

June 23, 1931.

F. K. FILDES

1,811,311

SAFETY DOORLOCK

Filed June 7, 1928

3 Sheets-Sheet 1

FIG. 1-

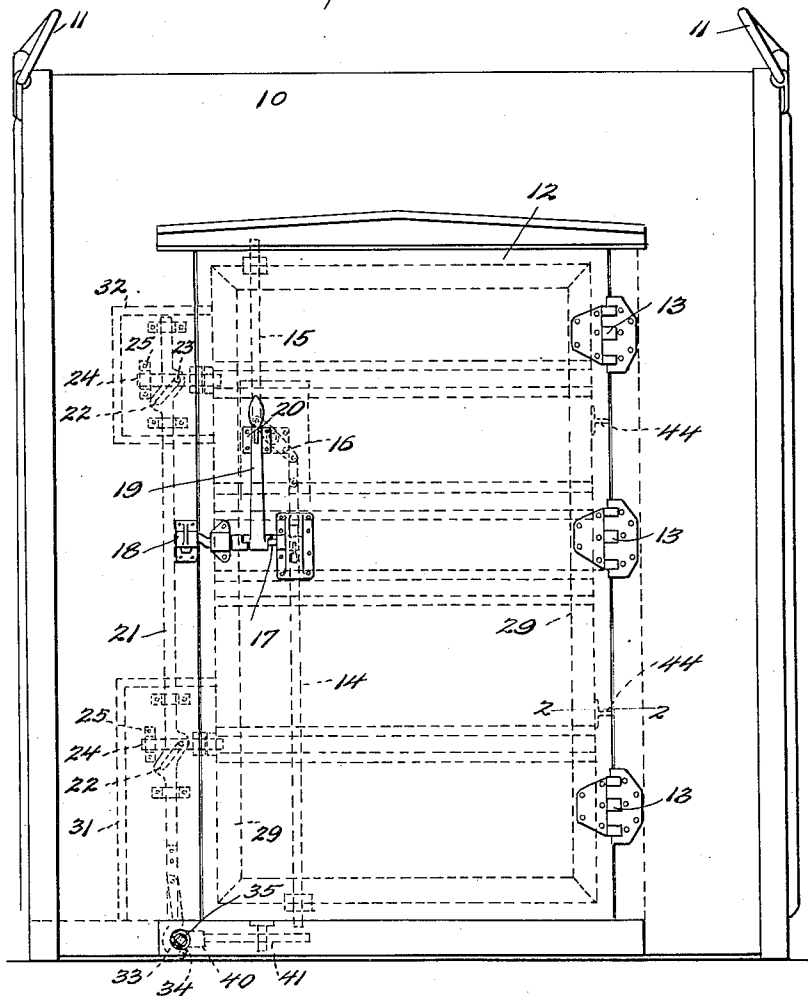
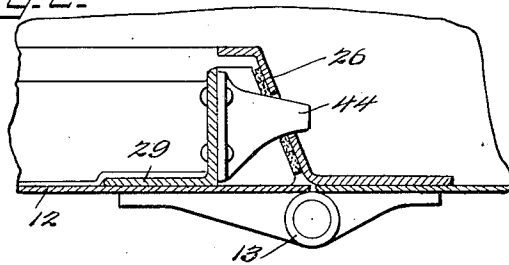


FIG. 2-



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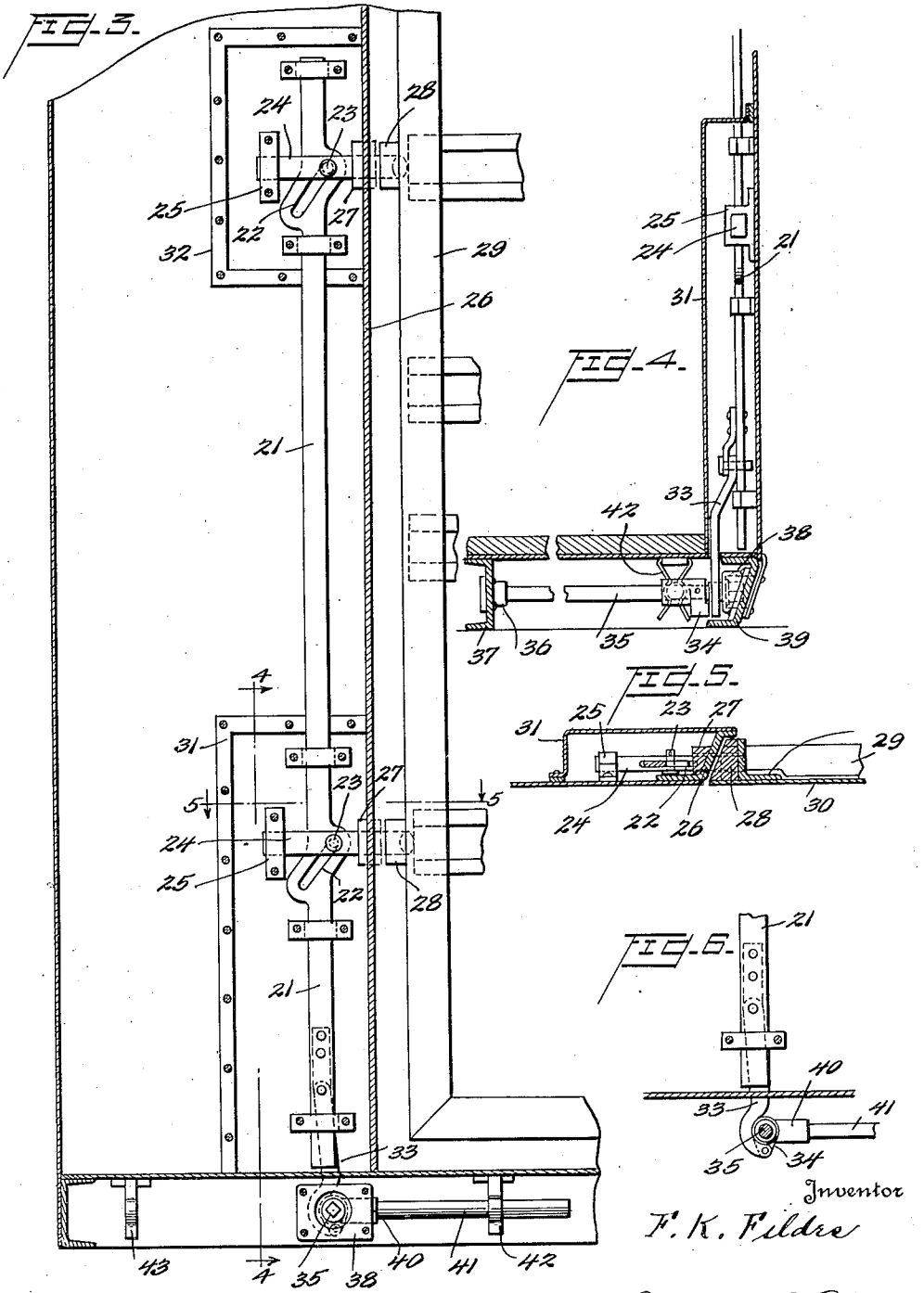
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3 Sheets-Sheet 2



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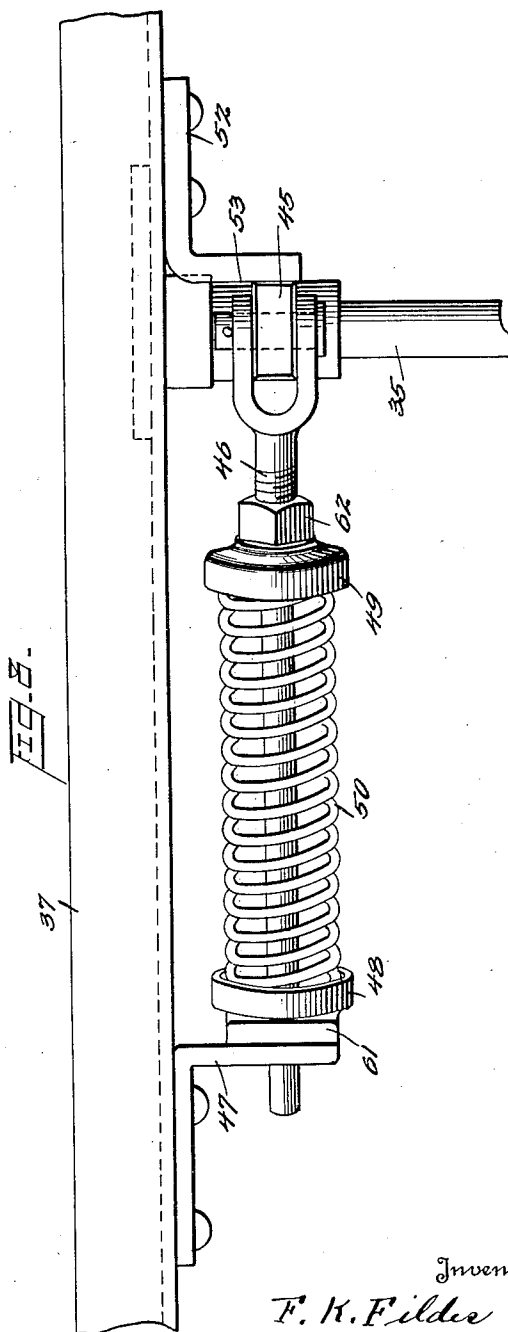
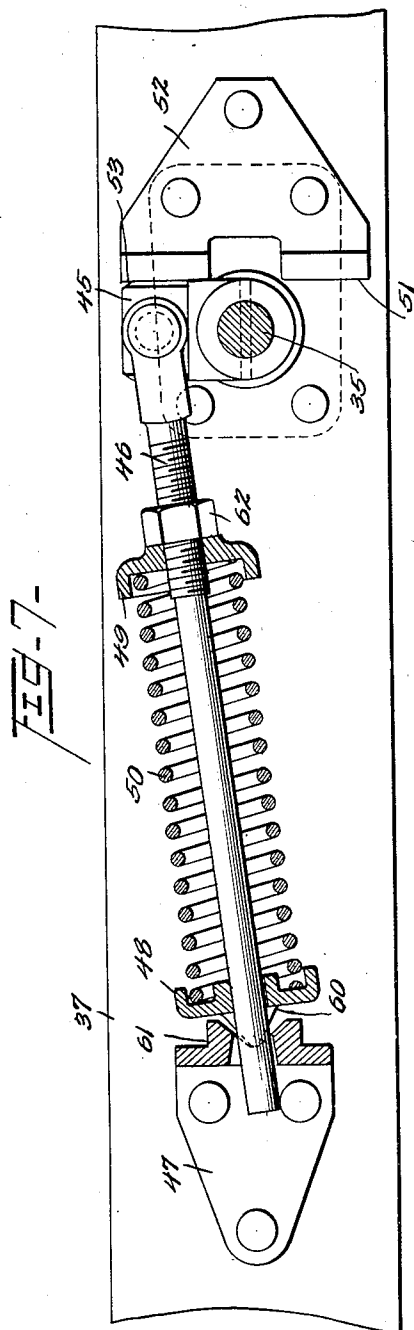
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3 Sheets-Sheet 3



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SAFETY DOORLOCK

Application filed June 7, 1928. Serial No. 283,524.

This invention relates to door locking mechanism and particularly to a safety lock for sheet metal containers of the kind used by railroads for the transportation of fractional car load lots. Containers of this kind are adapted to be seated on an open freight car in association with other containers of the same construction, and form independently removable units of a multi-container car.

The object of the present invention is to provide a safety locking mechanism for containers of the above mentioned type which will effectively guard against theft by preventing unauthorized opening of the container. For carrying out this object the invention provides a safety lock which cannot be operated so long as the container is seated on the car, but requires as a condition precedent to its operation that the container be lifted up a substantial distance from the car. As the container with its lading is heavy, requiring the use of power mechanism, such as a crane, to lift it, the locking mechanism provided by the invention very effectively guards against any unauthorized opening of the container. The invention also provides other safety features in connection with the locking mechanism and effects various improvements in the constructional details of mechanism of this character, as will hereinafter appear.

Referring to the accompanying drawings:—

Fig. 1 is a front elevation of a sheet metal container equipped with door locking mechanism embodying the present invention;

Fig. 2 is a sectional detail on the line 2—2 of Fig. 1;

Fig. 3 is a sectional elevation affording an inside view of the locking mechanism;

Fig. 4 is a sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a sectional view taken on line 5—5 of Fig. 3;

Fig. 6 is a detail sectional view; and

Figs. 7 and 8 are detail views showing a modification of means for holding the locking mechanism at the limits of its movements.

Fig. 1 shows a sheet metal container 10 provided adjacent its upper edges with lifting bails 11, whereby the container is adapted to be lifted on and off an open freight car by means of a crane or other lifting device. The container is formed in its front side with a door opening adapted to be closed by a door 12 pivoted on a vertical axis by hinges 13. The door may be provided with door operating and locking mechanism of the construction shown in my co-pending application, Serial Number 280,056, filed May 23, 1928, but the present invention is not concerned with this particular mechanism and so far as the invention is concerned any other suitable mechanism may be provided. The mechanism shown comprises a pair of bolts 14 and 15 mounted for vertical sliding movement on the inside of the door and connected at their inner ends for simultaneous movement by a rocker 16. These bolts are operated by a shaft 17 which has an arm at its inner end projecting through a slot in the door and engaging a slot in bolt 14, the outer end of the shaft being offset to form a crank adapted to engage a keeper 18 mounted on the container at the edge of the door opening. An operating handle 19 is mounted on shaft 17, and when the door is closed and locked a staple 20 projects through a slot near the extremity of the handle and has a perforation through which a padlock or seal may be passed.

The present invention relates to a safety locking mechanism supplementary to the mechanism referred to briefly above, such supplementary mechanism being designed to render the container thief proof even with the container seated on a flat car, the mechanism being so controlled that it is impossible to open the door of the container so long as the container is seated on the car. For the attainment of this result I provide a locking mechanism which is operated by a rock shaft mounted on the container beneath the bottom thereof and having fixed thereto a relatively long arm which will engage the floor of the car if it should be attempted to rotate the shaft to unlock the door when the container is seated on the car.

As shown more particularly in Fig. 3, the locking mechanism of the present invention comprises a vertically slidable bar 21 formed with inclined cam slots 22 through which pass pins 23 in slotted bolts 24, bar 21 passing through the slots in said bolts, as clearly shown in Fig. 5. Bolts 24 are slidable at right angles to bar 21, being mounted in guides 25 at their outer ends and at their inner ends passing through apertures in the Z bar 26 which defines the door opening, bushings 27 being welded to the Z bar to provide a greater bearing surface for the bolts. The inner ends of the bolts are adapted to project through bushings 28 welded to the angle bar 29 which is secured on the inside of door plate 30 adjacent the edge thereof. In order that the lading may not come in contact with the bolts and their operating mechanism, covers 31 and 32 are secured to the inside wall of the container over these parts. Bar 21 is connected by a link 33 to a crank 34 on a shaft 35 which is rotatable at its inner end in a bearing 36 secured to a channel bar 37 and at its outer end in a housing 38 secured in a channel bar 39 which forms the base of the container. Shaft 35 projects into the housing 38 and has a polygonal or square end opposite an opening formed in channel bar 39, whereby shaft 35 can be rotated by a socket wrench applied to its square end.

Integral with the sleeve of crank 34 is a socket 40 disposed at right angles to the crank and secured in this socket is a bar 41 which should be of substantial length and may be as long as desired. Bar 41 is adapted to be held impositively in the locking position shown in Fig. 3 by a spring clip 42 and in the unlocking position by a spring clip 43, these clips being secured in any suitable way to the bottom of the container.

When the container rests on a car or other support it is obvious that shaft 35 cannot be rotated from the position shown in Fig. 3 to any substantial extent, as the bar 41 will engage the floor of the car. In order to rotate shaft 35—therefore, to slide bar 21 upwardly and withdraw bolts 24 from locking engagement with the door, it is first necessary to lift the container bodily from the car a distance at least as great as the length of bar 41. This guards effectively against theft, as it is quite a job to lift the container with its lading, requiring power means not in the equipment of the ordinary thief and also involving a certain degree of publicity.

It is possible however that a resourceful thief might remove the hinges 13 and secure access to the container by pulling the hinge side of the door outwardly. This, of course, could be done without withdrawing the bolts 24 if the bolts 14 and 15 should be withdrawn, which could be done by breaking the lock or seal holding handle 19. To

guard against this method of obtaining unauthorized access to the container, I secure a pair of lugs 44 to angle bar 29 on the inside of the door and form in the Z bar 26 apertures opposite these lugs and through which the lugs are adapted to project when the door is closed, as clearly shown in Fig. 2.

Figs. 7 and 8 illustrate a modification in the means for holding the shaft 35 impositively in the two extremes of its position. In this modification the shaft 35 has fixed adjacent its inner end an arm 45 to which is pivoted the bifurcated end of a rod 46, the free end of the rod passing loosely through an aperture in a bracket 47 secured to base bar 37. Loosely mounted on rod 46 are cup members 48 and 49 in which bear the ends of a coil spring 50 surrounding the rod. Cup member 48 is formed with a V-shaped projection which rests on a saddle 61 formed integrally with bracket 47. Cup member 49 bears against a nut 62 threaded on rod 46 whereby the tension of spring 50 may be adjusted. When shaft 35 is rotated from the position shown in Fig. 7, spring 50 is compressed between the two cup members until crank arm 45 passes its dead center position, whereupon spring 50 will expand and quickly move shaft 35 to the limit of its movement in this direction, this limit being determined by engagement of crank 45 with a lower stop 51 formed on a bracket 52, the limit of movement in the other direction being determined by an upper stop 53. This spring-actuated mechanism for holding the shaft 35 in the two extremes of its position is alternative to the spring clips 42 and 43 and of course the latter will be omitted as unnecessary where said spring means is employed.

It is, of course, possible to operate the safety locking mechanism by manipulating bar 41, but as this necessitates the placing of the operator's hand under the container when the container is lifted, which might result in injury to the operator in case the container should come loose from its lifting tackle while the bar 41 was being manipulated, I form the front exposed end of shaft 35 polygonal in cross section so that a socket wrench may be applied thereto without any liability of injury to the operator.

Now having particularly described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In combination with a portable container having a door in one side, means for locking said door, operating mechanism for said locking means comprising a rock shaft mounted adjacent the bottom of the container and an arm fixed to said shaft adapted to engage the support on which the container is seated when the shaft is rotated in a direction to unlock the door.

2. In combination with a portable container having a door in one side, a bolt adapted to lock the door, and operating mechanism for said bolt comprising a rock shaft mounted under the bottom of the container, and an arm on said rock shaft adapted to strike the support on which the container is seated when the shaft is rotated in a direction to withdraw the bolt from locking position, whereby the door cannot be unlocked so long as the container rests on its support.

3. In combination with a portable container having a door in one side, a bolt adapted to lock the door, operating mechanism for the bolt including a shaft rotatably mounted adjacent the bottom of the container on an axis substantially parallel to said bottom, and an arm fixed to said shaft extending substantially parallel to the bottom in the locking position of the shaft.

4. In combination with a portable container having a door in one side, a bolt adapted to lock the door, operating mechanism for the bolt including a shaft rotatably mounted beneath the floor of the container and formed with a polygonal outer end for the reception of a socket wrench, and an arm fixed to said shaft and extending laterally therefrom a substantial distance and necessitating that the container be raised substantially from its support before said shaft can be rotated to unlock the door.

5. In combination with a portable container adapted to be seated on a railway car and having a door in one side, means for locking the door, operating mechanism for said means, and an arm actuated by said operating mechanism and adapted to be projected a substantial distance below the bottom of the container when said mechanism is being operated to unlock the door, whereby the latter cannot be unlocked until the container has been lifted a substantial distance from the car.

6. In combination with a portable container adapted to be seated on a railway car and having a door in one side, means for locking the door, operating mechanism for said means comprising a shaft mounted on the container beneath the bottom thereof, and means preventing operation of said shaft so long as the container is seated on the car consisting of an arm fixed to said shaft and extending laterally therefrom a substantial distance.

7. In combination with a portable container adapted to be seated on a railway car and having a door in one side, bolts slidably mounted on the container transverse to the edge of the door opening adapted to be projected into locking engagement with the door, a slidably mounted vertical bar having cams engaging said bolts, a rock shaft mounted on the container under the bottom

thereof and having a crank arm connected to the lower end of said bar, and a relatively long arm fixed to said shaft extending substantially parallel to the bottom of the container when the door is locked.

8. In combination with a portable container adapted to be seated on a railway car and having a door in one side, a bolt adapted to lock the door, operating mechanism for said bolt comprising a rock shaft mounted beneath the bottom of the container and a sliding bar connected to said shaft and having a cam engaging said bolt, an arm fixed to said shaft adapted to rotate therewith in a plane perpendicular to the bottom of the car thru an arc of substantially 180° and means for impositively holding said arm in its two extreme positions.

9. In combination with a portable container adapted to be seated on a railway car and having a door in one side, a bolt adapted to lock the door, operating mechanism for said bolt including a rock shaft mounted on the container beneath the bottom thereof, a crank on said shaft, a rod pivoted to said crank and slidably mounted at its free end, a coil spring surrounding the rod and adapted to be compressed as the crank is rotated to its dead center position and to thereafter expand, stops for limiting the rotation of said shaft, and a relatively long arm fixed to the shaft and extending substantially parallel to the bottom of the container when the shaft is at the limit of its rotation.

10. In combination with a portable container adapted to be seated on a railway car and having a door in one side, a bolt adapted to lock the door, operating mechanism for said bolt including a rock shaft mounted on the container beneath the bottom thereof, a spring adapted to yieldingly hold the shaft at two positions separated substantially 180°, and an arm fixed to said shaft and extending substantially parallel to the bottom of the container when the shaft is in said two positions.

11. In combination with a portable container adapted to be seated on a railway car and having a door in its front side, locking mechanism for the door and means for operating said mechanism comprising a shaft mounted on the container beneath the bottom thereof transverse to said side and having its front end accessible for the application of power, and an arm fixed to said shaft and projecting laterally therefrom substantially parallel to the bottom of the container when the shaft is in locking position.

12. In combination with a portable container adapted to be seated on a railway car, and having a door in its front side, locking mechanism for the door, means for operating said locking mechanism and a member actuated by said operating means so as to

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project a substantial distance below the bottom of the container during the unlocking operation of said means, whereby it is necessary to lift the container from the car before the door can be unlocked.

5 13. A sheet metal container having a hinge door, angle bars secured to the inner wall of the container and defining the door opening, angle bars secured to the inner side
10 of the door adjacent the edges thereof, bolts slidably mounted on the inner wall of the container adapted to project through apertures in said angle bars to lock the door, and
15 lugs fixed to the angle bar of the door at the hinged side thereof adapted to project through apertures in the angle bar secured to the container when the door is closed.

14. In combination with a portable container having a door in one side, means for
20 locking said door, operating mechanism for said locking means comprising a rock shaft mounted adjacent the bottom of the container, and an arm connected to said shaft
25 and adapted to engage the support on which the container is seated when the arm is rotated in a direction to unlock the door.

15. In combination with a portable container having a door in one side, means for
30 locking said door, operating mechanism for said locking means comprising a rock shaft mounted under the bottom of the container, and means adapted to engage the support on
35 which the container rests to prevent operation of said rock shaft while the container rests on its support.

16. In combination with a portable container having a door in one side, means for
locking the door comprising transversely reciprocable bolts adapted to engage sockets
40 in the free edge of the door, a vertically reciprocable bar operably connected to said bolts, a rock shaft mounted under the bottom of the container having a crank, and a link connecting said crank to said vertically
45 reciprocable bar.

17. In combination with a portable container having a door in one side, means for
locking the container comprising transversely reciprocable bolts mounted on the inside
50 of the container and adapted to engage sockets in the free edge of the door, means for operating said bolts also mounted on the inside of the container and having a part
55 projecting through the bottom of the container, and means mounted under the bottom of the container operably connected to said part.

18. In combination with a portable container having a door in one side, means for
60 locking the container comprising transversely reciprocable bolts mounted on the inside of the container and adapted to engage sockets in the free edge of the door, means for operating said bolts also mounted
65 on the inside of the container, and having a

part projecting through the bottom of the container, and a rock shaft pivoted under the bottom of the container and operably connected to said part.

In testimony whereof I hereunto affix my signature.

FREDERICK K. FILDES.

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