

[54] **MOBILE CONTAINER FOR SAFELY
HANDLING EXPLOSIVES**

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[73] Assignee: **FMC Corporation**, San Jose, Calif.

[22] Filed: **Feb. 23, 1973**

[21] Appl. No.: **335,404**

[52] **U.S. Cl.**..... **109/1**, 109/49.5

[51] **Int. Cl.**..... **E06b 9/00**

[58] **Field of Search**..... 109/49.5, 58.5, 49, 59,
109/2, 80, 1; 296/24 R; 280/124 R;
105/392.5, 394; 86/1

[56] **References Cited**

UNITED STATES PATENTS

2,315,799	4/1943	LaGuardia et al.	109/49.5 X
2,393,350	1/1946	Wiedman	109/49.5
3,491,994	1/1970	Reynolds	280/124 R X

Primary Examiner—Dennis L. Taylor

Attorney, Agent, or Firm—R. S. Kelly; J. W. Edwards;
C. E. Tripp

[57] **ABSTRACT**

A mobile container in which an explosive, such as an infernal machine or a time bomb, can be placed after discovery for transport to a suitable location for disarming and whereby, in the event of an accidental explosion within the container, there will be no resultant injury to persons or damage to property adjacent thereto. The container has an upright cylindrical shape with the shell and base thereof being made of aluminum armor plate. A cover, pivotally connected to the top of the container, is made in the form of a ballistic grille to vent explosion gases in an upwardly direction, and a wheel suspension system is provided allowing the container to resiliently deflect downward in response to a detonation within the container so as to seat the container upon the wheel support surface and thereby prevent damage to the wheel suspension system.

7 Claims, 6 Drawing Figures

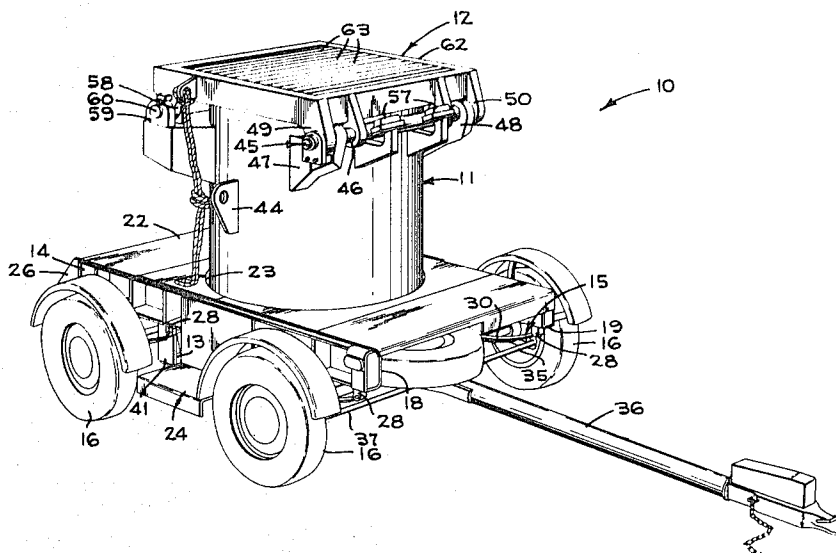
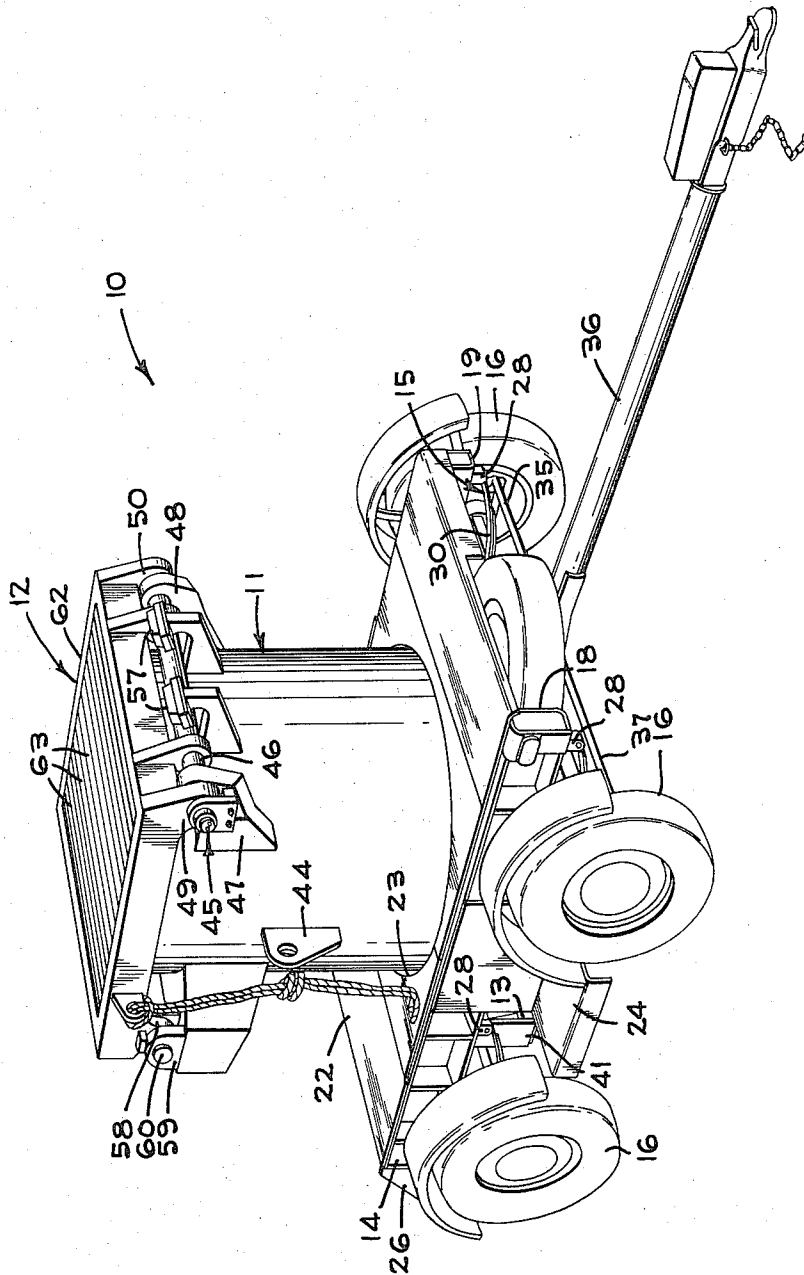


FIG. 1



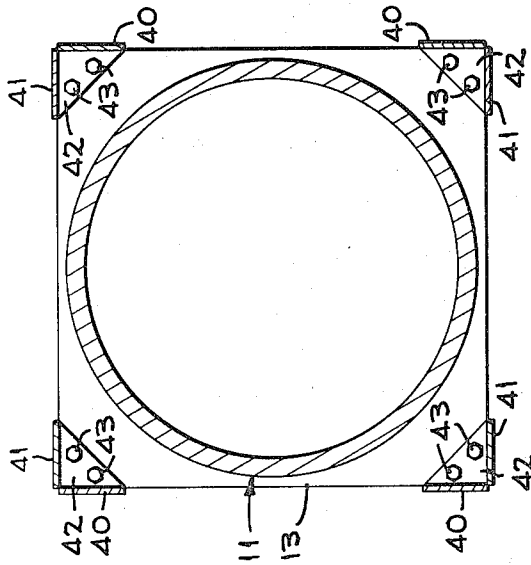


FIG. 3

FIG. 2

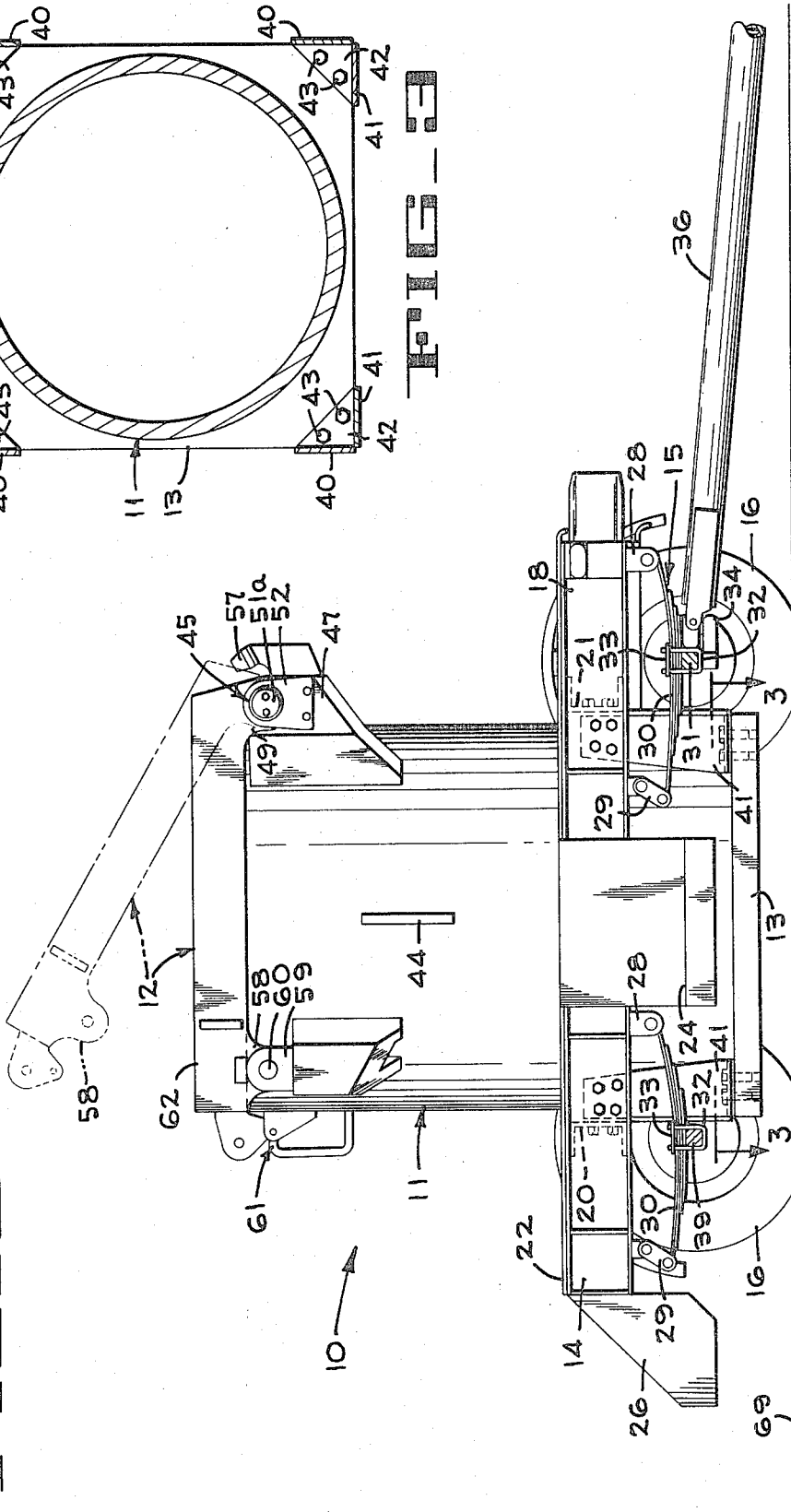


FIG. 4

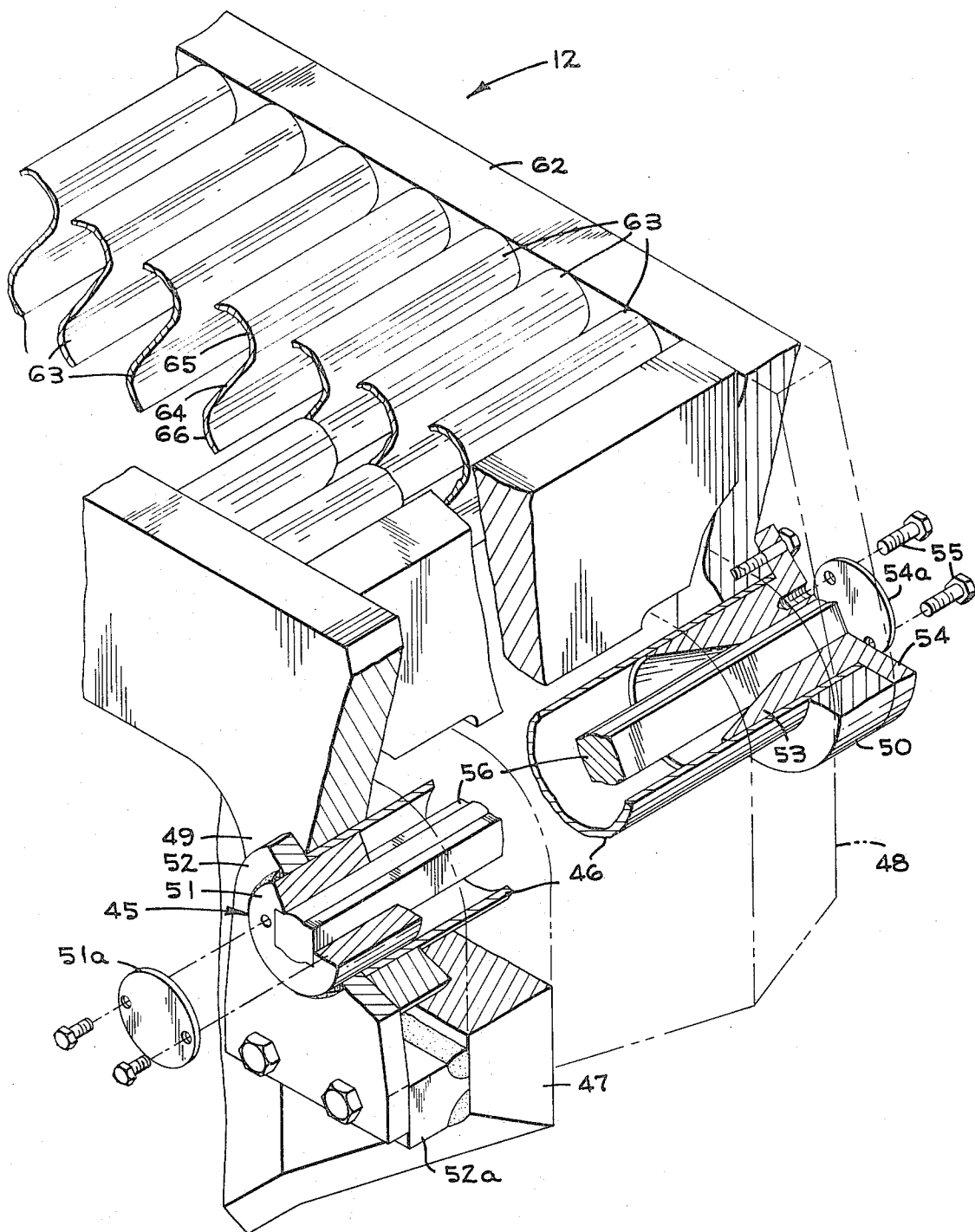


FIG. 5

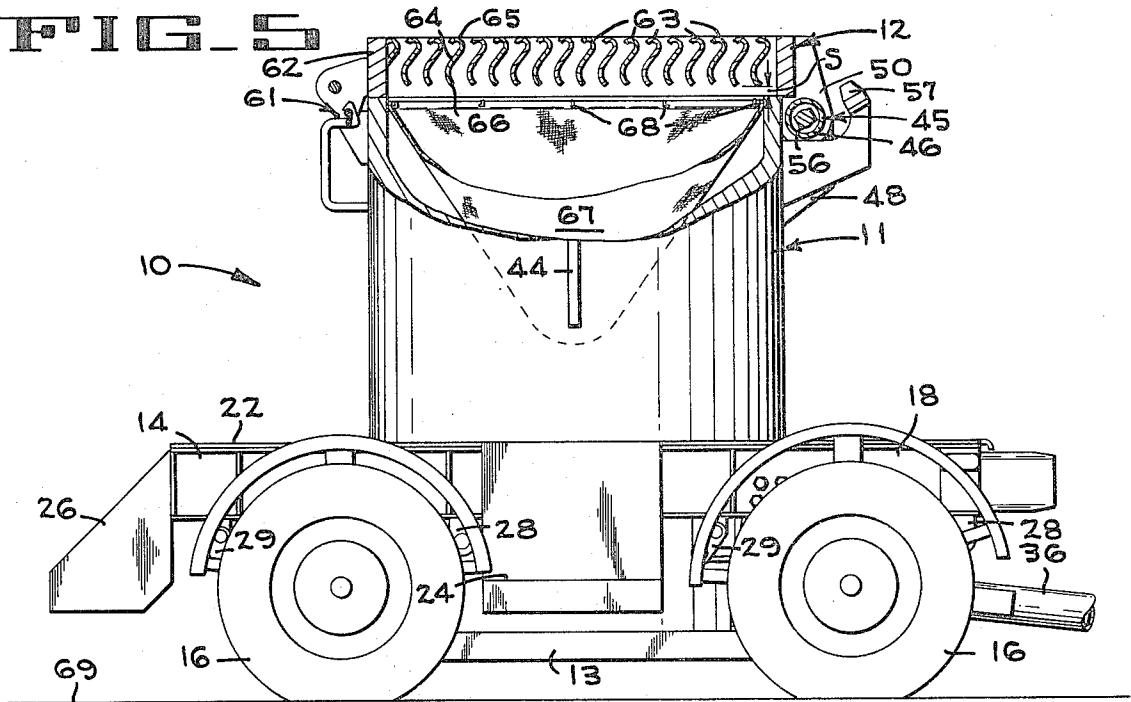
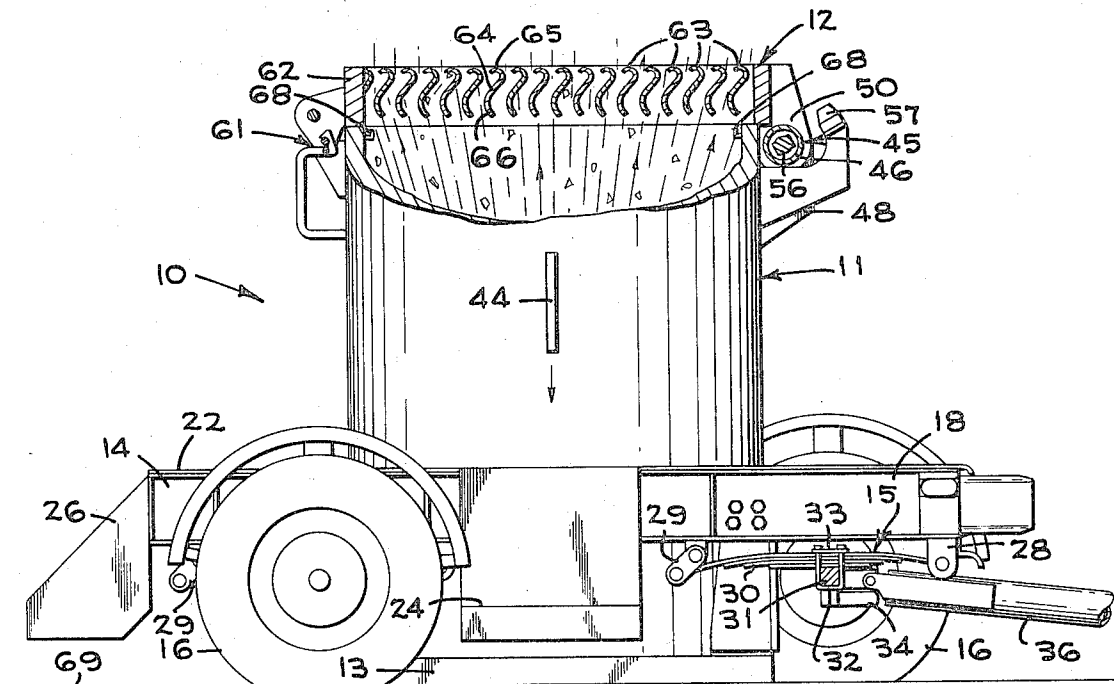


FIG. 6



MOBILE CONTAINER FOR SAFELY HANDLING EXPLOSIVES

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to containers for safely handling explosive devices whereby an explosion within the containers will not result in injury or damage to persons or property in the immediate vicinity, and more particularly, it relates to mobile containers for transporting explosives in a safe manner.

2. Description of the Prior Art

U.S. Pat. No. 2,315,799 to LaGuardia et al. discloses a safety enclosure for handling explosives which vents explosion gases while retaining fragments. The enclosure is mounted upon a truck or trailer for rapid transport. Since explosion gases are vented downward and outward from the enclosure as well as upward, there may be some danger for bystanders or adjacent property, but the explosive reaction upon the vehicle is minimized.

U.S. Pat. No. 2,309,145 to Turnock et al., shows a truck for carrying explosives which is made of non-sparkable material to minimize the danger of an explosion in the event that one should occur.

Containers which include grills and guards for venting explosion gases while retaining fragments are shown in U.S. Pat. Nos. 559,112 to Treman; 1,026,207 to Johnson; 1,029,996 to Howard; and 1,086,708 to Hoagland.

When explosion gases are vented in all directions from a container, there may be some danger to bystanders or adjacent property due to heat, pressure and very small fragments that might ricochet through the containers grille with the gases. To provide more adequate protection, the container should limit the venting of gases to an upwardly direction so that bystanders and adjacent property would be safeguarded in the event of an explosion. However, an explosion in such a container would result in an explosive reaction downwardly upon the container bottom which would have to be absorbed by the container and its supporting structure and which would normally result in severe damage to this structure.

SUMMARY OF THE INVENTION

Objects of the present invention are to provide a mobile container in which an explosive, such as a time bomb or an infernal machine, can be placed after discovery and transported to a suitable location for disarming with a minimum hazard for bystanders, adjacent property and the vehicle itself in the event of an accidental explosion within the container. The container defines an explosion chamber from which gases are vented in an upwardly direction only while fragments are retained therein, and the container is supported by a wheel suspension system which permits resilient deflection of the container downwardly in response to a detonation within the chamber. This deflection allows the base of the container to seat upon the wheel support surface to thereby prevent damage to the wheel suspension system. A cover, pivotally connected to the top of the container, is formed like a ballistic grille to vent explosion gases upward while retaining fragments within the container.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a mobile container embodying the present invention.

FIG. 2 is a side elevation view of the mobile container shown in FIG. 1 with the wheels on one side of the apparatus being removed to show the wheel suspension system and with an open cover position being indicated in phantom line.

FIG. 3 is a section taken on the line 3—3 of FIG. 2.

FIG. 4 is a perspective view of the torsion bar assembly connecting the cover to the mobile container with portions thereof being broken away to show underlying structure.

FIG. 5 is a broken side elevation of the mobile container illustrating, in section, the cover grille which vents explosion gases upward and showing the normal position of the container base above the ground surface supporting the wheels.

FIG. 6 is a broken side elevation of the mobile container similar to FIG. 5 but illustrating how the container base seats upon the wheel support surface in response to an explosion within the container so as to transfer the explosion load to the support surface and thereby prevent damage to the wheel suspension system.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIG. 1, a vehicle 10 is there shown which includes an upright cylindrical container 11 having a cover 12 in the form of a grille for venting explosion gases upward from the container while retaining fragments therein. A base 13 at the bottom of the container is mounted to a chassis 14 that is resiliently supported by a wheel suspension system 15 upon a set of wheels 16. Should there be an explosion within the container, the wheel suspension system will resiliently deflect downwardly to allow the container base to seat upon the ground or wheel support surface and transfer pressure directly thereto thereby preventing damage to the wheel suspension system.

Chassis 14 includes a pair of longitudinal frame members 18 and 19 that are supported in spaced relationship by transverse beams 20 and 21, as shown in FIG. 2. The chassis can be covered with a deck plate 22 having an opening 23 therein, as shown in FIG. 1, which is cut out to receive the body of the container 11. A step 24 is mounted on each side of the chassis while a step 26 is mounted at the back end thereof.

Wheel suspension system 15, as best shown in FIG. 2, includes at each end of longitudinal frame members 18 and 19 a clevis 28 fixedly attached to the frame member and a clevis 29 pivotally attached to the frame member. A leaf spring 30 is pinned at its opposite ends to clevis 28 and clevis 29 so as to be suspended therebetween. Extending transversely between the forward leaf springs is a front axletree 31, and this axletree is coupled to the leaf springs by a pair of U-bolts 32 fitting about the axletree and through a rectangular plate 33 that fits over the leaf spring.

The front axletree 31 is provided with rocker arms 34 at each end thereof mounted for pivotal movement about substantially vertical axes. Each end of axle-tree 31 is provided with a spindle shaft, not shown, for supporting a wheel 16. A link 35, shown in FIG. 1, con-

nects one rocker arm to a trailer coupling arm 36 while a link 37 connects the coupling arm to the opposite rocker arm. The coupling arm is thereby pivotally connected to the front axletree and has a joint therein providing pivotal movement about a horizontal axis. Thus, the rocker arms turn in response to pivotal movement of the trailer coupling arm in a horizontal plane.

A rear axletree 39 extends transversely between the rearward leaf springs and is coupled thereto by U-bolts 32 and rectangular plates 33 in the same manner as the front axletree was connected to the forward set of leaf springs. The rear axletree does not include rocker arms but has spindle shafts, now shown, projecting outwardly at each end thereof. A wheel 16 is mounted on each spindle shaft to support the chassis 14.

Container 11 is formed by a cylindrical shell made of one or more pieces of aluminum armor plate welded together. The cylindrical shape provides greater strength to resist internal lateral pressure. Base 13, also made of aluminum armor plate, is welded to the bottom of the cylindrical shell and has a rectangular shape, as shown in FIG. 3. At each corner of the base is a container support weldment which includes a pair of vertical legs 40 and 41 positioned at right angles to each other. A right triangular fillet plate 42 is welded to each of legs 40 and 41 and extends horizontally between the legs at the bottom thereof to fit over the adjacent corner of the base. Bolts 43 extend downward through holes in fillet plate 42 and into threaded openings in base 13 for attachment of the container support weldment to the base. The upper ends of each pair of vertical legs 40 and 41 are bolted to chassis 14 with legs 41 being bolted to the longitudinal frame member 18 or 19 and legs 40 being bolted to the transverse beam 20 or 21 (FIG. 2). Lifting ears 44 are provided to each side of the container for lifting the container into place before bolting it to the chassis.

Cover 12 is hingedly mounted to the top of container 11 by a horizontal torsion bar spring assembly 45 which resiliently urges the cover from a substantially horizontal closed position, as shown in solid line in FIG. 2, through an upward angle of approximately thirty degrees to an open position, indicated in phantom line. Torsion bar spring assembly 45, shown in detail in FIG. 4, includes a tube 46 inserted through openings in a pair of mounts 47 and 48 projecting from the container and through openings in a pair of arms 49 and 50 extending from the cover outwardly of the mounts 47 and 48. Inserted within one end of the tube is an end plug 51 which is welded to a bracket 52 that is secured to the mount 47 of the container body through a mounting block 52a. At the opposite end of the tube, an end plug 53 is inserted and is provided with a projecting radial flange 54. The flange is rigidly connected to arm 50 of the cover by means of bolts 55.

Each end plug has an internal bore of generally rectangular cross section for receiving a torsion bar 56 and restraining the ends of the bar in a fixed angular position relative to the plug. The torsion bar is inserted into place when cover 12 is in an elevated position and when allowed to settle downward, torsion is applied to the bar because plug 53, which is fixed to the cover, rotates with the cover while plug 51, which is fixed to the container body, remains in a fixed angular position. The torsion bar develops sufficient resilient force to maintain the cover in an open position inclined upwardly at approximately 30° except when the cover is

forced downward and latched in a closed position. A cover plate 51a is bolted to end plug 51 and a similar cover plate 54a is bolted to end plug 54 to seal the torsion bar within tube 46.

A pair of steps 57, mounted on the container, are positioned to support the cover in a fully opened position. A locking ear 58 projects downwardly from each side of the cover to align with corresponding upwardly projecting ears 59, mounted on each side of the container, and, when the cover is in a closed position, a locking pin 60 can be inserted through holes in ears 58 and 59 to lock the cover in place. A temporary latch mechanism 61 is mounted to the cover and container on the side opposite from the torsion bar assembly 45 so as to hold the cover in a properly aligned position for inserting or removing locking pins 60.

Cover 12 has a rectangular shaped outer frame 62 with a series of thin bars 63 extending parallel to the front and rear ends of the cover to form a grille. With reference to FIG. 5, it will be seen that the bars have a transverse section with a straight intermediate portion 64 skewed to the vertical axis and curved end portions 65 and 66 hooking in opposite directions. Thus, the bars form a grille that will vent explosion gases upward while explosive fragments within the container will be deflected downwardly and retained within the body of the container.

It should also be noted, as shown in FIG. 5, that curved end portions 66 of bars 63 are spaced by a distance S above the top of container 11. This is a pressure relief feature which allows explosion gases to be vented laterally over the side of the container within the rectangular frame 62 of cover 12 and the rectangular frame tends to direct such vented explosion gases downward along the outside of the container towards deck plates 22. When explosion gas pressure builds up to where the velocity of escaping gases approach the speed of sound, the bar grille blocks the upward passage of gases until the pressure is reduced by venting over the side of container 11.

A conical shaped fabric liner 67 can be suspended within container 11 to provide flexible support for explosives at an intermediate location therein spaced from the cylindrical shell, cover 12 and base 13.

In operation, when an infernal device or time bomb is discovered, vehicle 10 can be towed to the scene. Cover 12 is opened and the bomb can be gently placed upon the conical shaped fabric liner 67 held within the container by hooks 68, shown in FIG. 5. The cover is then closed and locked in place by locking pins 60. The vehicle can then be towed to a safe location for disarming the bomb. Base 13 of the container is normally spaced above a wheel support surface 69, shown in FIG. 5, to provide adequate clearance for traveling. In the event of an accidental explosion within the container, explosion gases are vented upward, as shown in FIG. 6, while fragments are retained within the container by bars 63. Chassis 14 recoils downward in response to the explosion and base 13 seats upon wheel support surface 69. Thus, the downward pressure is distributed directly over the entire area of the base to the ground or wheel support surface, while leaf springs 30 are not permitted to deflect beyond their elastic limits. It will be noted that pivotal clevises 29 allow the leaf spring ends attached thereto to shift horizontally upon a substantial amount of leaf spring deflection.

Although the best mode contemplated for carrying out the present invention has been herein shown and described, it will be apparent that modification and variation may be made without departing from what is regarded to be the subject matter of the invention.

What is claimed is:

1. A mobile container for safely handling explosives, said container comprising means defining an enclosed explosion chamber wherein fragments resulting from an explosion are retained, said chamber defining means including a lower portion, said chamber being provided with means for venting the explosion gases in an upwardly direction; a chassis supporting said chamber defining means; a set of wheels supporting said chassis for rolling movement upon a surface; and a wheel suspension system connecting said set of wheels to the chassis for resiliently supporting said chassis in a normal position with the lower portion of the chamber defining means extending within the area bounded by the wheels and downwardly to a position below said suspension system and spaced by a certain distance above the surface upon which said set of wheels roll, but relationship of said certain distance and the elastic limit of said wheel suspension system being such that, upon a substantial downward pressure as results from a detonation within said chamber, said wheel suspension system is capable of deflecting downwardly within its elastic limit to a position where said surface engages said lower portion of the chamber defining means and stops further downward movement of the chamber defining means and chassis whereby damage to the wheel suspension system as might result from a deflection beyond its elastic limit is prevented.

2. A mobile container as described in claim 1 wherein said chamber is defined by a cylindrical shell and said lower portion of the chamber defining means

is comprised of a base made of aluminum armor plate.

3. A mobile container as described in claim 2 wherein said means for venting the explosion gases comprises a cover pivotally attached to said chamber defining means and made in the form of a grille to vent explosion gases while retaining fragments within the chamber.

4. A mobile container as described in claim 3 further including a torsion bar spring connected between said cover and said chamber defining means to urge the cover towards an open position.

5. A mobile container as described in claim 1 wherein said wheel suspension system includes at least one leaf spring having one end pinned to a member pivotally connected to the chassis and the opposite end pinned in a fixed position in relation to the chassis whereupon with substantial vertical deflection of the leaf spring said one end can move horizontally relative to the chassis.

6. A mobile container as described in claim 1 wherein said lower portion of the chamber defining means comprises a flat base suspended from the chassis and extending parallel with the surface supporting said wheels so that upon deflection of the wheel suspension system to seat said base upon the wheel support surface excess downward pressure is distributed directly over the entire base area to the wheel support surface.

7. A mobile container as described in claim 1 wherein said chamber defining means has a cover made in the form of a grille to vent explosion gases upward while retaining fragments within the chamber, said cover grille being spaced above the explosion chamber to vent explosion gases outward laterally of the grille.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 3,820,479
DATED : June 28, 1974
INVENTOR(S) : DONALD R. FYLLING

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 10: change "containers" to --container--;
line 27: after "sion" insert --but which is not
adapted to withstand an explosion--;
line 37: change "containers" to --container--.
Column 4, line 5: change "steps" to --stops--.
Column 5, line 22: change "but" to --the--.

Signed and Sealed this

twenty-ninth Day of July 1975

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks

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[SEAL]

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