(No Model.)

E. J. BROOKS.

LEAD AND WIRE SEAL.

No. 349,873. Patented Sept. 28, 1886.

Fig. 1.

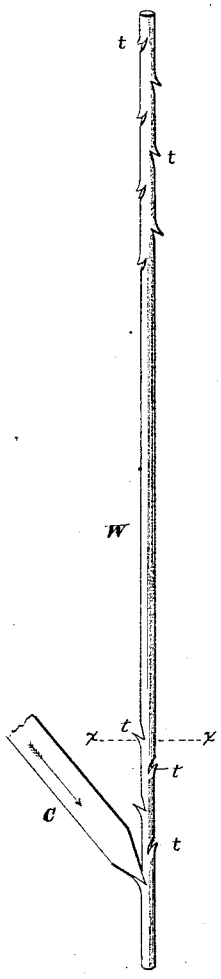

Fig. 2.

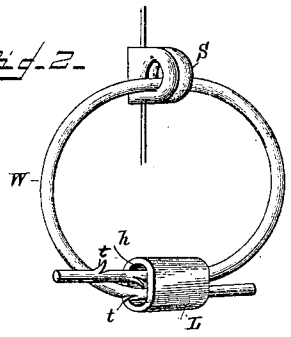

Fig. 3.

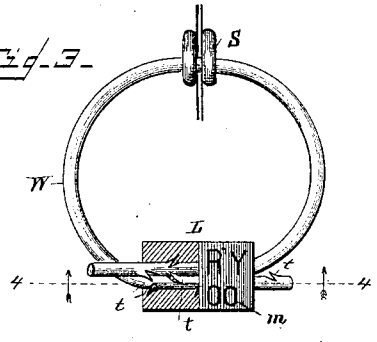

Fig. 4.

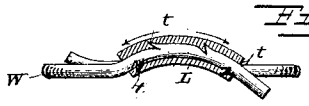

Fig. 5.

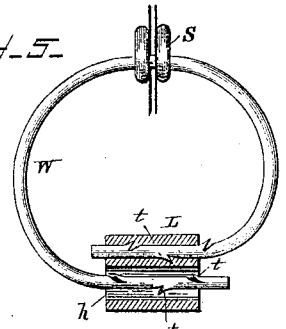

Fig. 5a.

Fig. 6.

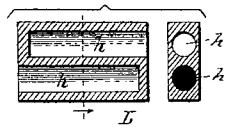

Fig. 7.

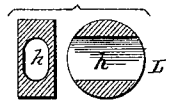

Fig. 8.

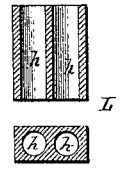

Fig. 9.

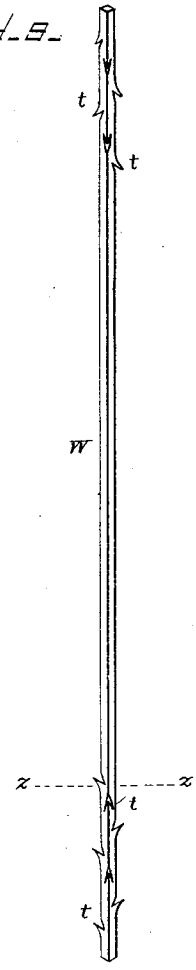

Fig. 9a.

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Inventor.
Edward J. Brooks,
By his attorney,
L. Edwin.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

EDWARD J. BROOKS, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO E. J. BROOKS & CO., OF NEW YORK, N. Y.

LEAD-AND-WIRE SEAL.

SPECIFICATION forming part of Letters Patent No. 349,873, dated September 28, 1886.

Application filed August 27, 1886. Serial No. 212,006. (No model.)

To all whom it may concern:

Be it known that I, EDWARD J. BROOKS, a citizen of the United States, residing at East Orange, in the State of New Jersey, have invented a certain new and useful Improvement in Lead-and-Wire Seals, of which the following is a specification.

This invention is additional to certain of my improvements in lead-and-wire seals heretofore patented, particularly those set forth in United States Patents No. 179,260, dated June 27, 1876, and No. 298,665, dated May 13, 1884.

It relates with the former to the adaptation of ordinary "thick" wire, as it may be termed—that is to say, wire which is round or square in cross-section—for use singly, in combination with seals proper of lead, to form cheap and secure sealing devices; and it relates with said improvement patented May 13, 1884 to the concentration of the holding capacity of anchoring projections on the shackles of lead-and-wire seals against the withdrawal of either shackle end from the pressed seal by making said projections in the form of ratchet-teeth with faces toward the mid-length of the shackle. In forming effective anchoring-teeth of this general description on flat wire it was necessary to employ wide and relatively expensive wire, and to form the teeth thereon by two distinct operations—namely, by serrating the edges of the flat wire and then bending them at right angles, so as to render the sides of the teeth perpendicular to the faces of the wire, and the holding-surfaces of the teeth were limited as to area by the thinness of the flat wire.

I form much more effective "ratchet" anchoring-teeth on thick wire at a single operation, similar to file-cutting, each tooth having a flat withdrawal resisting-face of relatively large area, and at the same time a sharper point, the latter facilitating the solidification of the lead around the wire at the pressing operation, while said large flat face efficiently resists withdrawal. Such teeth may, moreover, be formed in three or more radial lines, so that one or more rows of them shall in all cases be in effective position. (Those formed on flat wire can project in only one or two directions.) The shackle ends of my toothed thick wire are thus and otherwise adapted to interlock with each other without crossing the wire if both shackle ends be inserted in one threading-hole in the lead, or so that the teeth on one end have access to those on the other, especially if they be inserted from opposite directions, and if the lead be drawn out in the direction of the shackle ends at the pressing operation, so as to draw the shackle ends toward each other. Being formed by oblique incisions, as hereinafter more fully set forth, said ratchet anchoring-teeth on thick wire may, furthermore, be so proportioned to the breaking strain of the toothed shackle ends as to make sure that the weakened wire will break sooner than yield otherwise to tensile strain.

The present invention consists in a lead-and-wire seal having such peculiar ratchet anchoring-teeth on thick wire, and in the combination, with such toothed wire, of a peculiarly-constructed seal proper of lead which facilitates the interlocking of the shackle ends with each other within it, as aforesaid, and in a peculiar method of fastening such seals, as aforesaid.

A sheet of drawings accompanies this specification as a part thereof.

Figure 1 of these drawings is a perspective view of the toothed shackle-wire of a seal illustrating this invention. Fig. 1^x represents a magnified cross-section thereof on the line $x\,x$. Fig. 2 is a perspective view of said seal applied to car-door staples and ready for the pressing operation. Fig. 3 is a front view, partly in section, of the same seal pressed. Fig. 4 is an edge view thereof with the lead in section on the line 4 4, Fig. 3. Fig. 5 is a sectional face view of a seal ready for the press, illustrating a modification. Figs. 6, 7, and 8 are sections representing other modified constructions of the lead. Fig. 9 is a perspective view of a toothed shackle-wire square in cross-section; and Fig. 9^z represents a magnified section on the line $z\,z$, Fig. 9.

Like letters of reference indicate corresponding parts in the several figures.

My improved seal, in either form thereof, is composed of a peculially-toothed shackle, W, of thick wire, and a seal proper, L, of lead, hereinafter simply termed the "lead."

Each threading end of said shackle-wire is provided with ratchet anchoring-teeth *t*, integral therewith, and preferably in three or more equidistant radial lines, as represented by Figs. 1^x and 9^z. Each of said teeth *t* has an inclined back, which facilitates inserting the toothed shackle ends in the threading hole or holes *h* of the lead. (See Fig. 2.) Each tooth *t* has a sharp radially-projecting point, which facilitates closing down the lead upon and around the tooth when the seal is pressed, (see Figs. 3 and 4,) and each tooth *t* has a broad flat face, *f*, Figs. 1^x and 9^z, which effectively resists the withdrawal of either shackle end from the solidified lead of the pressed seal. (See Figs. 3 and 4.) Such ratchet anchoring-teeth *t*, on thick wire W, are readily formed at a single operation by means of suitable chisel-pointed cutters, C, Fig. 1, making oblique incisions in the wire, and at the same time bending outward the partly-severed metal so displaced. The convexity of the sides of the wire secures the desirable sharp points of the teeth. In toothing "square" wire W, Figs. 9, 9^z, the salient angles naturally locate the teeth *t* and form their sharp points.

The several forms of lead L (shown in Figs. 2 to 7, inclusive) have, as features common to all, said holes *h*, broadly considered, and capability of being solidified upon the shackle ends within them.

The lead L of the seal represented by Figs. 1 to 4 has a single threading-hole, *h*, oblong in cross-section, with its longer axis parallel to the face and back of the lead, whereby it is adapted for the insertion of both shackle ends in one and the same threading-hole, so that they will lie side by side and in one and the same plane, and at the same time will naturally interlock with each other, not only preparatory to the pressing operation, so as to facilitate the latter, but within the solidified lead of the pressed seal, as represented in Figs. 3 and 4, so as to further preclude the withdrawal of either shackle end, and this is so accomplished without crossing the shackle ends, and thus within a relatively-thin and easily-pressed seal.

By inserting the shackle ends in opposite directions, as represented in Figs. 2, 3, and 4, and pressing the seal, so as to to draw out the lead longitudinally in solidifying it, as illustrated by Fig. 4, said interlocking of the shackle ends in the most secure manner is insured. The lead may be so pressed by dies having curved faces which bend the wire transversely, as represented in Fig. 4, or in my roller seal presses, (patented June 2, 1885, and subsequently,) which elongate the lead in a very effective manner. At the pressing operation the lead is appropriately stamped with distinguishing marks or lettering *m*, Fig. 3, the characters of which may be large, as indicated, owing to said elongation of the lead.

The lead L of the modified seal represented in Fig. 5 is cast on one end of the shackle-wire W, and has a threading-hole, *h*, parallel and adjacent to the cast-in end to receive the single-toothed threading end of the shackle-wire. The cast-in end is identical with the other in the example, but might obviously be indented instead, as set forth in my said patent No. 179,260, or otherwise anchored, as the mode of fastening cast-in shackle ends forms no part of my present invention.

The lead L, Fig. 6, is adapted to be threaded like that shown in Figs. 2 to 4, but has two threading-holes, *h*, neither of which extends entirely through the lead, so as to inclose the extremities of the wire. That represented by Fig. 7 has the oblong single hole *h*, first described, but is otherwise of the more common disk form. That represented by Fig. 8 has the two ordinary threading-holes *h*, extending lengthwise through it, so as to be threaded either as shown in Figs. 2 to 5 or by inserting both ends in one and the same direction, as may be preferred.

Having thus described my said improvement in lead-and-wire seals, I claim as my invention and desire to patent under this specification—

1. In a lead-and-wire seal, the combination of the lead of a shackle of single thick wire having one or each end threaded into the lead and provided with ratchet anchoring-teeth, each of which has an inclined back, a radially-projecting sharp point, and a broad flat face, the faces of said teeth being directed toward mid-length of the shackle, substantially as herein specified.

2. The combination, in a lead-and-wire seal, of a shackle of single thick wire having each end provided against withdrawal with ratchet anchoring-teeth, and a seal proper of lead having a single longitudinal threading-hole oblong in cross-section into which hole the respective shackle ends are threaded in opposite directions, substantially as herein specified.

3. The within-described method of fastening a lead-and-wire seal, the shackle of which is provided at each end with ratchet anchoring-teeth to resist withdrawal, consisting in threading the respective shackle ends into the lead in opposite directions and drawing out the lead longitudinally at the pressing operation, substantially as specified.

EDWARD J. BROOKS.

Witnesses:
HENRY L. C. WENK.
N. S. KLINE.

Correction in Letters Patent No. 349,873.

It is hereby certified that in Letters Patent No. 349,873, granted September 28, 1886, upon the application of Edward J. Brooks, of East Orange, New Jersey, for an improvement in "Lead-and-Wire Seals," an error appears in the printed specification requiring correction, as follows: In line 94, page 2, the word "of" at the commencement of the line should read *with;* and that the Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 5th day of October, A. D. 1886.

[SEAL.]

H. L. MULDROW,
Acting Secretary of the Interior.

Countersigned:

R. B. VANCE,
Acting Commissioner of Patents.