust bearing arranged at the rear end of the frame with which the rear end of said nut engages, and a brake for governing the rate of feed of the drill shaft comprising a band of spring metal partially encircling a portion of the rear end of said nut, one end of the band being secured in a fixed position, and the other free end being arranged in position for being pressed downward by the foot of the operator, and thereby clasping the band around a portion of the circumference of said nut.

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Witnesses:
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