Feb. 10, 1948. A. M. BUEHLER 2,435,670

CLOSURE FOR HOPPERS AND THE LIKE

Filed May 5, 1945

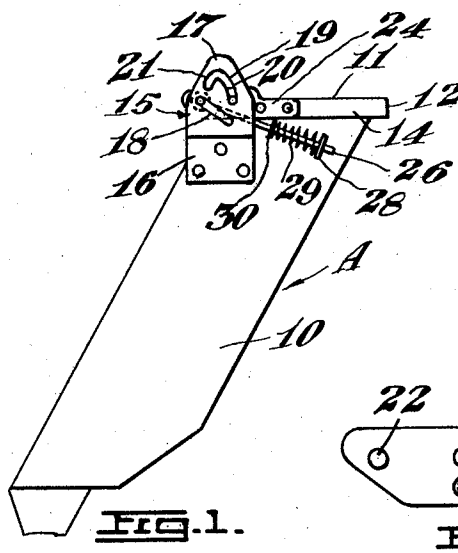


Fig. 1.

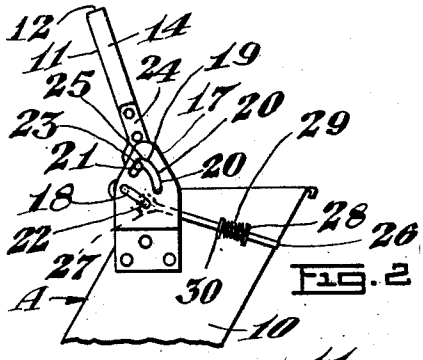


Fig. 2.

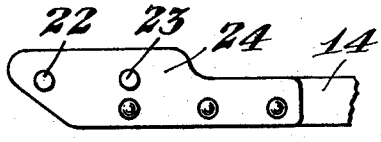


Fig. 6.

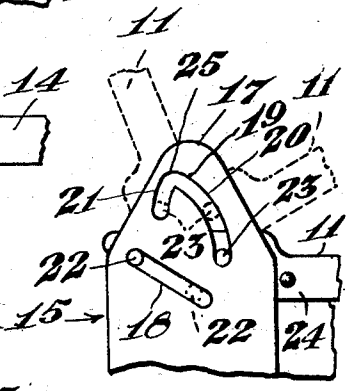


Fig. 8.

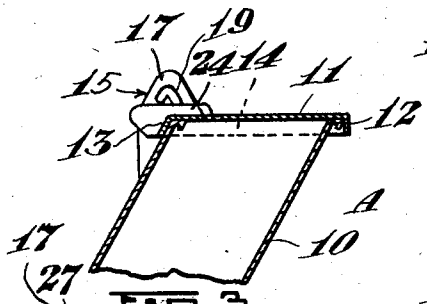


Fig. 3.

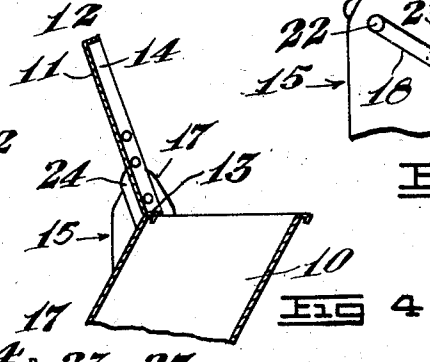


Fig 4

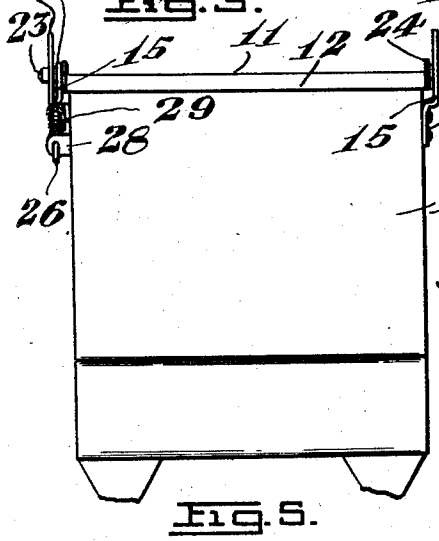


Fig. 5.

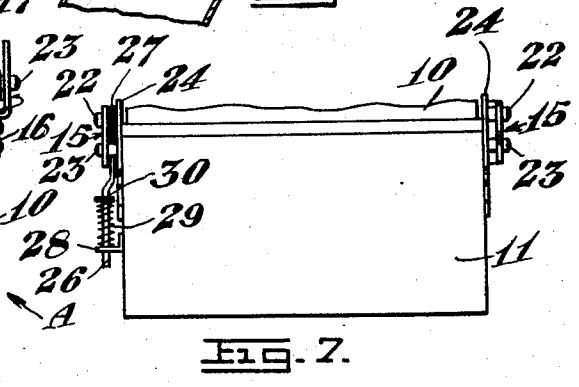


Fig. 7.

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CLOSURE FOR HOPPERS AND THE LIKE

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This invention relates to a hopper closure for agricultural implements.

Up to the present time, hoppers for agricultural implements employing a swingable cover have been subject to certain disadvantages including the formation of a slot or crack between the cover and the hopper when the latter is swung to open position which permits loss of material when filling the hopper, since some of it usually will pass through this slot or crack. Furthermore, when closed, water will very often seep in, thus damaging the material contained therein. On the other hand, in structures provided to avoid such water seepage, a general complication in structure is usually made which adds to the cost and sometimes detracts from the entirely smooth operation of the cover.

These disadvantages are avoided by the present invention.

It is therefore an object of the present invention to provide a hopper cover of the swinging type which is simple in construction and which will be water-tight when closed.

A further object of the invention is to provide a structure of this kind whereby the cover, when swung to open position, will avoid any cracks or slots between the cover and the hopper and in which the cover will in effect form a guide to assist in the introduction of material to the hopper.

A further object of the invention is to provide a structure of this kind which may be smoothly opened and closed and which may be readily maintained positively in either position.

A still further object of the invention is to provide a construction which, through its general simplicity, may be manufactured at low cost.

With these and other objects in view, the invention generally comprises a hopper having a swingable cover including front, rear and side flanges to overlap the upper edges of the hopper and including guide means forming a swingable mounting and designed to guide the rear flange of the cover free of the upper edge of the hopper both in the opening and closing operation, while fully sealing the upper edge of the hopper within the cover when closed by causing the rear flange of the cover in particular to overlap the rear upper edge of the hopper when opened.

The invention will be clearly understood by reference to the following detailed specification taken in conjunction with the accompanying drawings.

In the drawings—

Figure 1 is a side elevation of the hopper with the cover closed.

Figure 2 is a side elevation of the hopper with the cover open.

Figure 3 is a longitudinal section taken through the hopper with the cover closed.

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Figure 4 is a similar view to Figure 3 with the cover open.

Figure 5 is an enlarged front elevation of the top portion of the hopper.

Figure 6 is a side elevation of the cover showing the mounting pins carried thereby.

Figure 7 is a top plan view of the cover closed, and

Figure 8 is an enlarged side elevation of one of the hinge brackets showing partly in dotted lines, relative positions of the hinge pins in various positions of the cover from closed to open position.

Referring to the drawings, A indicates the hopper as a whole which includes a body 10 and a cover 11. This cover is flanged to form front and rear flanges 12 and 13 and side flanges 14.

Due to the fact that the hopper illustrated is designed to be disposed at an incline, the rearward flange 13 is likewise inclined as illustrated particularly in Figures 3 and 4. It is obvious, of course, from this that when the cover is closed the top of the hopper is completely sealed and any rain or water that falls upon the hopper will be shed by the cover without possibility of it entering the hopper.

In order to produce smooth swinging movement of the cover, I provide a guide mounting therefor in the form of brackets 15 which are stepped, as illustrated in Figure 5, including a mounting plate 16 designed to be fastened to the side of the hopper and a cover mounting section 17 offset from the mounting plate and spaced from the hopper to lie closely adjacent to the projecting flanges 14 of the cover.

The mounting section of the brackets 15 includes a straight, inclined slot 18 and a curved, cam-like slot 19 disposed above the slot 18 and having two connecting sections 20 and 21 forming a continuous path of travel for the pin of the cover receivable therein.

The cover is provided with the spaced apart parallel mounting pins 22 and 23 which are preferably carried on a bracket 24 which is riveted or otherwise firmly secured on each end of the cover to the flanges 14. The pins 22 and 23 are designed to enter respectively the slots 18 and 19 so that, in the normal closed position of the cover, pins 22 are disposed at the rearward end of the slot 18 and pins 23 are disposed in the lower extremity of the section 20 of slot 19.

As will be noted, the brackets 15 project upwardly at an incline to the rear wall of the hopper and the rear edges of these brackets are disposed beyond the rear face of the hopper so that the pin 22 is located behind the rear wall of the hopper at a distance at least as great as the depth of the rear flange below the top of the cover when it is in a closed position. Similarly, the brackets 24 carrying the pins 22 and 23 are disposed partially to project rearwardly of the

cover. Thus, when the cover is swung upwardly from closed position, it will first of all pivot on the pins 22, while the pins 23 swing freely through the section 20 of slot 19. However, when the pins 23 reach the point of juncture of the sections 20 and 21 of slot 19 and engage the cam-like edge 25 thereof, this will cause the pins 22 to move forwardly in the inclined slots 18. However, as this operation is occurring, namely, movement of the pins 23 to the point of juncture of the sections 20 and 21 of slot 19, the rearward flange 13 of the cover has been passed substantially to the level of the rearward wall of the hopper. Consequently, as the pins 22 move forwardly in the inclined slot 18 and the pins 23 then move downwardly in section 21 of the slot 19, the flange 13 of the cover will be moved forwardly to overlap the upper edge of the rear wall of the hopper, so that the cover is finally disposed at a rearward incline, to the rearward wall of the hopper and the plane of the upper end of the hopper, and will be supported in this position. Consequently, the flange 13 overlapping the upper edge of the rear wall of the hopper in effect forms a cover plate for the upper edge of this wall and provides a guide to direct material to the hopper, when the latter is being filled, if such material happens to be directed against the inner face of the cover. As a result, therefore, no slot or opening is formed between the cover and the rear wall of the hopper, when the cover is open, and thus there can be no loss of material as generally occurs through the slot or opening which usually is formed there in the case of a normally hinged cover.

I prefer to place the cover under spring pressure as this contributes to a particularly smooth operation of the cover from its closed to open position and vice versa. One manner in which this spring pressure may be applied is by providing the pressure applying rods 26 at each end of the hopper, the rod being formed with an eyelet or the like 27 designed to loop over the pins 22. The other end of the rod passing through an orificed bracket 28 fastened on each end of the hopper is designed to be engaged by a coil spring 29 which exerts pressure between the bracket 28 and a stop member such as a washer 30 rigidly fastened on the rods 26. Consequently, when the cover is closed, pressure is applied through the rods 26 against the pins 22 which, on the one hand, extends to hold the cover closed and, on the other hand, provides a pressure on pins 22 such as to assure a smooth operation as the cover is swung from the closed to open position and vice versa. In swinging the cover to open position, the rods 26 tend to assure that the pins 22 remain at the upper end of the slot 18 until the pins 23 engage the cam-like edge 25 of the slot 19, at which point the pins 22 are then caused to move forwardly in the inclined slots 18 and the rods 26 slide in the bracket 28 compressing the coil spring 29 as shown in Figure 2.

It will be apparent that this cover construction will operate efficiently and will seal the hopper completely, when closed, preventing the entrance of water or the like to the hopper, whereas, when open, the rear flange completely overlaps the upper edge of the rear wall of the hopper to avoid any formation of an opening along this upper edge which usually occurs in normally hinged constructions. Thus, the cover, when open, acts as a convenient guide to some of the material as it is being discharged into the hopper, while avoiding loss of some of the material which occurs in ordinary hinged constructions.

What I claim as my invention is:

1. In a closure means for hoppers and the like, a cover member having front and rear flanges designed to overhang the upper edges of the hopper, brackets rigidly mounted on opposed sides of said cover and designed to project beyond said rear flange, a pair of spaced apart pins projecting laterally outwardly from the sides of the projecting portions of each of said brackets, guide bracket members rigidly mounted on opposed sides of said hopper, each having a pair of spaced apart guide means therein designed cooperatively to engage said pins on said cover, said pins moving in said guide means upon lifting of said cover, one of said guide means extending generally forward from a point located behind said rear wall at a distance at least as great as the depth of said rear flange below the top of said closed cover, the other of said guide means having a section concentric with said rearmost point of said first mentioned guide means and a section extending toward said first mentioned guide means, said guide means engaging said pins such that when said cover is raised from a closed position one of said pins will pivot in the rearmost portion of said first mentioned guide means while the other pin is guided around said concentric section of said second mentioned guide means to cause said rear flange to swing to a height above the back edge of said hopper, said second mentioned pin being designed to enter the non-concentric section of said second mentioned guide means when said back flange is raised above said back edge a predetermined amount to cause each of said pins to move generally forward in their respective guide means simultaneously to position said rear flange over the upper edge of said rear wall when said cover is fully open.

2. In a closure means for hoppers and the like, a cover member having front and rear flanges designed to overhang the upper edges of the hopper, brackets rigidly mounted on opposed sides of said cover and designed to project beyond said rear flange, a pair of spaced apart pins projecting laterally outwardly from the sides of the projecting portions of each of said brackets, guide bracket members rigidly mounted on opposed sides of said hopper, a pair of slots in each of said guide brackets designed cooperatively to receive said pins, one slot being positioned above the other, the lower slot extending forwardly and downwardly from a point located behind said rear wall at a distance at least as great as the depth of said rear flange below the top of said cover when closed, the upper slot having a section concentric with said rearmost point in said lower slot and a section inclined towards said lower slot extending toward said lower slot, said guide bracket members engaging said pins such that when said cover is raised from a closed position one of said pins will pivot in the rearmost portion of said lower slot while the other pin is guided around said concentric section of said upper slot to cause said rear flange to swing to a height above the back edge of said hopper, said second mentioned pin being designed to enter the non-concentric section of said upper slot when said back flange is raised above said back edge a predetermined amount to cause each of said pins to move generally forward in their respective guide means simultaneously to position said rear flange over the upper edge of said rear wall when said cover is fully open.

3. In a closure for hoppers as claimed in claim 2, the inclusion of a spring means designed to bear against the pin in said lower slot to urge it towards the rear portion of said slot for the purpose of effecting a smoother cover operation.

4. In a closure for hoppers as claimed in claim 2, the inclusion of a rod connected at one end to the pin disposed in said lower slot, a bracket member on the hopper slidably receiving the opposite end of said rod and spring means acting on said rod to exert a pressure against said pin.

ALLAN MOYER BUEHLER.

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