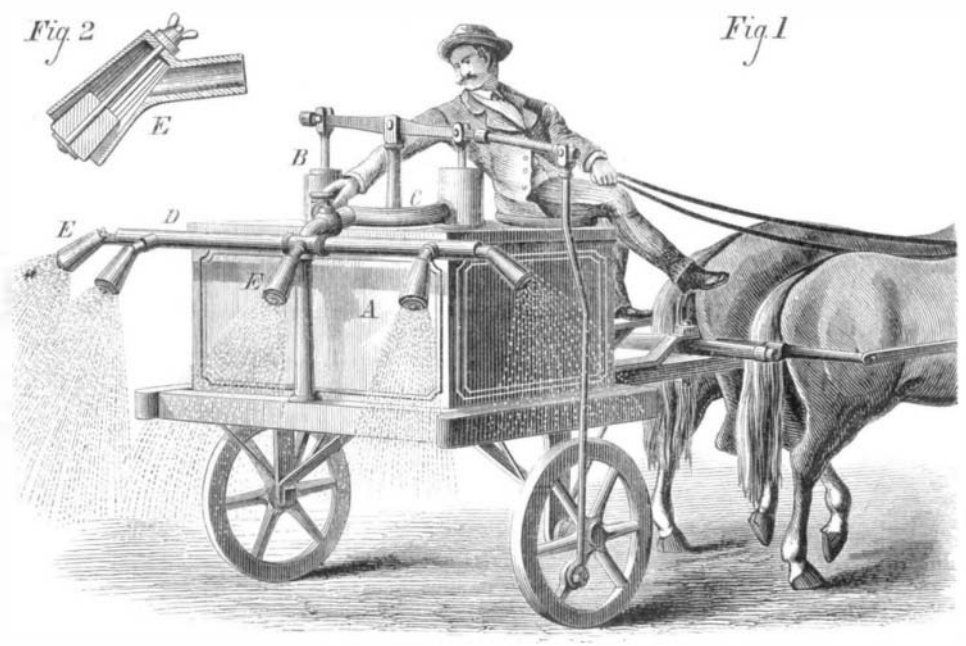
### IMPROVED COTTON WORM DESTROYER.

The inventor of the device represented in our engraving proposes to exterminate cotton worms by ejecting a poisonous liquid over the plants on which they exist. To this end he has devised a novel apparatus, mounted on wheels, so as to be drawn by horses around the field, which is provided with mechanism by which the fluid is distributed in the form of a fine spray.

There is a large tank or reservoir, A, into which the poison is placed, and from which it is lifted by the double action force pump, B, into the two branches of a pipe, C, on top of the tank. The lever of the pumps is actuated, as will readily be understood from the engraving, by a pitman pivoted eccentrically on one of the wheels of the apparatus. From the pipe, C, the liquid passes through a suitable valve, by which its flow is readily governed, and into a horizontal tube, D, which runs transversely across the rear of the tank. To this tube are connected several shorter pipes, E, a section of one of which is represented in Fig. 2. In the interior of these attachments, which are of cast metal, are cut grooves, and their lower ends are closed by plugs of india rubber, which are secured by a rod and set screw. By means of the latter the stoppers can be tightened or loosened in the opening at will.

It will be seen that the liquid, being continually carried up by the force pumps, will, in passing through the lower end of the tubes, E, escape by way of the grooves, and assume the form of fine spray, which will penetrate and evenly distribute itself over the foliage of the plant. The wheels upon which the apparatus is mounted are smaller than those ordinarily used for wagons, and are attached to the tank by means of vertical bars. The machine is thus enabled to pass over the rows of plants without injuring the same; while, at the same time, the dimensions of the wheels are such as to give the required number of strokes to the pump lever necessary to the production of a constant and full volume of spray from the pipes, without auxiliary gearing. The action of the device is necessarily automatic, and hence but a single hand is needed to regulate the spray openings, admit or cut off the liquid, and guide the horse or horses attached to the machine.

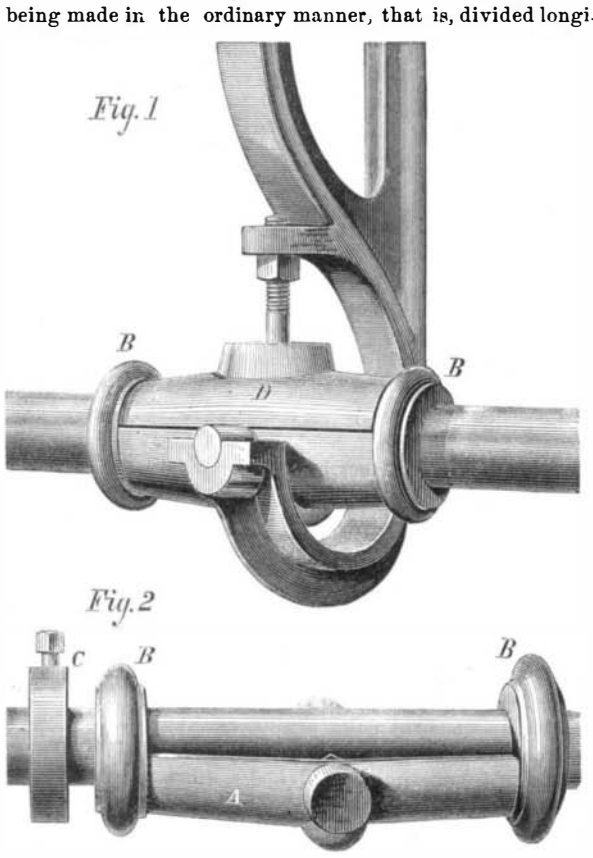
Patented December 16, 1873. For further particulars address the inventor, Hon. J. W. Johnson, Columbus, Texas.




JOHNSON'S COTTON WORM DESTROYER.

### IMPROVED BEARING FOR SHAFTING.

In examining the annexed engraving, the reader will notice that the box through which the shaft passes (instead of being made in the ordinary manner, that is, divided longitudinally, and the halves united by bolts) is constructed of two portions of unequal size. The idea of the inventor is to produce a bearing, the ends of which, in taking against the usual collars or rings, secured to the shaft to prevent end motion of the box, shall not cause the unequal wear of the collars and the consequent disagreeable noise.




The lower portion of the box, A, Fig. 2, is cast hollow to fit the shaft, and in a single piece; while at its extremities rings, B, are provided to abut against the collar, C, on the shaft. These rings present a smooth surface to the collars, and hence exercise but very little wearing effect upon the same. In putting up a line of shafting, the box, A, has to be slipped over the end, the shaft passing through the rings which, of course, support the box when bearings are being fitted, and also during repairs, etc. The upper part of the box, D, fits, as shown in Fig. 1, in the opening between the rings, B, and, if both portions are made with flanges, the bearing is readily attached together by bolts in the usual way.

In our engravings, however, these flanges are omitted, and the mode of securing the box in the hanger is clearly shown in Fig. 1. Lugs are cast upon the box, A, which fit in suitable sockets in the hanger; and an indentation with raised sides is formed upon the cover, D, into which a screw, passing through a projection on the support, is, by a nut, firmly turned. It will be noticed that the apparatus, while thus held tightly in place, can, by loosening the screw, the work of a minute, be quickly opened for any purpose. In practice, the apertures in all boxes of the same size are designed to be of similar dimensions, so that all the covers may be cast alike, and hence all fit any one box. The inventor states that the difficulty often met with in losing line by taking off the ordinary boxes and then replacing them accidentally end for end, as may easily be done, is here necessarily avoided, as the lower portion of the bearing is always on the shaft, unless removed over the extremity. The interior of the box is lined with the usual Babbitt or other suitable metal.

Patented December 16, 1873. For further particulars, address Messrs. Pierre J. Hardy & Co., 156 West 19th street, New York city.

### Manganate of Baryta as a Green Pigment.

The manganate of baryta, possessing a handsome green color, has attracted the attention of color manufacturers; and it has been proposed to employ it as a pigment. Two methods of preparing it have been published: One consists in igniting together the nitrate of baryta and manganese oxide or dioxide; the other consists in fusing a mixture of of pyrolusite or black oxide of manganese, caustic baryta, and chlorate of potash. By either process a green mass is obtained, but the second method seems to yield a more beautiful and homogeneous product. In experimenting with other and more direct methods for preparing a baryta green of great purity and beauty, Fleischer has made several observations of its properties not generally known, which will, we think, prove of interest to our readers.

If a green solution of manganate of potash be precipitated while boiling, by chloride of barium, a heavy, granular, but not crystaline, precipitate of manganate of barium is obtained. This precipitate has a violet color, approaching blue, can be washed by decantation at first, and afterwards may be collected on a filter. On drying the precipitate, its color grows lighter with the increase of temperature; and on being heated to a dark red heat, it looks almost perfectly white, with only a shade of grayish blue. If then it be heated still higher with free access of air, or in an oxidizing flame, it gradually turns green; by carrying the process farther, the color becomes a beautiful greenish blue, and finally at a very high heat a dirty grayish brown mass is formed from the reduction of the manganic acid to binoxide of manganese.

On adding chloride of barium to a solution of the permanganate of potash, and boiling, a precipitate is slowly formed, of a peach blossom color, while the liquid retains a deep violet color. By decanting and bringing the mass, diluted with water, on a filter, the precipitate is not decomposed and can be dried at 100° C. without changing color. When the dry permanganate of barium is gradually heated, its color also grows paler, but does not, like the manganate of baryta, acquire a green color at a still higher temperature; for after the color has once vanished, an increase of temperature soon converts it into the grayish brown mixture of the binoxide of manganese and baryta, or carbonate of baryta. Hence it is impossible to prepare the green manganate of baryta from the permanganate.

In regard to the color itself, experiments have shown that the most beautiful green is that formed by igniting the manganate as described above. The green prepared by Rosenstiehl's process,—fusing together caustic baryta, chlorate of potash, and binoxide of manganese—is less beautiful than the above; while that attained from nitrate of baryta and binoxide of manganese is far inferior to either of the others. Perhaps, however, this color could be improved by preparing it in a reverberatory furnace with a strong oxidizing flame.

The blue green baryta pigment has different shades according to its preparation, some being almost pure blue with only a shade of green, and resembling the light blue quill feathers of many parrots. The greener the color, the more it gains in intensity, but it loses in fineness, although still surpassing the green manganate of baryta.

The production of the blue or bluish green baryta color is due entirely to the alkaline property of the mass. Whether each definite color is due to a definite composition is doubtful, since the temperature, which must not exceed that of a bright red heat, exerts a great influence on the color. This much is however certain, that both manganic acid as well as the permanganate of baryta, when mixed with about 20 per cent of hydrate of baryta and ignited at a red heat, will always produce this blue green color. It is evident that the blue green color is dependent entirely on its basic character; for on placing this powder in weak acids, it first turns green and is then gradually decomposed. The baryta pigment is quite permanent, and may be subjected to the action of strong sulphuric acid for hours, at the ordinary temperature, before the color will be destroyed. Boiling potash solution has no perceptible effect on it. The permanence, especially of the blue shade, is increased by adding a little baryta, which increases its alkalinity. It is also worthy of remark that the pigment prepared from the nitrate of baryta is much less permanent, because the nitrous acid present will after a time exert a reducing action.

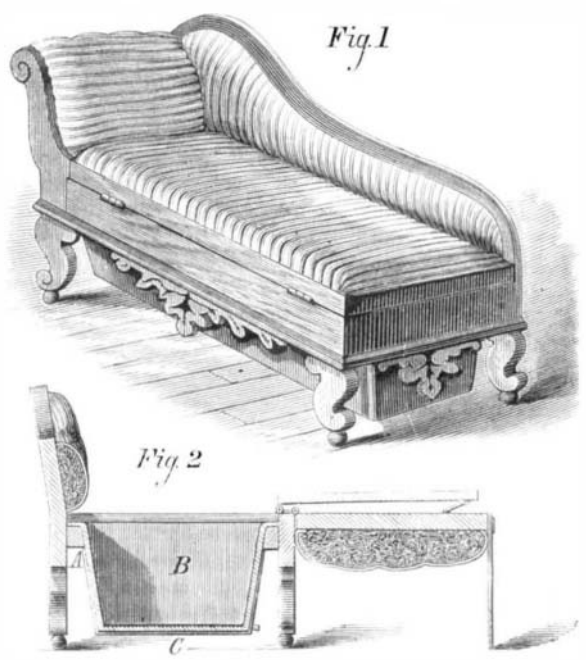
The baryta pigments seem especially adapted to fresco painting, because they appear very bright and lively on stone, and especially on lime, where many other pigments lose their beauty or are entirely destroyed.

### The Bridge over the Alleghany, at Warrenton, Pa.

We are indebted to a correspondent, Mr. A. Hertzel, for the following particulars regarding the structure above named, which is one of the handsomest of the many iron bridges crossing the rivers of the United States. The length of span, from center to center of the towers, is 470 feet. The latter extend 44 feet above the abutments, the masonry of which is 24 feet above the water. The floor beams are 33½ feet long, giving a roadway of 19 feet and a sidewalk of 5 feet on each side. The two main cables are composed of 7 two inch steel wire ropes each, manufactured by J. A. Roebling's Sons, of Trenton, N. J. The cost of the work was $45,000.

### COMBINED LOUNGE AND BATH TUB.

This is an ingenious combination of two indispensable articles of household utility, which will be found a convenience to persons occupying apartments in which economy of space is of importance. The invention, which was patented by Mr. Conrad Wendel, of New York city, consists in arranging, under the seat of a lounge, sofa, or bench, suitable supports, A A, for a bath tub, B, Fig. 2. The seat is hinged to the frame so as to form a cover for the tub, and to be readily thrown forward when it is desired to use the latter, in the position shown in the sectional view. The tub is provided with suitable flanges to rest on the cleats, A.




The seat is shown closed in Fig. 1, and serves to conceal the tub, and also as a cover for the same, to prevent the entrance of dust, etc. The tub is also supported by straps, C, which embrace its body at suitable distances apart, and which are secured to the frame.