F. L. CASKEY.

SEALING HOPPER CLOSURE.

APPLICATION FILED APR. 10, 1916.

1,224,136.

Patented May 1, 1917.

2 SHEETS—SHEET 1.

Fig. 2.

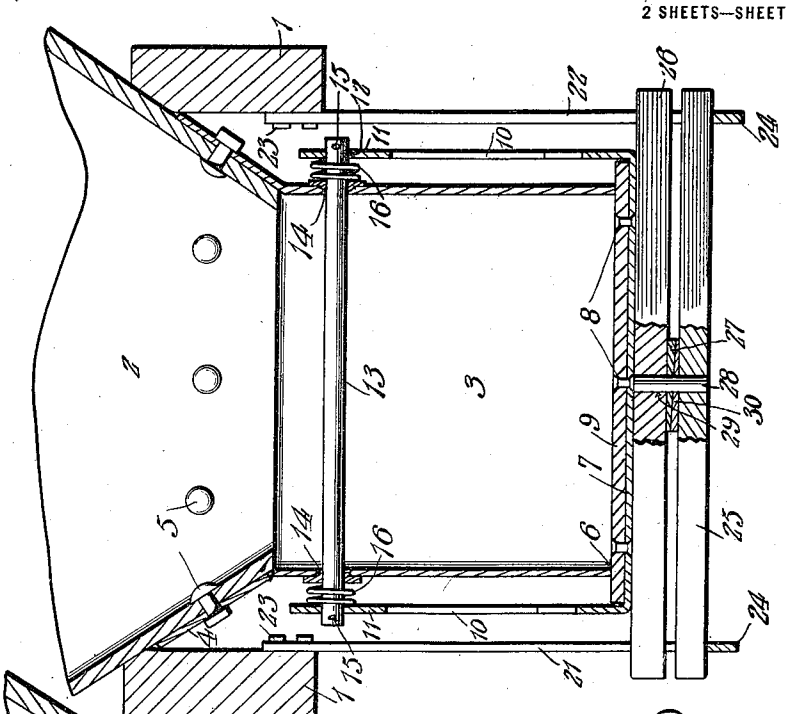
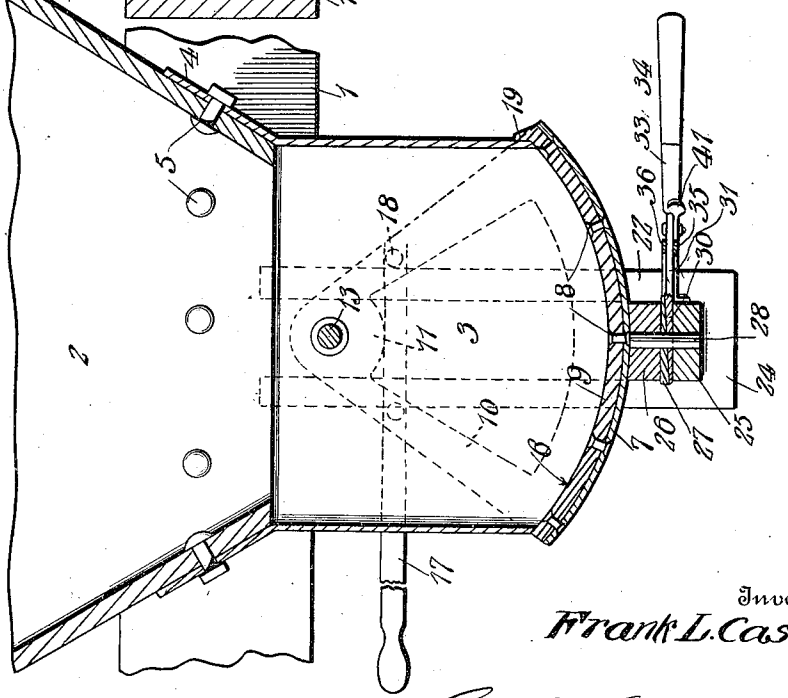


Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 3.

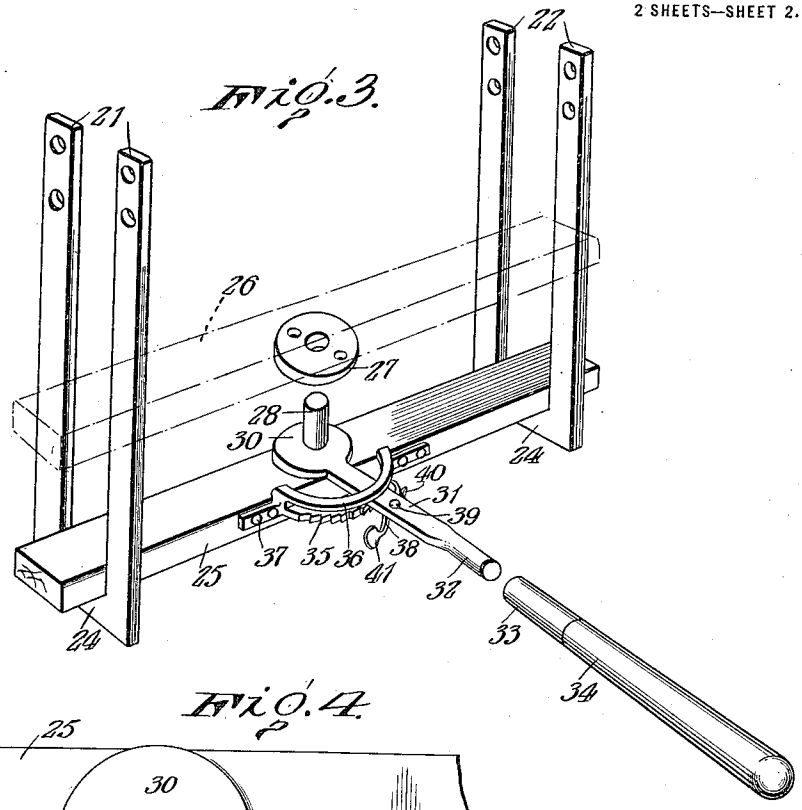


Fig. 4.

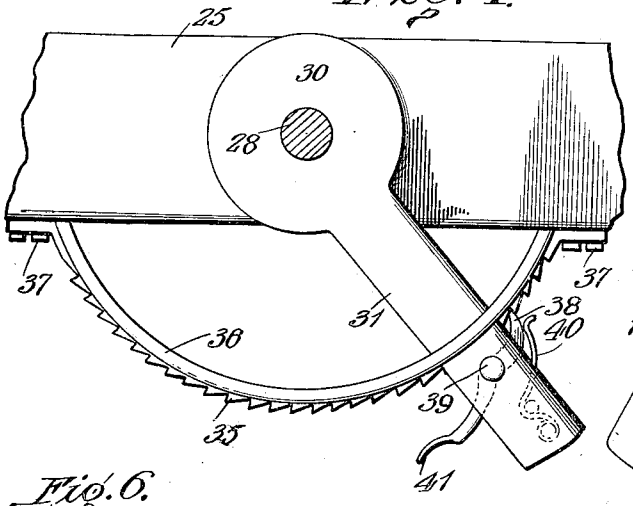


Fig. 5.

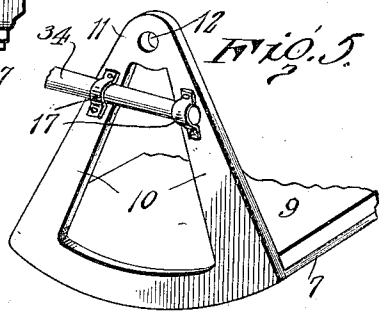
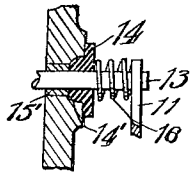


Fig. 6.



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UNITED STATES PATENT OFFICE.

FRANK L. CASKEY, OF EMPORIUM, PENNSYLVANIA.

SEALING HOPPER-CLOSURE.

1,224,136. Specification of Letters Patent. Patented May 1, 1917.

Application filed April 10, 1916. Serial No. 90,290.

To all whom it may concern:

Be it known that I, FRANK L. CASKEY, a citizen of the United States, residing at Emporium, in the county of Cameron and State of Pennsylvania, have invented certain new and useful Improvements in Sealing Hopper-Closures, of which the following is a specification.

The present invention relates to new and useful improvements in sealing hopper closures.

The primary object of my invention is to provide a hopper closure having sealing means associated therewith, the hopper being particularly adaptable for use in connection with powder manufacture. The present practice in powder factories is to arrange a plurality of hoppers in sets for delivering the different explosive powders to certain points. Closures are now employed in these hoppers which do not seal the hoppers and consequently permit gases or sparks or other dangerous foreign particles which might ignite the explosives to pass into the hopper, no sealing means being employed which will effectively prevent this.

It is therefore, a further object of my invention to provide a sealing closure for hoppers which contemplates the removal of the dangers now existing owing to leakage or the like about such hoppers and at the same time providing a structure which is simple, strong and durable.

A still further object of my invention is to provide a hopper closure of the class described which may be easily applied to the hoppers now in use by slightly modifying said structure, whereby increasing their effectiveness in operation without increasing prohibitively the cost of manufacture.

Other objects and advantages to be derived from the use of my improved hopper closure will appear from the following detail description and the claims, taken with an inspection of the accompanying drawing, in which

Figure 1 is vertical sectional view through a hopper embodying the improvements of my invention,

Fig. 2 is a similar view taken at right angles to Fig. 1,

Fig. 3 is a perspective view of the clamping mechanism,

Fig. 4 is a fragmental enlarged top plan view of the operating mechanism for said clamping means,

Fig. 5 is an enlarged perspective fragmental view showing a portion of the hopper and opening handle therefor, and

Fig. 6 is a fragmental vertical sectional view of one of the closure bearings.

Referring more particularly to the drawing, wherein similar characters of reference designate like and corresponding parts throughout the various views, 1 designates the supporting frame usually employed, said frame being in the form of stringers arranged in parallel relation. The hopper body is designated 2 and is of course tapering in configuration and may be rectangular in cross section.

The hopper 2 is provided with an outlet mouth 3, which may be rectangular in cross section, said mouth 3 being provided with flanges 4 which are secured to the hopper body 2 by means of bolts 5 or the like. The lower marginal edges of two of the walls of the mouth 3 are curved outwardly as at 6 to conform to the closure hereinafter described in detail.

The closure of my invention embodies a metallic closing portion 7 on to which is riveted at 8 a leather, rubber or some similar lining 9. The end margins of the closure 7 are provided with converging arm portions 10 merging as at 11 to form heads provided with bearing openings 12 to receive the opposite ends of a transversely mounted shaft 13 carried in sealing bushings 14 of rubber or the like arranged in certain of the walls of the mouth 3. Referring to Fig. 6 I provide the bushing 14 having an enlargement 14′ engaging in a suitable opening in the wall of the hopper. A bearing bushing 15′ is also arranged about the shaft 13 for an obvious purpose. Pins 15 carried in the shaft 13 adjacent the ends thereof serve to retain the heads 11 on said shaft. A pair of coil springs 16 are interposed between the heads 11 and the bushings 14 to retain said bushings in position to perform their sealing function. Upon an inspection of Fig. 1 it will be noted that the lining 9 is provided with an enlarged portion 19 which engages the lower marginal edge of one of the walls of the mouth 3, thereby limiting the movement of the closure member into closed position. The enlargement 19 is adapted to engage

one of the flanges 4 when the closure member 7 is swung to open position whereby to prevent any metal contacting with metal, which in some cases might tend to produce a spark igniting any explosive compound in the vicinity. If desired the opening 12 in the heads 11 may be slightly larger than the diameter of the shaft 13 for a purpose which will hereinafter appear.

I have provided means for clamping the closure 7 in sealing engagement with the mouth 3, said means including a pair of yoke members 21 and 22 bolted as at 23 to the stringers 1. The yoke members 21 and 22 are preferably U-shaped in configuration, the lower transverse portion 24 thereof supporting one of a pair of clamping bars 25 and 26. The bar 26 is adapted to be brought into engagement with the bottom face of the closure 5 when the latter is in closed position, and in order to accomplish this I provide a disk-like cam 27 arranged from the under surface of the bar 26 and permanently connected thereto. A stub shaft 28 extends upwardly from the bar 25 and serves as a carrying means for said bar 26, said shaft extending through a suitable opening 29 in said bar. A cooperating cam 30 is revolubly mounted upon the bar 25 and has an arm 31 integrally formed therewith, said arm having a rounded end 32 for detachable engagement with the socket 33 of an operating lever 34. The arm 31 extends between the segmental rack 35 and a guide rail 36 formed integrally therewith, bolts 37 or the like fastening means serving to retain said rack in position upon said bar 25. I provide means for locking the lever 34 in desired position, said means comprising a pivoted pawl 38 mounted pivotally on a pin 39 carried by the arm 31, said pawl normally engaging said rack 35 by means of a spring 40 carried by the arm 31. The free end of the ball is formed with a finger engaging portion 41 to facilitate this engagement of the ball with the rack bar when desired.

In use, assuming that the closure is in the closed position as best shown in Figs. 1 and 2, and it is desired to seal the same, the handle 34 is engaged with the arm 31 and the latter swung through the arc of a circle. This movement causes the cam 30 engaging with the cam 27, to force the bar 26 upwardly against the under surface of the closure 7, thereby forcing the closure into sealing engagement with the mouth 3. The pawl 38 maintains the arm 31 in the position in which the same has been moved and the handle 34 is detached therefrom and used for sealing or unsealing the other hoppers in a group. By releasing the pawl 38 the arm 31 is allowed to return to normal unsealing position by releasing the closure and permitting the same to be opened. By enlarging the opening 12 a slight movement of the closure is permitted. A pair of loops 17 are provided on the arms 10 for reception of the handle 34 as best shown in Fig. 5.

From the above description taken in connection with the accompanying drawing it will be clear that I have provided sealing closures for hoppers and the like which improve the hopper structure rendering the same more safe and effective in operation. I desire to call particular attention to the fact that the moving parts of the device are comparatively few for reducing the liability of sparks or the like being produced by the metal striking against metal. It will also be apparent that no gases pass through the closure into the hopper which undoubtedly have caused explosions in the past.

From the above description taken in connection with the accompanying drawing, it is thought that a clear and comprehensive understanding of the construction, operation and advantages of my invention may be had, and while I have shown and described my invention as embodying a specific structure, I desire that it be understood that I may make such changes on said structure as do not depart from the spirit and scope of the invention as claimed.

What I claim as new and desire to secure by Letters-Patent is:—

1. The combination with a hopper having a mouth thereon, a closure on said mouth, and sealing means associated therewith, of clamping means for said closure, including a plurality of relatively movable sections one of said sections being in clamping engagement with said closure, and a plurality of cam members interposed between said sections, whereby when one of said cam members is moved said sections will separate to seal the closure.

2. The combination with a hopper having a mouth and a sealing closure adapted to be engaged thereunder, of supporting yokes, a pair of relatively movable sections carried by said supporting yokes, cams carried by said sections, a lever associated with one of said cams, whereby to move the same, said movement tending to separate said sections whereby to cause the uppermost sections to engage said closure for clamping the same in the closed position.

3. In a hopper closure of the class described, the hopper having a mouth, an arcuate closure therefor having sealing means associated therewith, said closure being hingedly mounted on said mouth, sealing means adjacent the hinged portion of said hopper, supporting yokes, a plurality of members carried thereby, one of said members being adapted to engage at times, with said closure, cams carried by said members and adapted to co-act, a lever extending from one of said cams, locking means for

said lever, whereby when said lever is moved to a position, one of said members is moved for engagement with said closure member, to force the latter into sealing engagement with said mouth.

4. In a hopper closure of the class described, a hopper having a mouth thereon, flanges connected to the sides of said hopper, an arcuate closure therefor, said closure being hingedly connected to said mouth, a lining mounted on said closure means provided with an enlarged portion engaging the marginal edges of one of said flanges providing limiting means therefor, means for opening and closing said arcuate members, and means for forcing said closure into sealing engagement with the said mouth for the purpose specified.

In testimony whereof I affix my signature hereto.

FRANK L. CASKEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."