# W. Morris,

## Rock Drill Jar.

No 2,243. Patented Sep. 4, 1841.

Fig: 3

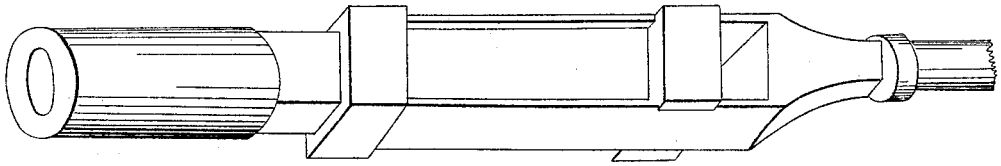


Fig: 5

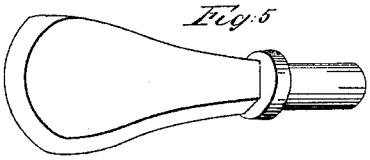


Fig: 4

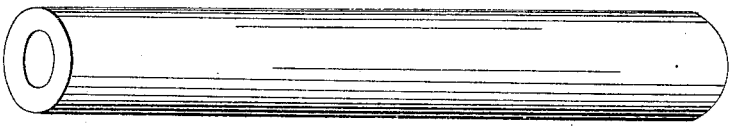


Fig: 6

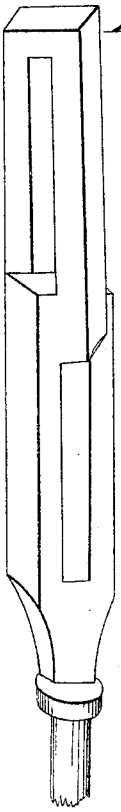


Fig: 2

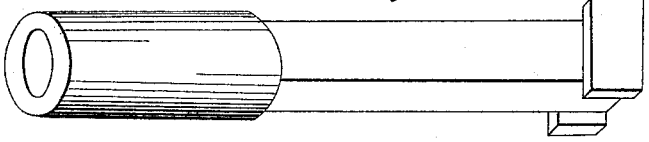
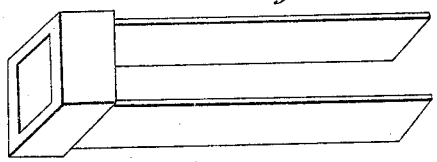


Fig: 1



# UNITED STATES PATENT OFFICE.

WM. MORRIS, OF KANAWHA COUNTY, VIRGINIA.

## MANNER OF UNITING AUGERS TO SINKERS FOR BORING ARTESIAN WELLS.

Specification of Letters Patent No. 2,243, dated September 4, 1841.

*To all whom it may concern:*

Be it known that I, WILLIAM MORRIS, of the county of Kanawha and State of Virginia, have invented a new and useful Improvement upon the Auger for Boring Artesian Wells; and as a necessary preliminary to the description of said improvement I will first describe the auger to which the improvement has been applied by me.

That auger is the one which has been in common use on the Kanawha River for many years in boring for salt water, and is believed to be the cheapest and best now in use in the United States. But my improvement can be applied advantageously to any other auger used in boring wells of small caliber.

The auger used on Kanawha for years past is constructed, as follows—Two poles made out of solid oak timber or other substantial wood, sixteen feet long, made smooth and round, and about two inches in diameter, are united by two plates of iron, convex on the outward side, and concave on the inner side, so as to fit the poles. The ends of the poles are first rabbeted together and then plates, about thirty inches in length, are laid on opposite sides of the poles, at the place where the poles are united, when five rivets passing through each plate and the poles so united, are well clenched, the center rivet passing through the rabbet in the poles aforesaid. Care should be taken when thus uniting the poles to keep the whole of it perfectly straight. Plates of half the length of those described as aforesaid are welded on the opposite sides of a square bar of iron about six inches long, and one inch, or one and a quarter inch square. These latter plates so welded are slipped over one end of the pole, the pole being shaped so as to be easily driven between the plates. These plates are in like manner confined to the poles by rivets passing through the plates and pole, and well clenched. A preparation of the same kind is put upon the other end of the pole. On the bars on which plates are welded as aforesaid screws are made, the one a male, the other a female screw and one of the size to receive the other. Then poles may be continued to any given depth, each being about thirty three feet long, and screwed the one upon the other. Immediately below the male screw, a shoulder is made on each side of the square bar, by which the pole or poles when suspended, may be caught in an iron clamp, and held until another is screwed on in letting down the auger, and unscrewed in taking it up. At the lower end of the auger a square or round iron bar of about one and one quarter inch in diameter, and varying from eighteen to twenty five feet in length, is used to give weight to the auger, and is called the sinker. At the upper end of the sinker a male screw is formed, on which the poles aforesaid are screwed. At the lower end of the sinker a female screw is formed. To complete the auger, a bit or boring chisel is necessary, with a male screw at the upper end, on to which the sinker is screwed. The bit is generally from twelve to fifteen inches long, about one and a quarter inch thick, and for three or four inches from the bottom upward, of the width that the perforation in the rock or earth is desired to be made. The lower end of the bit, and that part of it, with which the boring is done, is made of steel and brought to an edge with the hammer at an angle of about forty five degrees, from each side, so as to make the edge in the middle of the bit and cut across the entire diameter as well as the center of the hole to be bored. This edge is also of a convex form keeping the center of the hole boring deeper than the sides. In letting the auger down the bit is first put in the clamp on to which the sinker is screwed. They are let down until the upper end of the sinker only is exposed, which is caught in the clamp and held until the first pole is screwed on, and then let down, in the same manner, and the upper end of the pole caught and held as aforesaid, and a second pole screwed on and let down, and so on from pole to pole until the bit reaches the bottom. The pole thus screwed together is raised, from one foot to eighteen inches, and permitted to drop suddenly on the bottom and in rapid succession, until the bit is dulled, or the sides so worn by friction as to diminish the size of the hole, so much as to require it to be resharpened by the hammer, and drawn out again to the width of the hole to be bored. In letting down a fresh bit, it is often necessary to ream out the bottom of the hole where the former bit had been much worn by friction. It often happens with the most careful hands, in letting down the auger, that it gets loose, and drops to the bottom, and if a fresh bit is on, and

the former one had been much worn, the fresh bit, drawn to the full width fastens very tight, and often occasions much delay and expense to extricate it.

From the construction of this auger it is manifest that every part of it must participate in the jar which succeeds every fall of it, in boring, and that consequently a heavy sinker, increasing the jar, cannot be used without serious injury to the wooden poles, and it is equally manifest that the progress in boring, mainly depends upon the weight of the sinker. To give weight to the sinker and thereby expedite the boring without injury to poles, and to extricate the bit when fastened by falling as aforesaid, or sand settling around it or other obstruction below the upper end of the sinker, were great desiderati in boring Artesian wells, and is that which I claim to have accomplished in my improvement aforesaid which is constructed and applied as follows: I make a square socket, from four to six inches in length, large enough to pass freely a square bar of iron of one and one fourth inches. The socket itself made of iron not less than one fourth inch in thickness when finished. I then continue two, and opposite sides of the square socket about fifteen or eighteen inches farther, and leave the other sides open. See the drawings, Figure No. 1. I then take a square bar of iron that will fill the caliber of the square socket and slide through it, about thirty inches long, with a square head about four inches long upon the upper end of it as worked, and equal in size to the exterior of the square socket. On two of the opposite sides of this head a groove is made equal in width to the extended sides of the square socket and equal in depth to the thickness of the extended sides aforesaid, which grooves embrace the extended sides aforesaid, and within which the extended sides slide freely. The other sides of the head form a shoulder upon which the square socket in rising catches, and cannot rise higher without breaking or bringing with it whatever may be attached to the bar on which the head is formed. See Fig. No. 2. The square bar is then passed through the square socket and the extended sides placed in the grooves made in the head on said bar as aforesaid, and passed down until the shoulders of the head catch on the square socket. Then the square bar is welded at the end opposite the head, to a piece of iron similar to that used in making male or female screws for the poles as aforesaid. A female screw is then made in the iron to which the sliding bar is welded as aforesaid which will screw upon the male screw at the upper end of the sinker. See the drawings Fig. No. 2, which represents the bar that passes through the square socket, and the female screw to which it is welded after it is actually passed through the socket.

The extended sides of the square socket, after the bar is passed through the socket and welded to the female screw, are then welded to a bar at least equal in size to that which passes through the socket, and of the length of those used in making male and female screws for the wooden poles aforesaid. After the extended sides are so welded, a male screw is made at the upper end of the bar to which the extended sides are welded as aforesaid on which the first pole is screwed. When the pole is raised the socket slides up the bar until it catches on the shoulder aforesaid. The shoulder lifts the bar which is passed through the socket and screwed as aforesaid on the sinker, and unless some part of the machinery yields the sinker and bit must rise if force sufficient is applied. See Fig. No. 3, of the drawings which represents the entire invention, ready to be screwed in the sinker at the lower end, and ready to receive the wooden poles at the upper end.

In boring with this machine or invention which I claim to be new and useful, and invented by myself, the auger is raised as in the ordinary mode of boring, and permitted to fall suddenly, but the bit and sinker only rebound, for the socket to which the poles are attached slide down the bar which is screwed on the sinker as aforesaid and thus relieves the poles above from the jar. In boring, the length of lever used in raising the auger should be so adjusted that the lower end of the bar to which the extended sides of the square socket are welded, should not be permitted to fall so low as to strike the head of the bar which passes through the socket and screws on the top of the sinker. But when the bit or any part of the auger below the square socket is fast, then the lever should be so regulated that the end of the bar to which the extended sides aforesaid are welded, should strike the head of the bar passing through the socket, so that in falling down, a downward blow is given to the sinker and all below it, and in rising, the shoulder aforesaid catching on the square socket will give an upward blow to all parts below, and thus by rapid successive blows in both the upward and downward strokes of the auger, by power applied at the surface, the bit and sinker may be speedily released however tightly they or either of them may be fastened. The size of the auger here given is for boring a hole of about three inches diameter, and of course the size of all parts of it should be increased or diminished by the size of the hole to be bored, with a due regard to the force to be applied to it.

In describing the instrument, I have given iron as the metal to be used in its construc-

tion; but any other suitable metal may be used, and in such quantities as the functions it is required to execute shall demand.

What I claim as my invention, and desire to secure by Letters Patent is—

The method of uniting the auger with the sinker, by means of the sliding connection, substantially as herein described.

I aver that the sinker may be increased in weight to any manageable extent without injury to the wooden poles, by the jar occasioned by the falling of the auger, so that the boring may be executed with much greater safety and speed. I also aver that the auger fastened at any point below the sliding socket, may much more readily and with greater speed, and less expense be extricated.

The foregoing description of my improved apparatus for boring wells comprehends the form in which it is used by me, and is believed to be the best and safest; but I do not intend by any means to waive the right to the exclusive use of such other forms of construction however adjusted which operate upon the same principle and effect the purpose of separating the part of the auger above the sinker, from the sinker itself, in giving impulse to the chisel in its action upon the substance bored—for the separation alluded to, is the principle of my discovery, and for which I claim the exclusive use and benefit. Instruments upon the same principle, may be constructed in several ways, by slightly changing or modifying the construction above described. One other example of the same principle slightly modified will be found on the wood-cut accompanying the above description and marked (No. 6).

WILLIAM MORRIS.

Witnesses:
DANIEL SMITH,
JOHN R. HUMPHRIES.