July 7, 1936. F. K. FILDES 2,047,141

LIFTING SLING

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FIG. I.

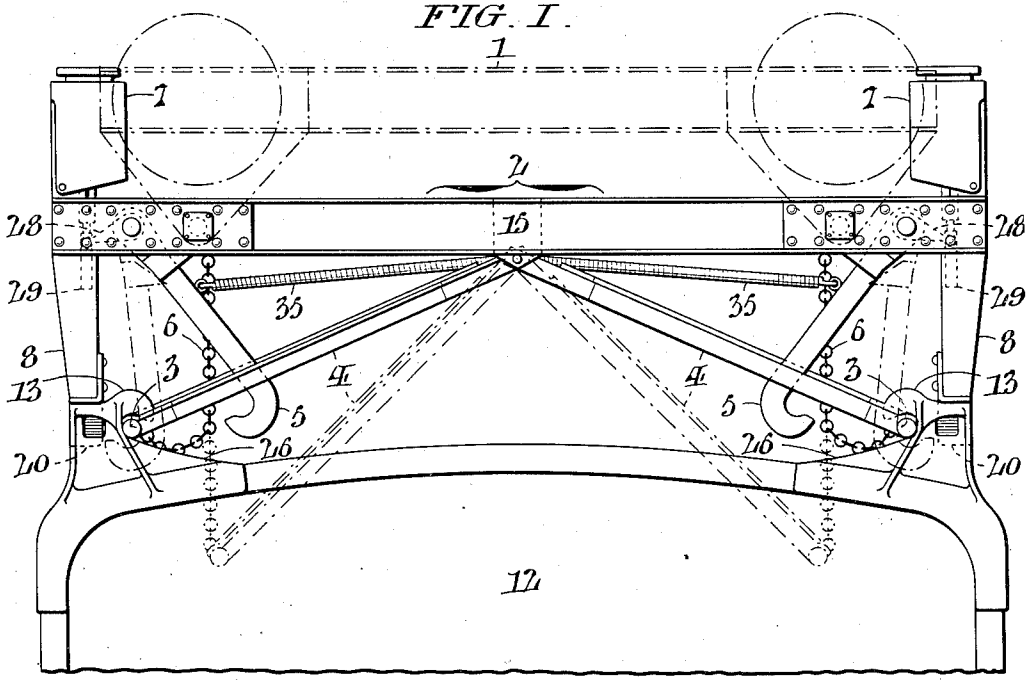
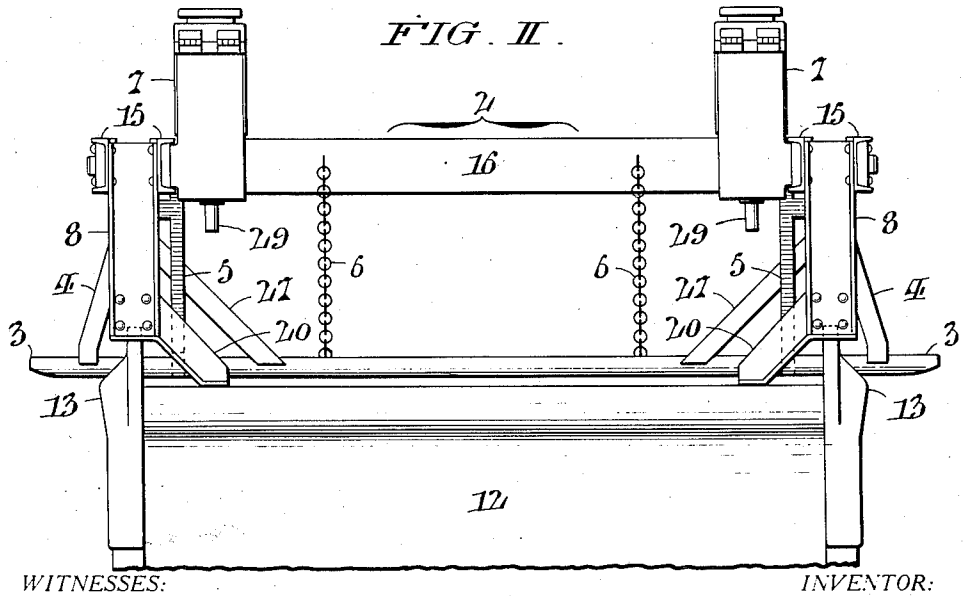


FIG. II.



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FIG. III.

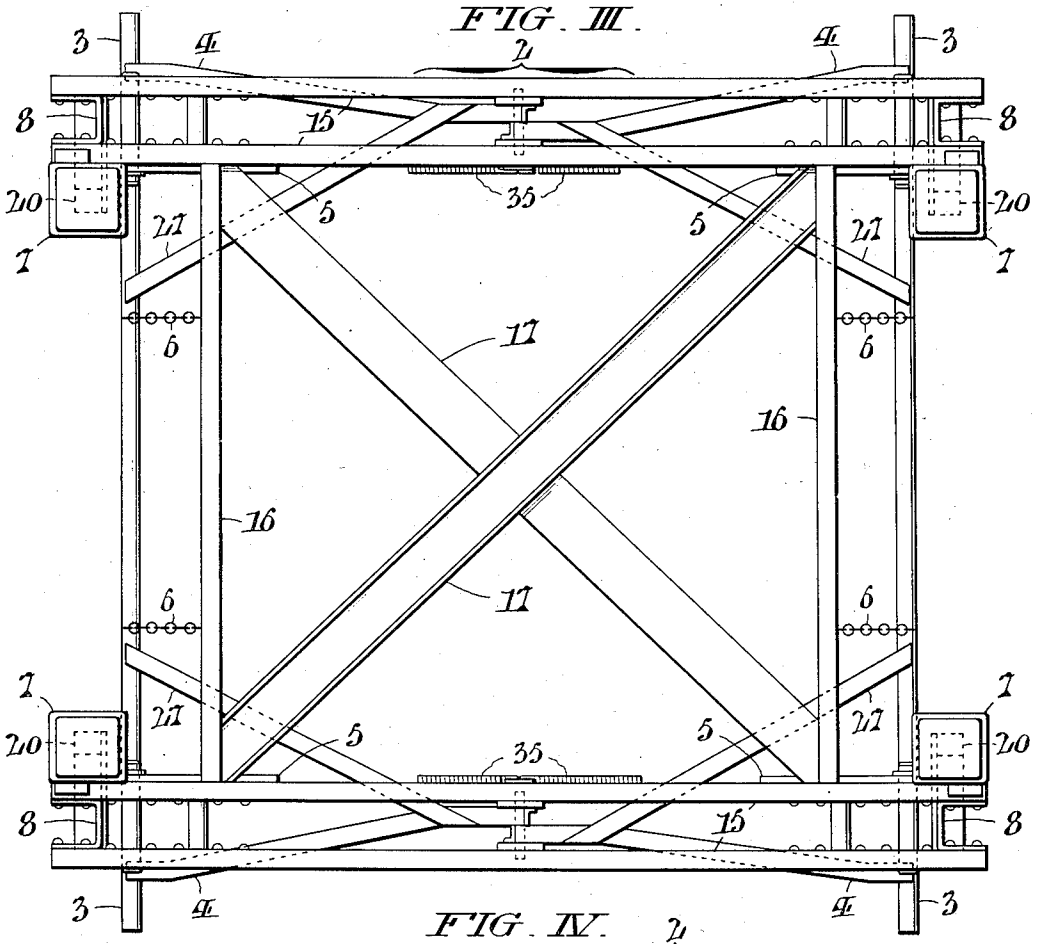
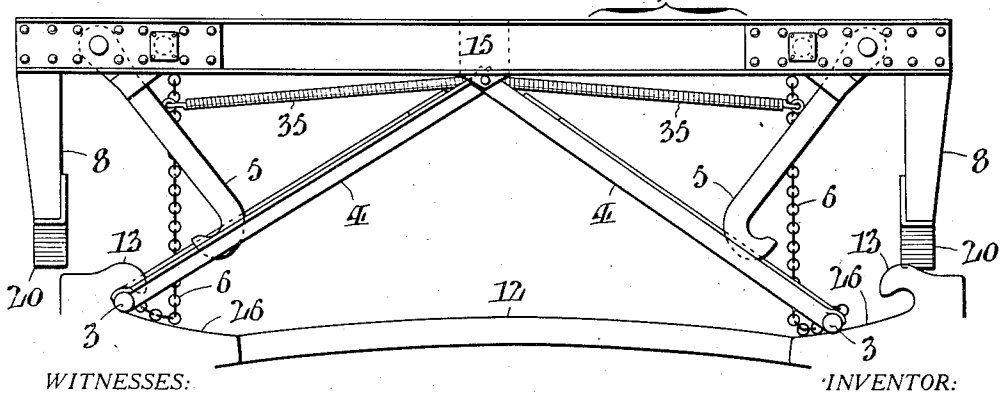


FIG. IV.



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FIG. V.

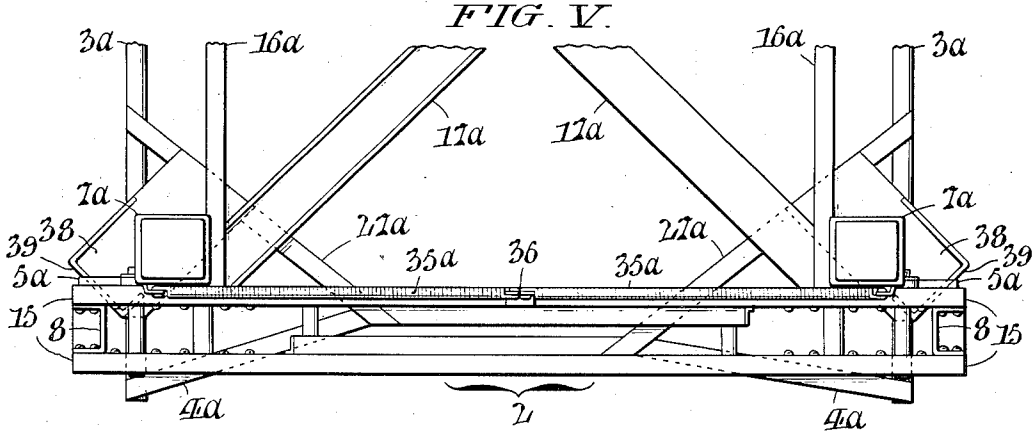


FIG. VI.

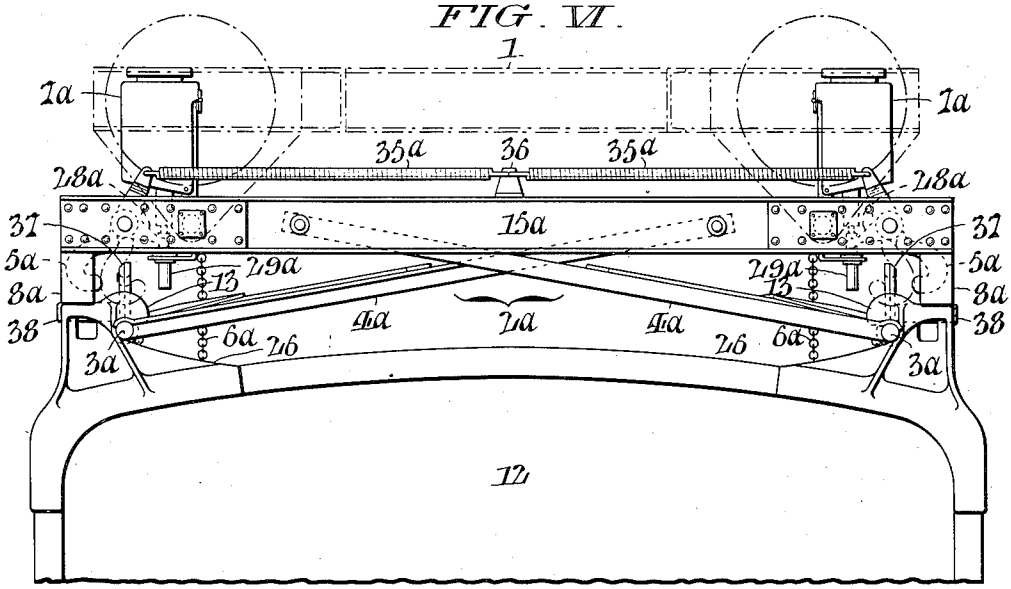
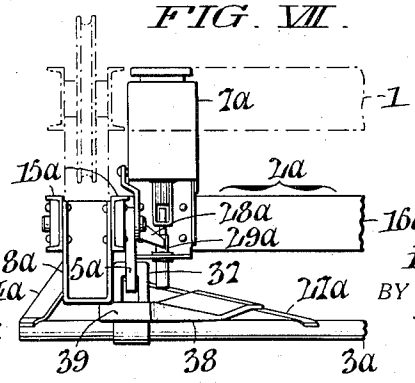


FIG. VII.



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UNITED STATES PATENT OFFICE

2,047,141

LIFTING SLING

Frederick K. Fildes, Altoona, Pa., assignor to The Pennsylvania Railroad Company, Philadelphia, Pa., a corporation of Pennsylvania

Application February 6, 1936, Serial No. 62,567

9 Claims. (Cl. 294—67)

My invention relates to lifting slings used in moving demountable truck bodies and shipping containers. Many lifting slings have been proposed for moving shipping containers but the problem of efficiently coupling the sling to the container without a man's riding the sling or climbing up on to the container top remained without satisfactory solution. The riding of the sling is dangerous to the workman and the weight of a man on the top of many containers and truck bodies will seriously damage them. Further the provision of a sling of this type which may be adapted to containers having inwardly turned hooks is another desideratum.

Consequently the principal object of my invention is the provision of a serviceable lifting sling which may be coupled and uncoupled without the presence of a workman on the sling or on the container and which may be adapted for use with a container having inwardly turned hooks. Another object is the provision of a lifting sling which guides itself into the coupling position as it is lowered over a container or truck body. Another object of my invention is a simple, rugged and efficiently operating lifting sling without complicated structural features. Further objects and advantages of my invention will appear from the following description of a preferred embodiment thereof, referring to the accompanying drawings.

Of these drawings,

Fig. I shows a side view of a lifting sling which is a preferred embodiment of my invention.

Fig. II shows an end view of same.

Fig. III shows a plan view of same.

Fig. IV shows a side view of this lifting sling showing its operation in coupling and uncoupling.

Fig. V is a fragmentary plan view of a modified form of my invention.

Fig. VI is a side view of same, and

Fig. VII is a fragmentary end view of a corner of same.

For the purposes of a detailed description the lifting sling shown in the drawings may be separated into a suspension frame 1 shown conventionally in broken lines only, a frame 2, engagement rods 3, having arms 4, hooks 5, retaining elements 6, solenoids 7, and supporting legs 8. The lifting sling is shown with container 12 having container hooks 13. The suspension frame 1 to which the frame 2 is fastened is fully described in United States patent to Fildes issued July 31, 1934, No. 1,968,135 and need not be further described here.

The frame 2 is rectangular in shape and is made up of longitudinal members 15, transverse members 16 and diagonal bracing members 17. The construction must be rugged and durable because of the weights to be lifted. The longitudinal members 15 are held in spaced parallel relation by the interposition of the supporting legs 8 which are designed to engage the top of the container hook 13. The supporting legs 8 have at their lower extremities extension pieces 20 which are inclined downwardly and inwardly to provide positioning guides.

The arms 4 of the engagement rods 3 are pivotally attached to the central portions of the longitudinal members 15. These engagement rods 3 operate on guiding surfaces 26 of the hooks 13 and are thereby guided into engagement with the hooks 13 as shown in the drawings. The arms 4 and engagement rods 3 are braced together by diagonal braces 27 to give greater rigidity. It is important that the arms 4 in their extreme down position (see Fig. I) be at sufficiently great an angle with the vertical that the arms 4 will swing up easily on contacting the container 12 as the lifting sling is lowered over the container 12. Therefore retaining elements 6 are provided in the form of chains connecting the rods 3 to the frame 2, the length of chain being such that a substantial angle of the arms 4 from the vertical is insured in the extreme down position.

The hooks 5 are pivotally attached to the longitudinal members 15 near the corners of the frame 2 and they are turned outwardly as shown in the drawings. The hooks 5 are normally held in the up position, as represented in Figs. I and IV, by means of springs 35. In order to swing the hooks 5 into engagement with the engagement rod 3, there is provided on the hook 5 an operating arm 28 which is actuated by a solenoid 7 having a plunger 29 which is pivotally connected to the operating arm 28. The solenoids 7 are mounted on the frame 2, one at each corner for each hook 5. When the solenoids are energized, the plungers 29 are lifted, and when de-energized, the plungers fall by gravity.

In the operation of the lifting sling, the springs normally maintain the hooks 5 in the up position. The arms 4 being in the extreme down position, the lifting sling is lowered over the container 12 until the engagement rods 3 contact the top of the container 12, somewhat in the manner represented in Fig. IV. The engagement rods 3 then move along the top of the container 12 as the lifting sling is further lowered, swinging the arms 4 upward to the position shown in Fig. I. The guiding surfaces 26

guide the operating rods 3 into engagement with the hooks 13, at which time the supporting legs 8 seat on the hooks 13. The solenoids 7 are then energized and each hook 5 is swung outwardly so that the bights of the hooks are underneath the engagement rods 3 ready to engage as soon as the lifting sling is lifted. As the lifting sling is lifted, the hooks 5 engage the engagement rods 3 and the container is ready for movement. At this point the solenoids 7 may be de-energized. In depositing the container for uncoupling, the lifting sling is lowered until the supporting legs 8 rest on the hooks 13. The hooks 5 are then disengaged from the engagement rods 3 and are swung in and up by the operation of the springs 35. The lifting sling is lifted, causing the arms 4 to swing down and the engagement rods to move inwardly and clear of the hooks 13 until the arms 4 are supported by the retaining elements 6. The lifting sling is then lifted clear of the container 12 and the operation is completed.

A modified form of my invention shown in Figs. V, VI, and VII, involves springs 35*a*, disposed above the frame 2 and attached to anchoring elements 36, for urging pivoted hooks 5*a* to the disengaged position. Also the hooks 5*a* turn inward instead of outward as in the preferred embodiment. The hooks 5*a* do not engage the engagement rod 3*a* directly as in the preferred embodiment, but by means of an engagement eye 37 which is fastened to the engagement rod 3*a*. It should be noted also that in the modified form, arms 4*a* are not secured to the central portion of longitudinal member 15*a*. The operation of this modified form of my invention is the same as the operation of the preferred form. The modified form of my invention is also provided with guide plates 38 each of which is secured to a brace 27*a*, and one of the engagement rods 3*a*. The outside edges of these guide plates 38 are turned up to form guide faces 39 which are designed to contact the container hooks 13 and thus assist in positioning the lifting sling for the engagement of hooks 5*a* in eyes 37.

While I have described a preferred and modified form of my invention in detail, it will be apparent to those skilled in the art that many changes may be made and other forms adopted without departing from the spirit of my invention as defined in the annexed claims.

Having thus described my invention, I claim:

1. A lifting sling having a frame, engagement rods for engaging container hooks or the like, said rods having arms pivotally attached to the frame, hooks pivotally attached to the frame to engage said rods, and retaining elements limiting the downward swing of said arms.

2. A lifting sling according to claim 1 characterized by the further fact that said engagement rods are pivotally attached at the central portion of the longitudinal members of the frame.

3. A lifting sling according to claim 1 characterized by the further fact that said hooks have an operating means.

4. A lifting sling according to claim 1 characterized by the further fact that said hooks have an electrical operating means for swinging the hooks into the engagement position with said engagement rods.

5. A lifting sling according to claim 1 characterized by the further fact that each hook has an independent solenoid for swinging the hook into the engagement position with the engagement rod.

6. A lifting sling according to claim 1 characterized by the further fact that the lifting sling has a pressure means urging the hooks to one position and an operating means for urging the hooks to the opposite position.

7. A lifting sling according to claim 1 characterized by the further fact that the lifting sling has a pressure means urging the hooks to the disengaged position and an operating means for overcoming the pressure means and urging the hooks into the engagement position with the engagement rods.

8. A lifting sling according to claim 1 characterized by the further fact that the frame has supporting legs for engaging the top of the container, guiding elements with vertically extending guide surfaces attached to the lower portions of said legs, and guide plates with horizontally extending guide surfaces attached to said frame.

9. The combination of a container having inwardly turned hooks with guide surfaces leading into the hooks and a lifting sling having a frame, engagement rods for engaging said hooks, said rods having arms pivotally attached to the frame, and hooks pivotally attached to the frame to engage said rods, said engagement rods operating on said guide surfaces in coupling and uncoupling.

FREDERICK K. FILDES.