June 23, 1964 G. R. DEMPSTER ETAL 3,138,275

FRONT END LOADER

Filed April 27, 1959 3 Sheets-Sheet 1

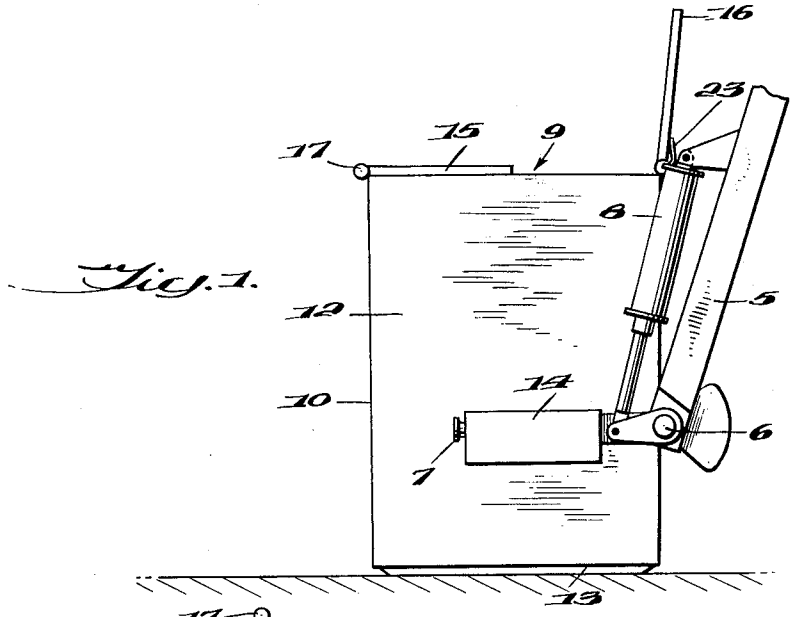


Fig. 1.

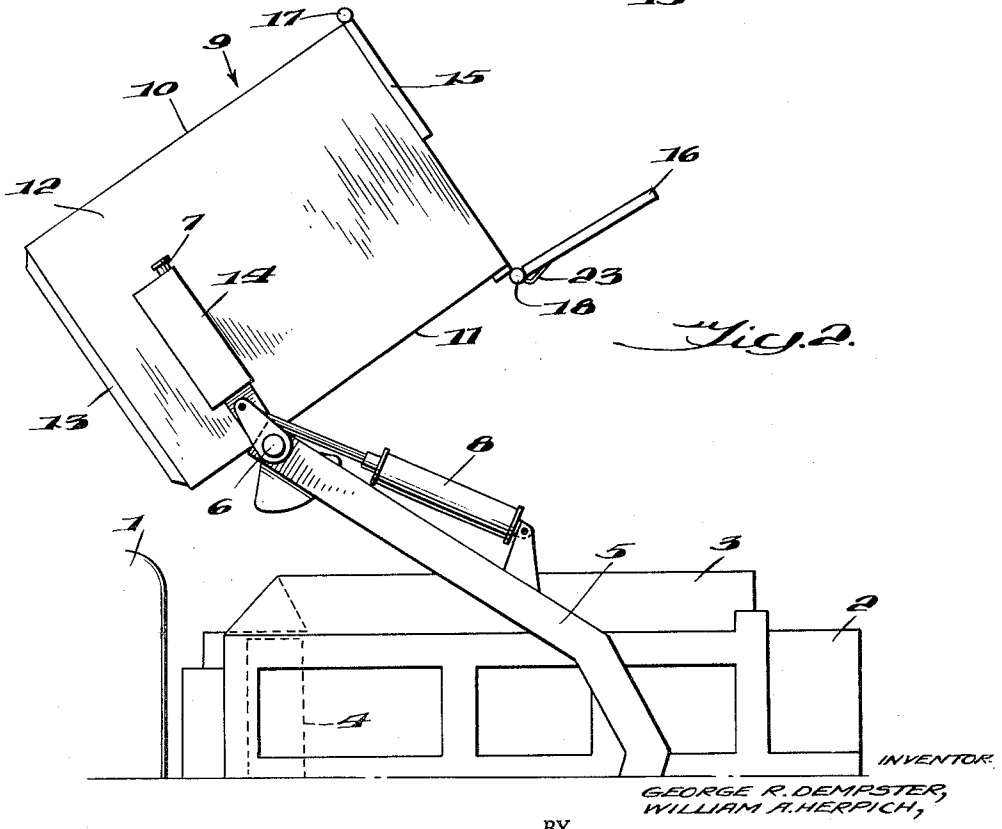


Fig. 2.

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FRONT END LOADER

Filed April 27, 1959 3 Sheets-Sheet 2

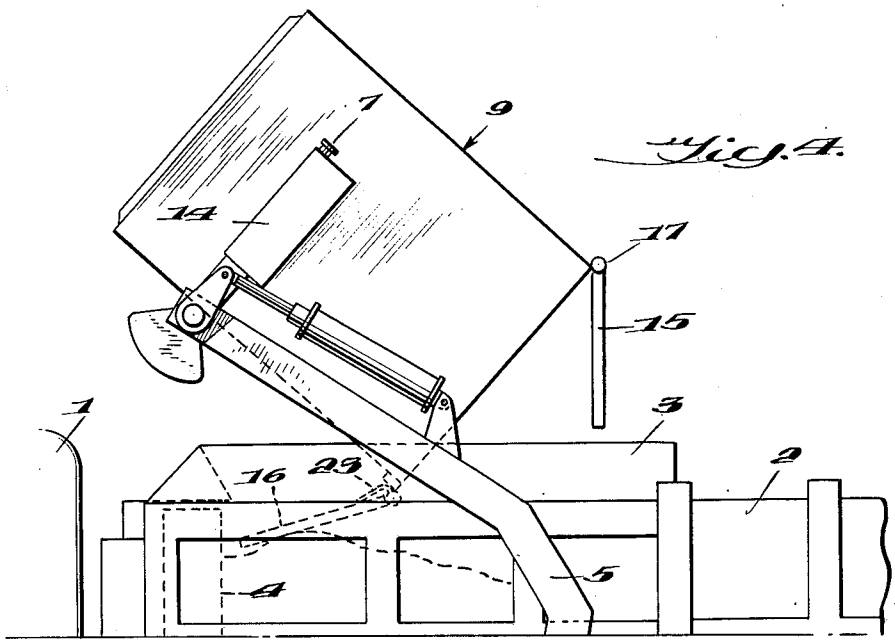


Fig. 4.

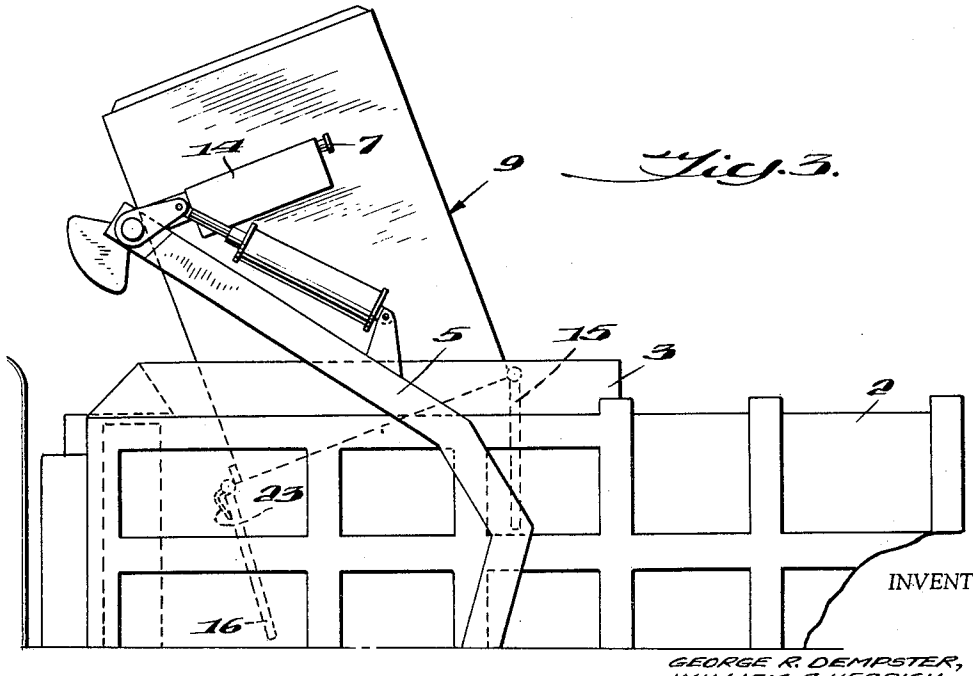


Fig. 3.

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FRONT END LOADER

Filed April 27, 1959 3 Sheets-Sheet 3

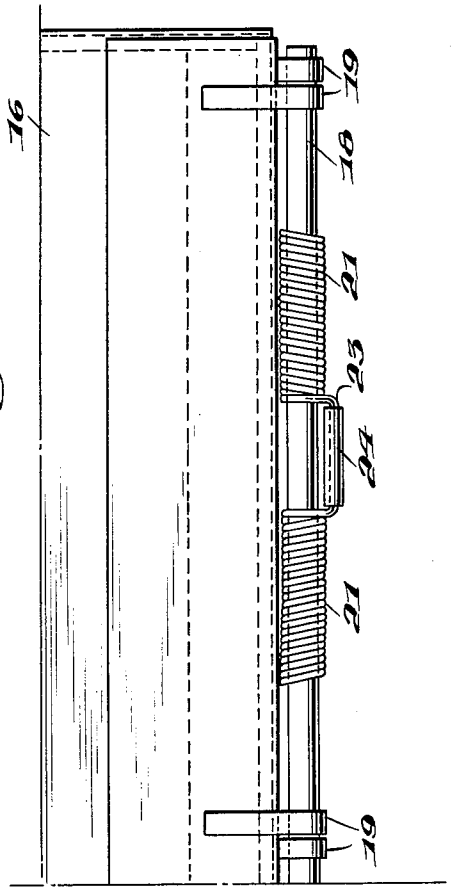


Fig. 6.

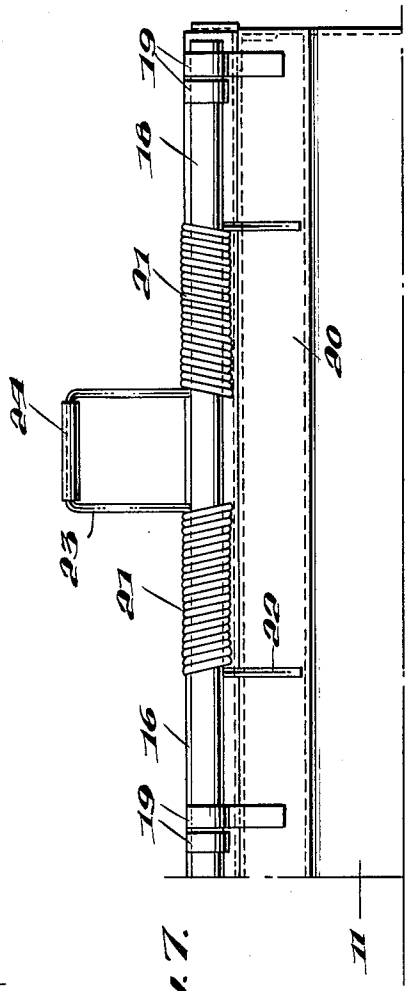


Fig. 7.

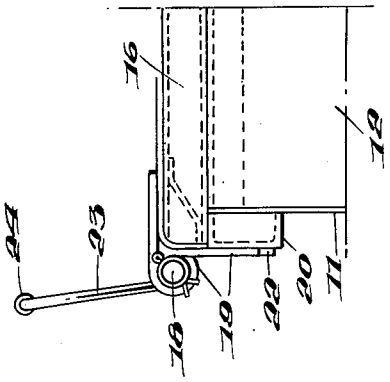


Fig. 5.

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United States Patent Office 3,138,275 Patented June 23, 1964

3,138,275

FRONT END LOADER

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Filed Apr. 27, 1959, Ser. No. 808,974
4 Claims. (Cl. 214—302)

This invention relates to improvements in front end loaders of the character used for picking up containers at the front of a motor vehicle and dumping the contents therefrom into the body of the vehicle.

It has been proposed heretofore that dumping equipment be mounted on a motor vehicle having a refuse body with a device mounted on the front portion of the vehicle adapted for engagement selectively with containers which may be approached at the front of the vehicle for picking up a container automatically and lifting the container over the front portion of the vehicle and for dumping the contents into the body.

Such containers are frequently provided with double lids, with each lid hinged to the body of the container along an axis extending lengthwise of the container at the upper edge of the front or back wall thereof and with each lid covering approximately one-half of the top of the container. It has been customary heretofore to hinge such double lids to the body of the container, but without any means to restrain the lids from swinging freely on the respective hinges.

These lids are usually opened to deposit refuse into the container and very often they are left open. When a hoisting unit or front end loader is moved into engagement with the container for picking it up for dumping, if the lid on the back wall of the container is open, it has been subject to striking the top of the cab during the lifting and dumping operation, which is objectionable both from the standpoint of the vehicle and because of injury to the container.

Attempts have been made to correct this difficulty by putting chains or stops on the lid toward the vehicle, to limit the opening movement thereof to a position where it is substantially vertical. Where the limit means thus provided for the lid is non-extensible and prevents yielding, the lid very often tends to drag the materials back out of the hopper of the body after dumping and during the restoring action of the container.

One object of this invention is to obviate these objections and to improve the construction of containers for use with front end loaders.

Another object is to provide for limiting the open movement of the lid that is toward the front end loader mechanism, so as normally to hold the lid in an upright position and yet will yield sufficiently so as to prevent the dragging of material out of the hopper of the vehicle body.

Still another object of the invention is to provide a yieldable support for a container lid, particularly applicable to the lid toward the front end loader mechanism, to restrain the opening movement of the lid substantially to a vertical position and yet to yield for extreme movement, especially while the container is turned over in dumping position.

One embodiment of the invention may be provided which is applicable to a container with double lids wherein one of the lids is hinged on the edge portion of the container toward the front end loader mechanism. The hinge means is provided with a spring abutment which will limit the opening movement of the lid at said side of the container, and yet will yield sufficiently so as to permit deflection of the lid by the material dumped into

the body, and yet will not to drag this material out of the hopper after dumping.

This embodiment preferably includes a torsion spring assembly which may be mounted on the hinge lid that supports the lid and has an upstanding arm in such normal position as to limit the opening movement of the lid substantially to a vertical position. This arm forms a yieldable abutment for the lid in open position. While it will restrain such opening movement, so as to prevent the lid from striking the cab of the truck during the dumping operation, it will nevertheless yield under extreme pressure and thereby permit deflection of the lid by the accumulated material in the body, so as not to drag the materials out of the hopper of the body as the container is withdrawn following the dumping operation.

This embodiment of the invention is illustrated in the accompanying drawings, in which:

FIG. 1 is a side elevation of the front end loading mechanism, including the container to which the invention is applied and showing the container in its normal position on the ground ready for pick-up operation;

FIG. 2 is a similar view, with the container in raised position just prior to dumping;

FIG. 3 is a similar view, showing the container in full dumping position;

FIG. 4 is a similar view after dumping and in the course of withdrawing of the container from the body;

FIG. 5 is a detail end elevation of the container;

FIG. 6 is a top plan view thereof; and

FIG. 7 is a partial side elevation of the container.

The invention is shown as applied to front end loader mechanism of the character set forth in our prior patent applications, Serial No. 662,252, filed May 28, 1957, now Patent No. 2,900,096, and Serial No. 720,441, filed March 10, 1958, now Patent No. 3,049,254.

The front end loader mechanism is usually applied to a standard type of motor vehicle, such as a truck with a conventional vehicle chassis, self-propelled and under control of the operator, who is usually located within a cab, generally indicated by the numeral 1. Mounted on the chassis is a refuse body 2, such, for example, as a compaction-type body, and having a hopper 3 in the top near the front thereof through which refuse is discharged into the body. A suitable compaction head is shown at 4 in FIGS. 2 and 4, as representative of the type of packer means frequently employed for compressing such refuse as garbage, trash or the like within the body 2.

The front end loader mechanism includes suitable means mounted on the vehicle chassis for picking up and dumping a container. We prefer to employ a pair of lifting arms, generally indicated at 5, spaced apart transversely of the vehicle chassis and power operated for raising and lowering movements to the several positions illustrated in FIGS. 1 to 4. The pair of lifiting arms are provided with a torque tube 6 on the free ends thereof on which are mounted fork arms 7 capable of swinging movement about the axis of the torque tube 6 to the several positions also shown in FIGS. 1 to 4. The torque tube 6 is rotated for swinging the arms 7, but suitable power devices, such as hydraulic cylinders, generally indicated at 8, are mounted on the lifting arms 5.

The foregoing front end loader mechanism is illustrated and described more in detail in our aforesaid patent applications, Serial No. 662,252 and Serial No. 720,441.

A container is illustrated generally at 9, adapted for use with the front end loader mechanism. While any suitable form and type of container may be employed as found desirable, we have illustrated as an example thereof a container which is provided with a body portion formed by front and rear walls 10 and 11 and opposite

end walls 12 and having a closed bottom 13. Such container is shown as having lifting attachments on the opposite end walls 12, as, for example, channels illustrated at 14, which are disposed adjacent the rear wall 11 within conveniently accessible position relative thereto, being displaced off center closer to the rear wall 11 than to the front wall 10. The fork arms 7 extend through the channels 14 and have lifting connection therewith for picking up and dumping the container.

The top of the container 9 is initially open and may be closed by a pair of front and rear double lids 15 and 16, respectively. The lids 15 and 16 preferably are hinged at or adjacent the upper edges of the respective front and rear walls 10 and 11, as indicated generally at 17 and 18, respectively. The hinge 18 is provided by a rod which extends through suitable coacting straps which, in turn, are indicated at 19 on the lid 16 and the back wall 11, as a means of hingedly connecting the lid to the body of the container for opening and closing movements relative thereto.

The back wall 11 may be provided with a reinforcing channel 20 extending along the upper edge thereof, if found desirable or needed. This reinforcing channel strengthens the wall at the hinge edge and provides a stiffened support for the hinge means and also for the back stop means, as herein described. In that event, the hinge straps 19 are mounted directly on the reinforcing bar 20 in the embodiment.

The back stop means comprises a pair of coiled torsion springs 21 sleeved over the hinge rod 18 at one or more points along the length thereof. It is preferred that such back stop means be provided at each opposite end portion of the container, one side of which is shown in FIGS. 6 and 7. The torsion springs 21 having one end of the coil of each anchored at 22 to the body of the container, as for example, by turning the end 22 down behind the wall 11 or the reinforcing bar 20 thereon, as illustrated in FIGS. 5 and 7. The opposite ends of the torsion springs 21 are turned upward and joined together to form a U-shaped arm portion, generally indicated at 23. This arm portion 23 preferably is elongated and has a roller 24 mounted on the connecting portion thereof for engagement with the face of the lid 16.

The arm 23 preferably is so formed that it stands up at an obtuse angle relative to the horizontal plane to the top of the container or through the lid 16, as shown in FIGS. 1 and 5. Thus, the lid can be raised against the back stop arm 23 and will be retained in its upright or open position by gravity, inasmuch as it is moved past its dead center position through the axis of the hinge rod 18, and yet it will be prevented from falling over back of the container but will be held in such upright position.

During normal filling, the container is sitting on the ground or other suitable support, substantially as shown in FIG. 1. Normally, it is desirable that the lids 15 and 16 be closed, except when either of them may be opened for an introduction of refuse into the container. However, it is common practice for one or both of the lids to be left open. If the lid 16 is left open, it will normally be in upstanding position, as described and as illustrated in FIG. 1.

When the front end loader equipment is moved up to the container, the fork arms 7 are introduced through the channels 14, and the container is then raised through the cycle of movements illustrated in FIGS. 2 to 4. With the back lid 16 resting against the spring arm 23, this lid cannot swing back over the hinge rod 18 during the raising operation and thereby strike against the top portion of the cab 1 of the truck, but instead, will remain in such open position during the initial portion of the cycle of movements. Of course, if the lid 16 should be closed during this initial pick-up operation, it will remain closed until the container has been turned over sufficiently to cause the container to be turned over by gravity against the back up arm 23.

As the cycle of movements continues, the container 9 will be turned over in its full dumping position through the hopper 3, substantially as illustrated in FIG. 3, in back of the compaction head 4. Both lids 15 and 16 are free to hang downward in the compaction body during discharge, as illustrated in FIG. 3, whereby to obtain full and effective discharge of all of the contents from the container.

In a reversal of the cycle of movement of the container 9 to rotate the latter out of the hopper 3, this involves a counterclockwise direction of swinging movement of the container from the position shown in FIG. 3 to the position shown in FIG. 4. In the event that the material discharged into the body 2 back of the compaction head 4 should fill the available space to a height such as illustrated in dotted lines in FIG. 4, this reverse swinging movement of the container would not cause the material to be dragged out through the hopper 3, because the lid 16 is free to swing to the dotted line position shown in FIG. 4, due to the yielding action of the spring arm 23. Then, after the container is lifted enough, so as to clear the hopper, the lid 16 will resume its normal position as shown in FIGS. 2 and 3.

Thus, an effective means is provided for limiting the normal open position of the lid toward the front end loader mechanism, so as not to strike the top of the cab of the truck during the dumping of the container, and at the same time this means will not tend to drag the material back out of the body during the return of the container to its lowered position after discharge of its contents into the body. Thus, a problem encountered heretofore with this type of equipment has been effectively solved.

The lid 15 at the front of the container may swing free relative to the body of the container or similar or other spring means provided therefor, normally tending to keep the lid closed.

While the invention has been illustrated and described in one embodiment, it is recognized that variations and changes may be made therein without departing from the invention as set forth in the claims.

We claim:

1. In a front end loader of the character described, the combination with a motor vehicle having a refuse body thereon and with a loader unit mounted on the vehicle, of a container including a body portion having means in position for engagement by the loader unit for lifting the container to an elevated position to dump the contents into the body, said container having an open top with a lid for closing said open top and hinged to the body portion to swing open toward the loader unit about an axis extending transversely of the loader unit and adjacent the side of the container toward the loader unit, and means at the side of the container toward the loader unit forming a yieldable abutment for limiting the opening movement of the lid toward the loader unit to substantially an upright position when the container is initially engaged thereby, but allowing the lid to be opened further toward the loader unit against the force of said yieldable abutment.

2. In a front end loader of the character described, the combination with a motor vehicle having a refuse body thereon and with a loader unit mounted on the vehicle and including a pair of fork arms, of a container including a body portion having front, back and opposite end walls, end connections on the end walls in position for engagement by the fork arms adjacent the back wall for lifting the container to an elevated position to dump the contents into the body, said container having an open top, double lids for closing the open top and each being hinged to the body portion adjacent the front and back walls, respectively, along axes extending transversely of the loader unit, and yieldable abutment means connected with the

body portion adjacent the back wall for limiting the opening movement of the lid at the back wall toward the loader unit and to hold the lid normally in an upright position relative to the body portion when the container is an upright position, but allowing the lid to be opened further toward the loader unit against the force of said yieldable abutment.

3. In a front end loader of the character described, the combination with a motor vehicle having a refuse body thereon and with a loader unit mounted on the vehicle and including a pair of fork arms, of a container including a body portion having end connections in position for engagement by the fork arms for lifting the container to an elevated position to dump the contents into the body, said container having an open top, double lids for closing the open top and hinged to the body portion adjacent the front and back walls thereof along axes extending transversely of the loader unit, and yieldable abutment means connected with the body portion for limiting the opening movement of the lid at the back wall toward the loader unit and to hold the lid normally in an upright position relative to the body portion when the container is an upright position, said abutment means including a torsion spring connected with the body portion and having an upright arm connected therewith extending in the path of the last-mentioned lid in position for yieldable engagement therewith.

4. A container for use with a front end loader, comprising a body portion having an opening in the top thereof, and means for supporting the container in an upright position on a surface, means on the body portion for detachable engagement and support of the container on the front end loader, a lid for at least partially closing said top opening, means hinging the lid to the body portion for swinging movement about an axis and to the opposite side of an upright plane through said axis from the closed position of the lid when the container is seated in the upright position, and yieldable abutment means on the opposite side of said upright plane from the closed position of the lid in position for initiating restraining action on the lid after movement from the closed position thereof past said plane and yieldably restraining the lid against further opening movement.

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CERTIFICATE OF CORRECTION

Patent No. 3,138,275 June 23, 1964

George R. Dempster et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 5, lines 5 and 23, before "an", each occurrence, insert -- in --.

Signed and sealed this 10th day of November 1964.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents