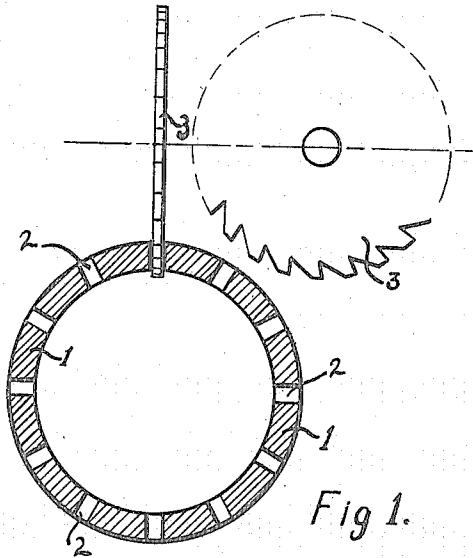
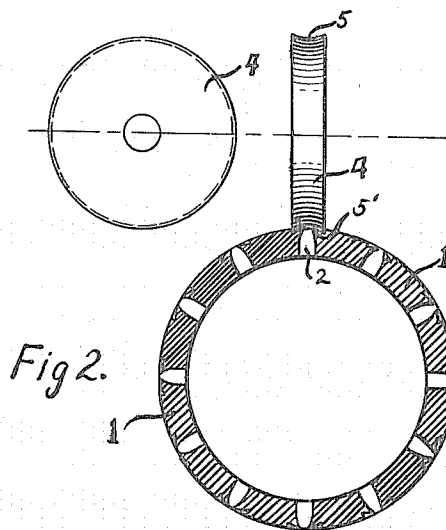
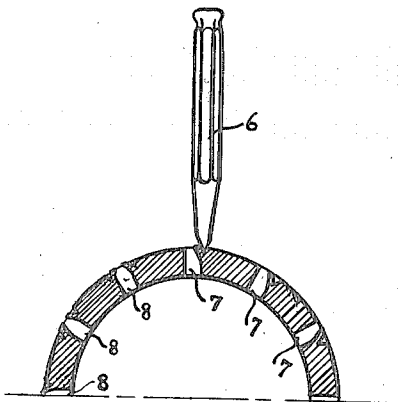
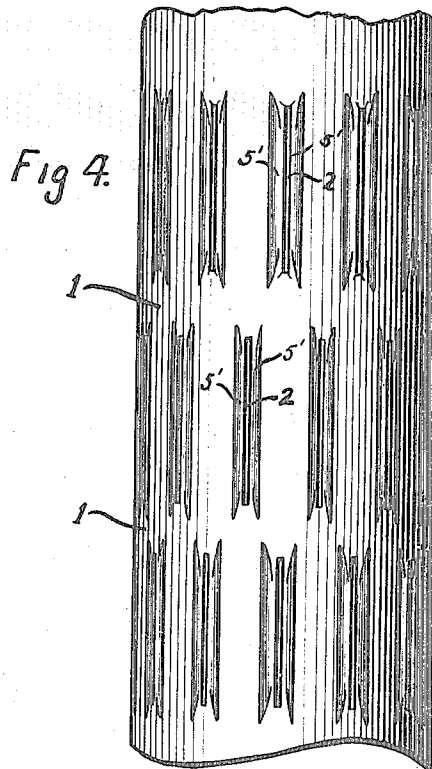


R. A. STEPS.
METHOD FOR MAKING SCREEN,
APPLICATION FILED APR. 11, 1916.

1,207,808.

Patented Dec. 12, 1916.



Inventor:

Robert A. Steps.

UNITED STATES PATENT OFFICE.

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METHOD FOR MAKING SCREEN.

1,207,808.

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Application filed April 11, 1916. Serial No. 90,422.

To all whom it may concern:

Be it known that I, ROBERT A. STEPS, a citizen of the United States of America, residing at Los Angeles, State of California, have invented a new and useful Method for Making Screens, of which the following is a specification.

The class of screen to which this invention relates is that used in oil or water wells, opposite the petroleum or water strata, for holding back the sands and letting the fluids through. Wells of this character are constructed of heavy pipe, in 20' lengths, a sufficient number of such lengths being screwed together to reach from the surface of the ground to the bottom of the well. The portion of the pipe that is set in the producing strata, is perforated so as to form a screen for letting the fluids in.

My method produces screen of this sort, and particularly that type known as "integral screen," with the so-called "key stone apertures" therein. This screen is termed integral screen because it has neither wires, buttons, or other movable parts, but has the straining apertures formed "integrally" in the body of the pipe. This is an advantageous feature. Also, the term "key stone aperture" is one applied to a wide class of straining slots or perforations used in such screens, and is characterized by the fact that such apertures are tapered in cross section; the narrow portion of the aperture lying outward against the sands, and the wider portion lying inward toward the inside of the pipe.

The object of this invention is to disclose and patent herein a new method for commercially making the integral key stone screen in pipe of any length and any diameter whatever, the structural limitations in this respect being eliminated, and the cost of such screen being made very small since by my new method the work may all be performed by working from the outside of the pipe inward, instead of from the inside of the pipe outward as heretofore.

The figures illustrate the steps of the invention when performed in the manner which I prefer.

Figure 1 illustrates the first step; Fig. 2 the second step; Fig. 3 a modified form of the second step; and Fig. 4 illustrates a fragmental portion of a screen finished according to my method.

In Fig. 1, 1 shows the pipe in cross section,

and the elongated slots 2, Figs. 1 and 4, are formed in the body thereof in any suitable way. For this purpose I prefer to use common slotting saws 3, Fig. 1, or other equivalent tools, working from the outside inward, in which case the apertures 2 are formed with parallel sides as shown. This is the first step in the method and the key stone aperture is not yet procured. The second step however, concerns itself with arching the aperture 2, so as to form the "key stone" slot. My preferred way of effecting this second step is illustrated in Fig. 2. Broadly speaking this second step consists in displacing the adjacent metal at one wall of the slot toward the other wall of the slot, so as to make the slot narrower at one side of the metal than at the other. I accomplish this in Fig. 2 by using a die or roller 4, having a concave face 5. This roller or die bridges over the slot 2, and is forced down onto the metal 5' adjacent the wall of the slot, and by rolling the tool back and forth this metal is displaced toward the other wall of the slot in a manner that will be obvious from the drawings. Also, in this form of the invention, the metal on both sides of the slot is acted upon at the same time, with the result that a symmetrical aperture having a good well balanced "key stone" shape, as illustrated, is produced. A moment's consideration will show that slots of this form can be made by a pure sawing action, only if the saw is worked from the inside of the pipe outward, the saw being tapered or arched to conform to the shape of the slot; whereas, by my method, as disclosed, the same result may be obtained by working entirely from the outside of the pipe inward, and by virtue of this underlying distinction, it is now possible to take finished pipe of any length or diameter whatever, and work it up into good merchantable screen with "key stone" apertures integrally therein, and this can be done on so economical a basis as to give this screen to the trade at reasonable prices and in commercial quantities freed from the limitations heretofore encountered. Also, since my method works entirely from the outside inward, I am not troubled by increased length in the sections, but can work very long sections as easily as short ones, and sections of very small diameter as well as sections of large diameter, all of which is the reverse of pure sawing methods.

Continuing now with some of the details,

Fig 3 illustrates what in my judgment is one of the inferior ways of performing the second step of my method, which consists in the use of some tool like a chisel 6 for displacing the metal, and as indicated this tool may be applied only on one side, as in apertures 7, or on both sides, as in apertures 8, Fig. 3. The metal is displaced of course, by applying force, as by means of a hammer, or otherwise, to the head of the tool. Also, all the operations hereinbefore described may of course be performed in the flat skelp.

Fig. 4 shows a short portion of the finished screen, the apertures being shown longitudinally of the pipe, and arranged in staggered circumferential relation, but the direction in which the apertures run, and their arrangement, is immaterial except that I consider the longitudinal direction preferable. Also, it will be understood that the mesh of my screen,—that is the width of the slot at its narrowest point,—is controlled by the pressure applied to the displacing tool, or by the number of times that its action is applied to the slot.

The object of this invention is to improve the methods previously used for making this screen, and to disclose a new method for commercially making it of tough steel or iron pipes regardless of the lengths, however long or short, and regardless of the diameter, however large or small, all structural limitations or difficulties of preceding methods being eliminated or avoided. The cost of such screen, when made in accord-

ance with my method, is very materially reduced, since the active steps of my method work entirely from the outside of the pipe inward, and finally, the result of my method is the production of a slot with a pronounced lip and adjacent trough which is much more effective for "getting" the oil from the native sands, than are slots having configurations previously used.

I claim:

1. The method of making well screen from pipe having slots, which consists in driving a cutting tool into the surface of the pipe adjacent a slot and distinctly nearer the slot thus operated on than to any other slot and thereby turning the edge of said nearer slot beyond the wall thereof so as to form a pronounced inwardly flaring lip which partly closes the said nearer slot.

2. The method of making well screen from pipe having slots, which consists in driving a roller under pressure into the surface of the pipe astraddle the edges of a slot and distinctly nearer the straddled slot than to any other slot and thereby turning said straddled edges toward each other so as to form pronounced inwardly flaring lips which partly close the straddled slot.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 4th day of April 1916.

ROBERT A. STEPS.

In the presence of—

ROBERT T. WILLIAMS,
J. H. DECIUS.