M. KNICKERBOCKER.

Electro Magnet.

No. 51,729. Patented Dec. 26, 1865.

Fig. 1

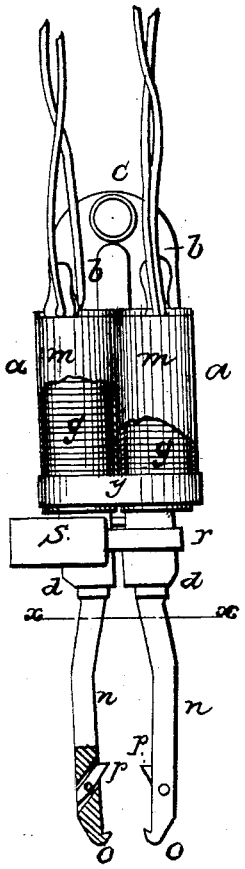
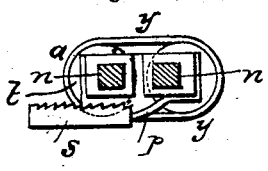


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

MILLIS KNICKERBOCKER, OF NEW LENOX, ILLINOIS.

IMPROVEMENT IN ELECTRO-MAGNETS FOR OIL-WELLS.

Specification forming part of Letters Patent No. **51,729**, dated December 26, 1865.

To all whom it may concern:

Be it known that I, MILLIS KNICKERBOCKER, of New Lenox, in the county of Will and State of Illinois, have invented a new and Improved Electro-Magnetic Tool; 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.

In the sinking of oil or other deep wells portions of the drill-rod are broken off, which, remaining in the bottom of the well, necessarily and seriously interfere with and prolong the boring of the same, requiring oftentimes several days to thoroughly overcome their resistance to the progress of the drill. The expense thus incurred of course is not only large, but the delay is the cause of much annoyance and vexation to the parties interested, and therefore the importance of easily and readily removing such broken or loose pieces of steel or iron from the well is so manifest to all interested in and conversant with the subject of sinking wells of all descriptions as to need no particular mention herein, the object of the present invention being to provide a tool simple and cheap in construction and operation, by means of which they can be so removed, it consisting in the use of an electro-magnet suitably arranged and constructed therefor, as will be presently explained, reference being had to the accompanying plate of drawings, of which—

Figure 1 is a side view of an electro-magnet arranged and constructed for the purpose before stated; and Fig. 2 a transverse section, taken in the plane of the line *x x*, Fig. 1.

a a in the drawings represent an electro-magnet having its two legs *b b* hinged or jointed together at their upper ends, *c c*, so as to allow their magnetic ends *d d* to be opened from or closed upon each other at pleasure. Around and for the whole length, or nearly so, of the straight portions *f f* of each leg of the magnet is wound a close coil of wire, *g g*, made of a suitable metal for conducting the electric fluid, the upper ends of which coils are connected with an electric battery in the ordinary manner, the whole surface and length of the said coils of wire being coated with gutta-percha or any other suitable insulating medium or substance, and protected from injury by means of an outer casing, *m*, entirely surrounding them, made, also, of any suitable metal or material.

To and in each pole of the magnet, and projecting therefrom in the direction of its length, and secured or fixed in any proper manner, are two similar grab-irons or rods, *n n*, having at or near their outer ends, *o o*, upon and in their sides facing each other, a similar swinging jaw, *p*, arranged in a peculiar manner, and operating as will be hereinafter explained.

Extending across and from one pole to another (it being secured at one end by a spring, *r*, to one of the same) is a fastening rack-bar or armature, *s*, with the teeth of which, when an electric current is passing through the magnet, the fixed sharp edge or tooth *t* of one of the legs engages, thus securely holding the poles together or in position, it disconnecting therefrom when the current is stopped through the elasticity of its spring *r*, as is evident.

Having thus in detail described the manner in which the electro-magnet is constructed, I will now proceed to explain the manner in which it operates and is used for extracting pieces of steel and iron from deep wells.

The magnet, with its wire disconnected from the electric battery, is first lowered until it has reached, or nearly so, the bottom of the well, a rope or any other suitable device being properly connected therewith for the purpose, when the magnetic wires are connected with the electric battery, and thus a strong magnetic attraction generated and imparted to the poles of the magnet, drawing them together and firmly nipping or grasping any material or substance which may be between its two grab-irons. The magnet is then raised, and when at the top of the well the wire is disconnected from the battery, thus releasing its gripe upon the material, which can be readily removed.

From the above description it is evident that a strong and powerful pressure can thus be brought to bear upon any material inclosed between or grasped by the grab-irons, the advantages of which are manifest.

In lieu of using the grab-irons, a simple magnet may be used, covered and protected as before described, for the extraction and removal

of small particles, it being necessary that the coil of each leg should be covered with some suitable casing to protect it from injury as the magnet is lowered and raised in the well.

The swinging jaws of the grab-irons, in case of any strong resistance to the raising of the metal strap or portion of a tube or any other article which may be in the bottom of the well, and inclosed in and between the two grab-irons, it is evident from their arrangement that any tendency of it to slip out of the irons causes the jaws to more tightly grasp the same—a very important advantage.

y is an endless india-rubber elastic band, placed around and about the legs of the magnet at or near their poles, the object of which is to cause the poles to be kept in contact with each other, while at the same time the grab-irons are allowed to swing open and embrace the object.

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

The combination, with an electro-magnet having its legs protected by any suitable covering, of the grab-irons *n n*, the whole being constructed, arranged, and operated substantially in the manner described and for the purpose specified.

The above specification of my invention signed by me this 19th day of June, A.D. 1865.

MILLIS KNICKERBOCKER.

Witnesses:

ALBERT W. BROWN,

C. L. TOPLIFF.