

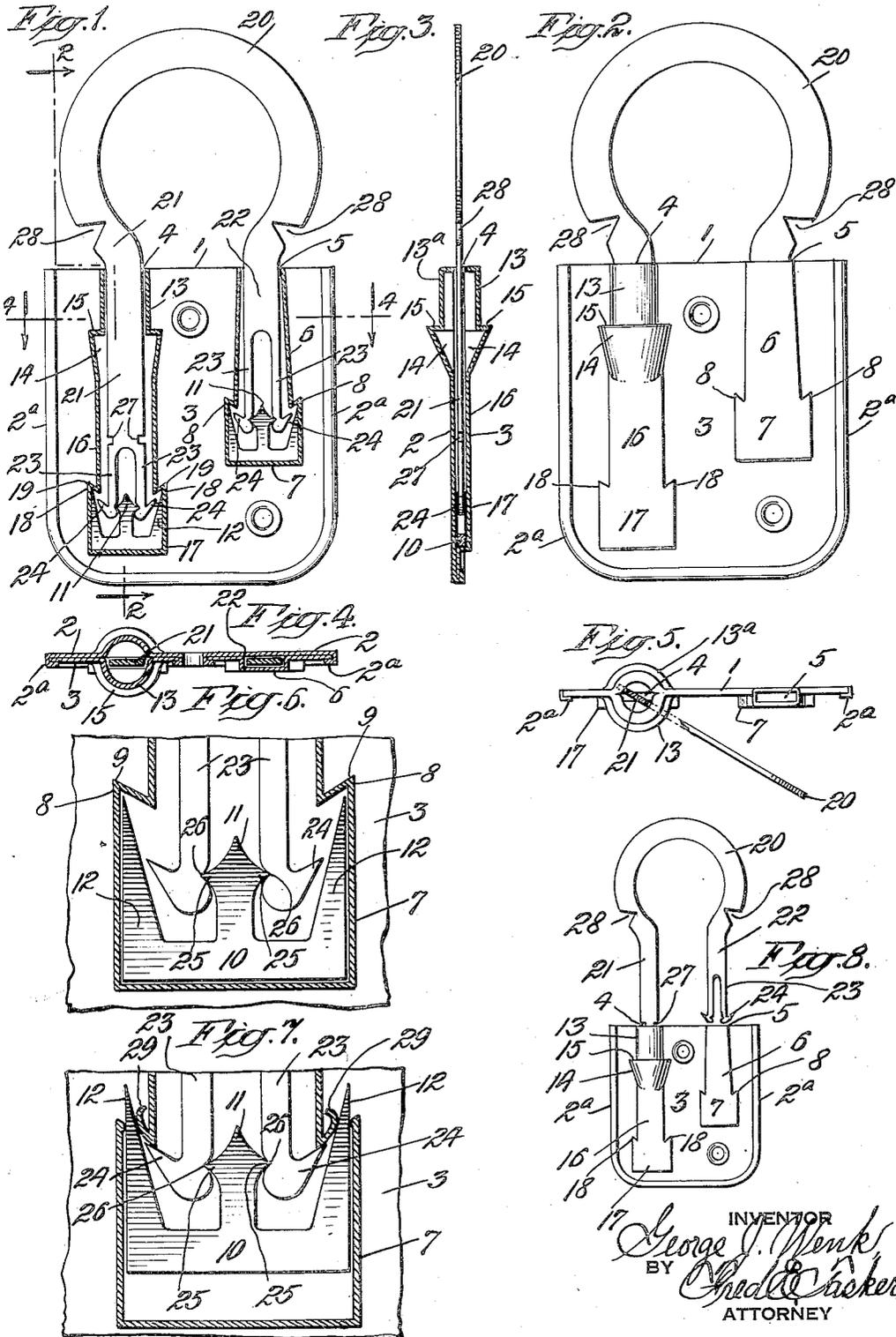
July 3, 1934.

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1,964,897

SELF LOCKING SEAL

Original Filed Aug. 31, 1932



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# UNITED STATES PATENT OFFICE

1,964,897

## SELF-LOCKING SEAL

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Application August 31, 1932, Serial No. 631,150

Renewed December 19, 1933

9 Claims. (Cl. 292—320)

This invention relates to improvements in seals, especially those of the self-locking kind, which will not suffer any tampering without breaking, and which are adapted for various uses, such for  
 5 example, as car doors, meters, trunks, packages, boxes, lids, covers, and the like. The improvements consist in novel and ingenious details in the shackle and the casing; and especially in a loose locking insert; and further they may be  
 10 said to comprise the construction, combination, and arrangement of parts, and numerous details and peculiarities of the same, substantially as will be hereinafter described and claimed.

In the accompanying drawing illustrating my  
 15 invention:

Figure 1 is an outside or front elevation of my improved self-locking seal, with the shackle having both its arms introduced full length into the shell or casing and locked therein, the raised or  
 20 pocket features of the shell being in section to indicate the inner construction and the position of the locking means when both arms are thus locked inside.

Figure 2 is an outside or front elevation of my improved self-locking seal, with the shackle fully  
 25 locked therein, similar to Figure 1 with all parts complete for use and without showing any part in section.

Figure 3 is a vertical section on the line 2, 2,  
 30 of Figure 1.

Figure 4 is a horizontal section on the line 4, 4,  
 of Figure 1.

Figure 5 is a top plan edge view of the shackle and shell when the shackle is partially or half  
 35 locked in the shell, so that it may be swiveled into a plane at an angle to the face of the shell.

Figure 6 is a partial enlarged detail sectional view of the inner locking end of the pockets, and shows the independent movable locking insert  
 40 therein, and the shackle teeth engaging the same.

Figure 7 is a similar view showing the destructive action on the shell of the pointed or barbed  
 insert after a locked seal has been tampered with.

Figure 8 is an outside view of the shackle and  
 45 shell, on a diminished scale, the shackle being only partially inserted and locked in the shell, the locking being with one arm only and a half locking, the other or shorter arm not being yet  
 50 inserted or locked, so that the shackle is thus left free to swivel or turn in the shell on the longer arm in the tubular socket in the shell.

Similar characters of reference designate corresponding parts in all the different figures of the drawing.

55 The essential features of my improved self

locking seal are the two-armed shackle, the shell or casing, and certain independent inner locking loosely-inserted devices that cooperate in locking with the toothed inner ends of the legs  
 60 or arms of the shackle.

The sheet metal shell, casing or body, is fashioned to serve as the main frame of the seal. It is made in any suitable manner and of as many parts as desired; but it is usually in the particular form which is shown by way of example, as  
 65 consisting of a single blank of metal that is bent back or folded upon itself at 1 to provide the flat side 2 which has raised parts for pockets or grooves, and also the opposite flat side 3 which is close against side 2 and also has raised parts  
 70 for pockets or grooves; although it will be understood that the formation of the raised parts for pockets or grooves may be widely varied and one or the other of the sides may be entirely flat and the pockets also may vary greatly in shape and  
 75 size; the edge 2<sup>a</sup> of the section 2 being bent or lapped over the edge of section 3 to form a bead or rib which runs around the entire edge of the shell except where the fold 1 occurs along the top edge of the shell, which fold is slotted before or  
 80 after the folding of the blank to provide openings at 4 and 5 for the insertion of the shackle arms into the pockets.

Thus the sides 2 and 3 are opposite to each other and are not spaced away from each other  
 85 except where the said sides are stamped out, struck up or grooved before the bending of the blank to provide a thin and substantially oblong pocket 6 between sides or sections 2 and 3, said pocket 6 in the present example being struck out  
 90 in the side 3 while the part of side 2 opposite pocket 6 is flat and smooth. See Figures 4 and 5. This pocket 6 is adapted to receive the shorter arm of the shackle and extends, say, from the folded edge 1 for a distance perhaps a half or  
 95 more of the way to the other end of the shell, this pocket 6 having an open entrance 5 through a slot in the folded edge 1; and the opposite or inner end of this pocket 6 being enlarged to  
 100 form a thin cavity 7 which is shaped at the top with lateral shoulders 8. The inner recess 7 is square or oblong and the shoulders 8 are horizontally-inclined so as to form with the walls of the recess 7 pointed or angular corners 9. The  
 105 recess 7 contains a movable independent locking inserted piece of thin metal 10 which is square at the base and has a central upper arrowhead 11 and lateral sharp prongs 12, 12. This insert cooperates in locking with the arm 22 of the shackle  
 110

that is inserted in pocket 6, and it has an amount of play in recess 7.

The shell section 3 is further provided with another raised part stamped therein or struck out therefrom, of an elongated form, to furnish at one end a round or tubular pocket at 13 which is enlarged at its inner end at 14 to form a T cavity with a shoulder 15. Opposite to the semicircular part 13 of this tubular pocket the other side 2 is provided with a similar corresponding struck out semicircular pocket 13<sup>a</sup>, which with the pocket 13, forms a tubular pocket, both being substantially semicircular, and the cavity 14 being below both members 13 and 13<sup>a</sup> is round and the shoulder 15 is therefore round. The outer end of this tubular pocket comprises a slot 4 in the folded edge 1 which serves as an opening to admit the other and longer arm of the shackle. Preferably the outer ends of the members 13 and 13<sup>a</sup> are made with a burr or are bent over a little on opposite sides of slot 4, thus assisting in holding the shackle when inserted to swivel around as seen in Figure 5. Obviously this pocket for the longer arm or its outer portion between shoulder 15 and inlet opening 4 may thus be tubular or it may be semicircular and stamped out of only one side of the shell or it may be any other shape, but in order to afford a complete and satisfactory swiveling effect I prefer to make it tubular as I have described, and stamped out of both sides 2 and 3.

The cavity or recess 14 merges with a taper into a flat and oblong or square or substantially rectangular flat inner portion 16 of the said raised member, which portion 16 forms a part of the elongated pocket for the longer arm of the shackle, and its inner end 17 furnishes a cavity to hold another insert 10, and has lateral shoulders 18 that are inclined to provide angular corners 19 adapted to receive the pointed ends of the lateral projections 12 on the movable locking insert 10. Thus the inner end 7 of the shorter pocket as described is constructed the same as the inner end 17 of the longer pocket, and the same kind of separate flat metal insert 10 is used in both places. The tubular part of the longer pocket allows one arm of the shackle to swivel therein before the other arm has an opportunity to be introduced into the short companion recess through the outer opening 5.

The shackle consists of a looped outer end 20 and a pair of parallel arms 21 and 22, the arm 21 being longer than the arm 22. The inner ends of these arms 21 and 22 are split or cleft to form pairs of parallel spring fingers 23, 23, having the ends or tips thereof hooked or provided with teeth, prongs, or catch projections 24, 24, that project horizontally and outwardly or at right angles to the direction of the fingers 23, in order that they may have the function of engaging the shoulders 15, 8, or 18, as the case may be, it being noted also that the projecting teeth or catches 24 are horizontally inclined and sharp or pointed at the ends where these ends rest against and under the respective shoulders therefor.

The arms of the shackle fit without much clearance in the rectangular thin pocket sections 6 and 16, substantially filling these pockets, but when the arms are being introduced into the pockets, the outwardly projecting teeth 24 at the ends of the fingers 23, being out beyond the line of said fingers, cause the said spring fingers to be squeezed toward each other when they are being introduced into the said pockets, and the same thing occurs when the spring fingers are passed

through the tubular pocket at 13; but the moment the teeth 24 are released from the compressing effect of the interior wall of said pockets, the spring fingers cause these teeth to expand respectively below the adjacent shoulders so that the arms are held non-withdrawably in the pockets.

A useful feature of my invention lies in the fact that the shackle can be permanently connected to the shell with one of its arms, and thus the shackle and shell prepared to be commercially sold in a single unit instead of having these parts sold separately. The two parts are connected in this manner by inserting the long arm through the opening 4 into the tubular pocket 13, thus compressing the spring fingers on the long arm towards each other as the projections 24 are forced toward each other by the walls of the tubular pocket, until the catches or prongs 24 snap under the shoulder 15 and prevent afterwards any withdrawal of the shackle from the shell. The shackle arm 21 has one or more notches 27 near the inner ends of the fingers 23, and when the prongs 24 are engaged with shoulder 15, as in Figure 8, the notches 27 being adjacent at the time to the edge of the opening 4, as shown in Figure 8, allow the shackle to swivel in the tubular pocket, because the notches 27 engage the edge of opening 4 and the flanges adjacent to said opening and thus the arm 21 may be rotated or moved around sufficiently to take the short arm 22 away from its receiving opening 5, or in fact arm 21 may be revolved completely around, to allow the engagement of the shackle with a staple or any other object.

After the shackle is so engaged, both the arms can be pushed home the full length into their respective pockets in the shell, as shown in Figures 1 and 2. The result is that when arm 22 enters through slot 5 into pocket 6 and is pushed on down into pocket 7, it will in the latter pocket pick up the loose insert 10 that is lying in said pocket. For after the prongs 24 snap out under the shoulders 8 the further movement of spring fingers 23 brings them into contact with the lateral pointed lugs 25 on the arrowhead 11 and these lugs 25 expand the fingers 23 sufficiently to keep them below the shoulders 8 and make it impossible for the fingers to again approach each other if any strain should pull severely upon the shackle. These arrowhead sharp lugs 25 come into firm engagement with the indents 26 on the inside of fingers 23. This is best shown in the enlarged views of Figures 6 and 7. While the short arm 22 is thus picking up one of the loose inserts 10 in pocket 7, the fingers 23 on the long arm 21 are doing the same thing with a loose insert 10 in pocket 17, for simultaneously with the movement of the prong-provided fingers beneath the shoulders 8 in pocket 7 the prong or catch-provided fingers in the other pocket will snap under the shoulders 18 of the pocket 17; and the insert 10 will be engaged as before explained. Thus both arms 21 and 22 are engaged not only with shouldered pockets, but with loose floating inserted pieces which keep the fingers in proper relative position and prevents them from collapsing.

What occurs if the seal is tampered with after being locked is this. The inserts between the spring fingers of the shackle arms keep the spring fingers from collapsing together when a severe strain pulls on them, and at the same time the side points or tapered prongs of the insert are forced to the extreme end of the raised portion in corners 9 and 19. And if severe force is used

in trying to release or withdraw the shackle in tampering with the seal these points 12 puncture or penetrate the shoulders 8 or 18 so as to lift a piece of the shoulder out or roll it back in a coil, as at 29 in Figure 7. And at the same time the projections on the spring fingers are engaged under the curl or opening showing a distinct break that can be easily detected without any close examination as having been forced with great effort in being tampered with. These features make it utterly impossible to withdraw the hasp or shackle unless the spearhead of the insert or the sharp fingers are broken off, and when this happens the raised parts of the shell, locking and curling the spring fingers and the pointed inserts, would be damaged to such an extent that there would be no possible way of again inserting the shackle and making the fingers snap or hold, as the least pull would then withdraw them from the shell.

If desired the shackle may be weakened by cut out notches, as at 28, 28, to enable it to be broken off easily. Many changes may also be made in the details of the invention, within the scope of the claims.

What I claim is:

1. In a self-locking seal, the combination with a shell having pockets, of a shackle having parallel arms, each arm being biceft to furnish spring fingers having prongs that engage shoulders within the interior of the shell, and loose inserts each having a central arrowhead engaged by the spring fingers, and lateral sharp prongs adapted under strain to puncture the shell.

2. In a self-locking seal, the combination with a shell having pockets, of a shackle having parallel arms, each arm being cleft to furnish spring fingers having prongs that engage shoulders within the shell, and loose inserts provided with lateral prongs and central arrowheads and adapted to be engaged by the spring fingers.

3. In a self-locking seal, the combination with a shell, having a pocket, of a shackle having an arm cleft to furnish spring fingers having prongs that engage shoulders in the shell, and a loose insert having a central arrowhead and lateral prongs and adapted to be picked up and embraced and held between the spring fingers to prevent them from collapsing together under strain.

4. In a self-locking seal, the combination with a shell, of a shackle having flexible arms provided with terminal angular teeth and adapted to engage interior shoulders in the shell, and loose inserts having tapered prongs to puncture the shell under strain, which inserts are picked up by the flexible arms and carried by them to prevent

them from collapsing under a strain which would release their prongs from the shoulders.

5. In a self-locking seal, the combination with a shell having shouldered T-shaped pockets, of a shackle having parallel spring arms, whose ends are formed with angular prongs to engage the shoulders in the pockets and prevent withdrawal of the shackle from the shell without breaking the same, together with loose inserts having lateral prongs and central arrowheads adapted to be engaged by the spring arms.

6. In a self-locking seal, the combination with a shell, having shouldered pockets, of a shackle having parallel arms of unequal length, each arm being cleft to provide a pair of spring fingers having prongs at the ends which project outwardly away from each other and engage the shoulders in the pockets, the longer arm being formed with a lateral notch to assist in swiveling the long arm in the shell, so that both arms may enter their pockets, and loose inserts engaged by the spring fingers when the arms are pushed in full length.

7. In a self-locking seal, the combination with a shell having shouldered T-shaped pockets, of a shackle having parallel arms split to provide spring fingers formed at the end with projecting teeth to engage the shoulders in the pockets, so that the shackle may be held inside of the shell and prevent it from being withdrawn, and loose inserts in the pockets that are engaged by the arms, said inserts having each a central arrowhead and lateral sharp prongs.

8. In a self-locking seal, the combination with a shell having a shorter pocket with a shouldered inner end and a longer pocket partly tubular with a shouldered inner end and the remainder non-tubular with a shouldered inner end, of a shackle having a long and a short arm provided with spring fingers that enter the pockets and engage the shoulders in said pockets, and loose inserts in the pockets engaged by the spring fingers, said inserts having each a central arrowhead and lateral prongs adapted to puncture the shell under strain.

9. In a self-locking seal, the combination with a shell having a shouldered pocket, of a shackle having an arm entering said pocket, said arm cleft to furnish spring fingers having prongs that engage the shoulders in the pocket, and a loose insert in the pocket having a central arrowhead and lateral prongs adapted to be picked up by the shackle to hold the latter non-withdrawably in the shell, said lateral prongs being adapted to puncture the shoulders in the pocket under strain.

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