

July 31, 1934.

F. K. FILDES

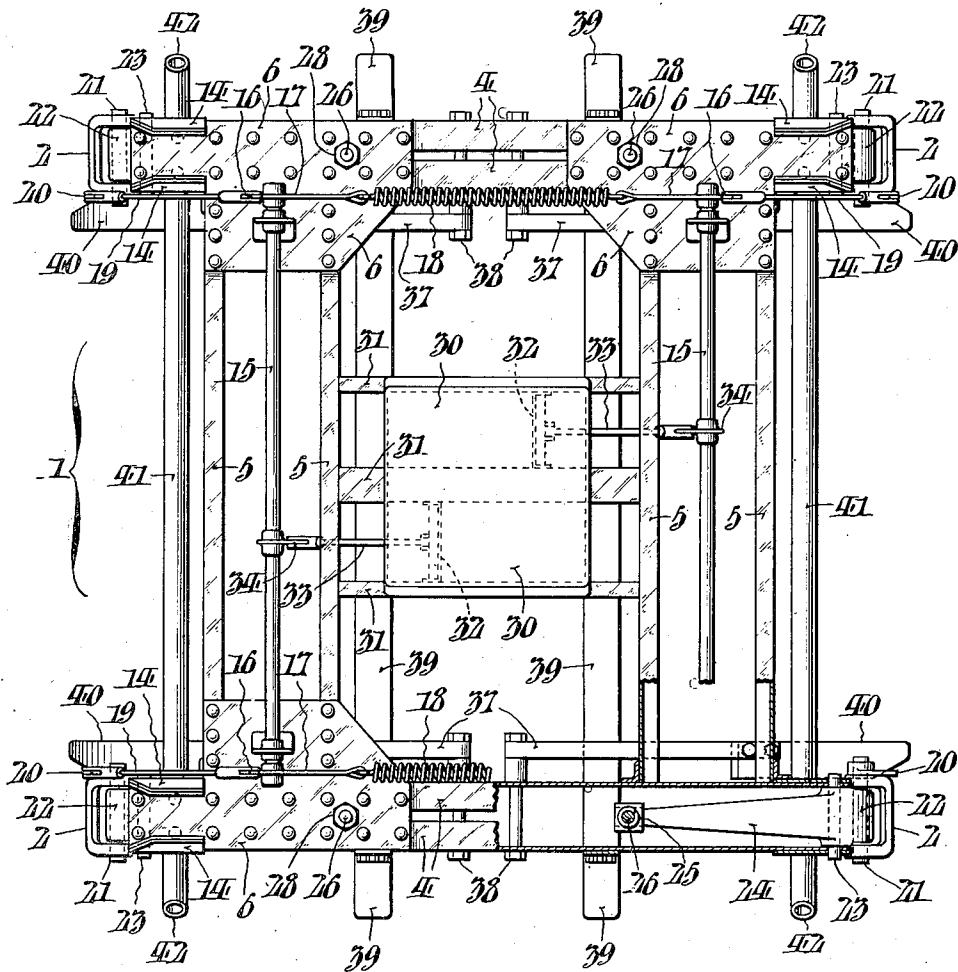
1,968,135

LIFTING COUPLER FOR CONTAINERS

Filed Oct. 5, 1933

3 Sheets-Sheet 1

FIG. 1.



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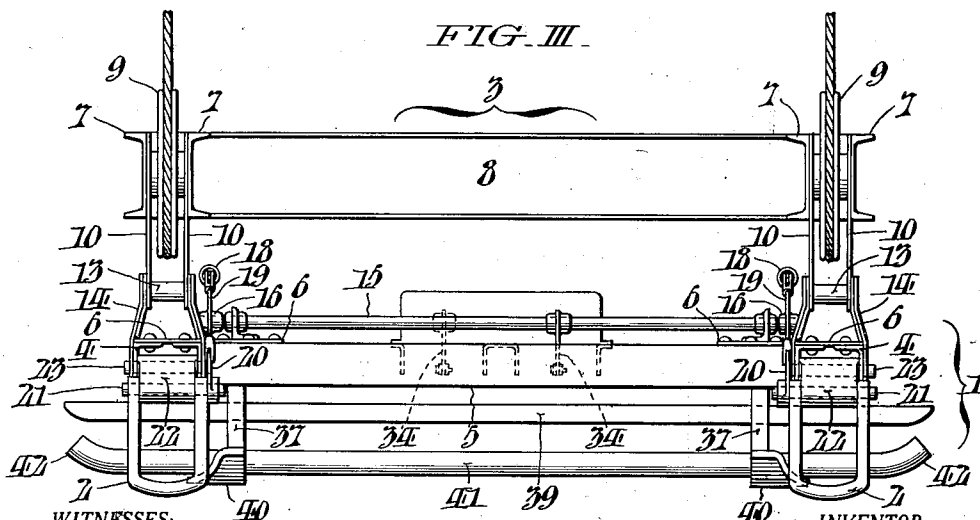
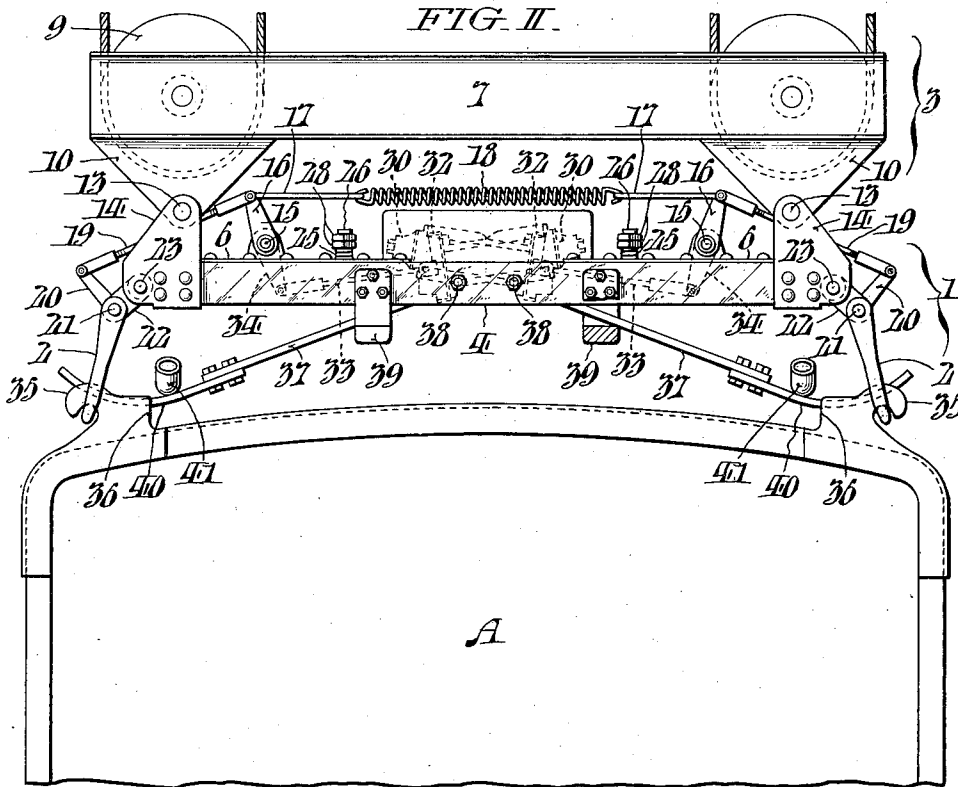
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LIFTING COUPLER FOR CONTAINERS

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3 Sheets-Sheet 2



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LIFTING COUPLER FOR CONTAINERS

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3 Sheets-Sheet 3

FIG. IV.

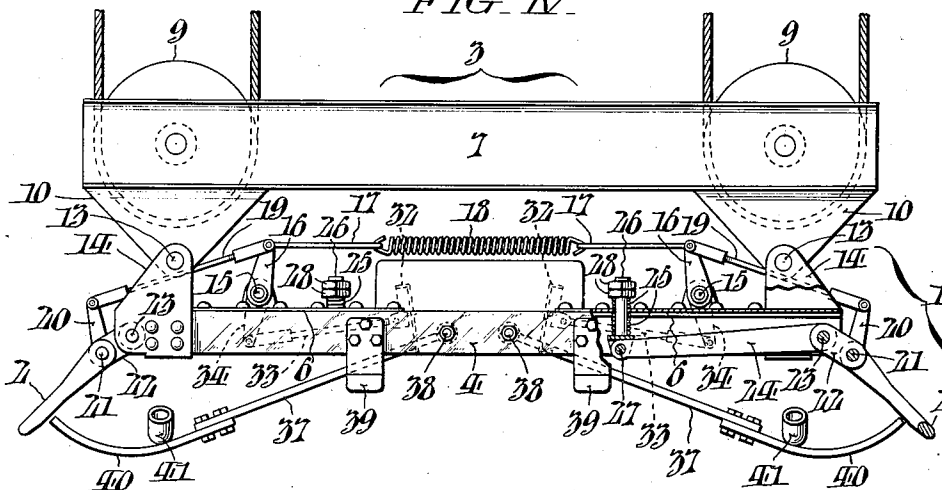
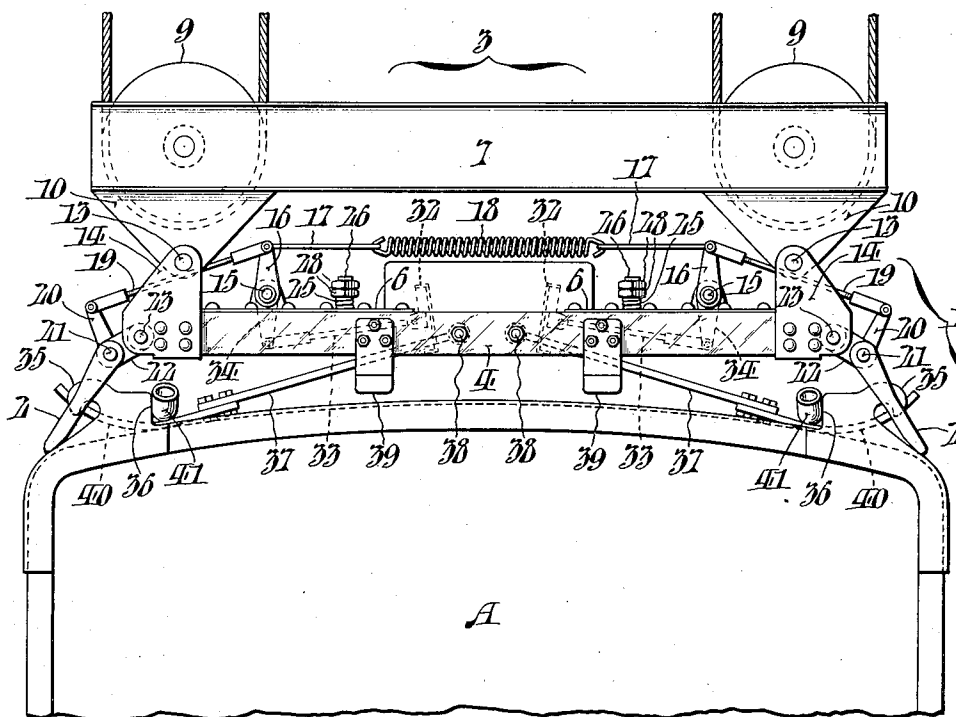


FIG. V.



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UNITED STATES PATENT OFFICE

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LIFTING COUPLER FOR CONTAINERS

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Application October 5, 1933, Serial No. 692,246

7 Claims. (Cl. 294—67)

This invention relates to lifting couplers, and more particularly to couplers designed for lifting railroad shipping containers or the like to facilitate their transfer from one location to another, the invention being characterized by a novel form of centering device which aids the operator in positioning the apparatus over a container preparatory to coupling.

It has heretofore been proposed to employ lifting slings or couplers suspended from an overhead crane and adapted to engage hooks or other attachment on containers. With certain forms of lifting couplers, it is necessary to have a man ride the coupler and assist the crane operator in centering the coupler squarely with respect to the container which is to be transferred. Such practice is not only dangerous but involves delays in the positioning of the couplers and the securing of their load engaging members to the lifting attachments on the containers.

Accordingly the principal object of my invention is to provide a container lifting coupler of relatively simple and inexpensive manufacture, characterized by a centering device for automatically centering the coupler frame with respect to the container to be lifted in such manner that the crane operator may speedily perform the operations involved in positioning the coupler squarely with respect to the container and in coupling and uncoupling the apparatus with respect to the container lifting attachments.

Another object of the invention is to dispense with the necessity of carrying a man on the lifting coupler, and such object is accomplished by the provision of load engaging links which are operated by remote controlled apparatus on the coupler frame.

Other objects and advantages characterizing the invention will become more fully apparent from the description hereinafter set forth of one embodiment or example thereof, having reference to the accompanying drawings. Of the drawings:

Fig. I represents a plan view of the apparatus with parts broken away and shown in section to better disclose important features.

Fig. II represents an end elevation of the same, showing also the top portion of a container engaged by the coupler and showing the coupler in the position which it assumes when the container is in readiness for hoisting.

Fig. III represents a side elevation of the same.

Fig. IV represents a fragmentary view similar to Fig. II, but showing the coupler with its parts in the position occupied when it is free of a con-

tainer, with a portion broken away to better disclose important details; and,

Fig. V represents a similar view showing the coupler with the parts in the position occupied when the coupler has been lowered onto the top of a container and prior to the engagement of its links with the container lifting attachments.

In the drawings there is illustrated a lifting coupler of my invention comprising generally a rectangular coupling frame 1 having load engaging links 2 pivotally attached thereto and a superimposed suspension frame 3 which is adapted for connection with an overhead crane.

The coupling frame 1 comprises end members 4 built up of plates and angle bars and cross connected by spaced parallel longitudinal members 5. To give rigidity to the frame 1, the end members 4 and longitudinal members 5 are connected by corner gussets 6, as shown clearly in Fig. I. The suspension frame 3, in the illustrated example of my invention, is made up of end members 7 and longitudinal members 8 in the form of channel beams. Within the end members 7 near the corners of the suspension frame, sheaves 9 are housed, the sheaves being connected by suitable cables to the overhead crane from which the lifting coupler is suspended. Adjacent to each sheave 9 there are downwardly extending plates 10, of substantially triangular formation, which are connected by pins 13 to plates 14 which extend upward from the coupler frame 1. Obviously, the suspension frame 3 may take a great variety of forms or may be eliminated entirely, depending upon the type of overhead crane from which the lifting coupler is supported.

Shafts 15 extending longitudinally across the coupling frame 1 near the sides thereof serve as the actuating means for imparting swinging movement to the load engaging links 2. Each shaft 15 has at its ends crank arms 16 which extend upwardly, with the pair of crank arms at each end of the lifting coupler joined by cables 17 and a spring 18. Attached to the end of each crank arm 16 there is also a rod 19 which is directed outwardly and which is preferably made adjustable as to length. The load engaging links 2 are in the form of bell crank levers having arms 20 joined to the outer ends of the rods 19. In an obvious manner the springs 18 through the cables 17 and rods 19 tend to spread the load engaging links 2.

Each load engaging link 2 is pivotally attached by a pin 21 to the end of a bell crank lever 22, which in turn is pivotally attached by a pin 23 to the coupling frame 1. The bell crank levers

22 have long arms 24 which extend inwardly and engage a shock absorbing means on the coupling frame 1. The shock absorbing means comprise springs 25 mounted above and below the top surface of the corner gussets 6. A bolt 26 passes through each spring 25 and joins the arm 24 of the bell crank lever 22 with a pivotal connection 27, shown in Fig. IV. By means of nuts 28 on the bolts 26, the degree of compression of the springs 25 may be adjusted. The springs 25 serve to absorb the initial shock incident to the application of the load to the coupling frame 1 when the load is engaged and raised from its platform, the shock being transmitted to the springs 25 through the load engaging links 2 and the bell crank levers 22.

For swinging the load engaging links 2 inwardly, I preferably employ electro-magnetic cylinders as indicated in diagrammatic outline at 30, the apparatus being mounted on transverse members 31 which are joined to the inner longitudinal members 5 and the coupling frame. Associated with each electro-magnetic cylinder 30 there is a plunger 32 having a connecting rod 33 which joins the end of a crank arm 34 projecting downwardly from the actuating shaft 15. Movement of the plungers 32 of the electro-magnetic cylinders 31 transmits, through the connecting rods 33 and crank arms 34, a rotary movement to the shafts 15 in a clockwise direction, as viewed in Fig. II. Such rotation of the shafts 15 through the crank arms 16 and rods 19 causes the load engaging links 2 to be swung inwardly against the pressure of the spring 18. The movement of the load engaging links 2 is accomplished through remote controlled electric circuits leading to the crane operator's station. Normally, the load engaging links 2 are maintained in a spread position, but upon energizing the electro-magnetic cylinders 30 the links of each pair at each end of the coupler are drawn towards each other; and upon deenergizing the electro-magnetic cylinders 30 the links of each pair are spread apart by action of the springs 18 to their normal positions.

As clearly shown in Fig. II, the lifting coupler of this invention is particularly adapted for engagement with a type of shipping container such as represented at A. The container A has at each top corner thereof a lifting attachment 35 in the form of an outwardly directed hook. Associated with each lifting hook 35 and desirably formed as a part thereof, there is an abutment 36 projecting upwardly from the roof of the container A, the abutments 36 serving as guides for coaction with a centering device on the lifting coupler as hereinafter described.

Suspended from each end member 4 of the coupling frame 1 there is a pair of centering arms 37. The arms 37 are pivotally mounted at 38 and normally assume the position shown in Fig. IV, each pair being spread apart in angular relation and limited as to downward movement by stops which, in the illustrated example, comprise bars 39 suspended across the bottom of the coupling frame 1.

While the centering arms 37 may assume a variety of shapes, I have shown in the drawings arms in the form of flat plates having at their free ends smoothly rounded horns 40. The horns 40 are offset from the inner ends of the arms 37 so as to lie within the load engaging links 2 in positions not obstructing their movement. Each centering arm 37 carries near the end thereof a tubular bar 41 which extends substantially at right angles to the arm in a horizontal plane.

The bars 41 extend from near the end of each arm 37 to near the end of the corresponding arm of the pair at the opposite end of the frame 1. To avoid sharp edges contacting with the top of the container, the bars 41 have rounded upturned ends 42. Moreover, the bars 41 are so formed and spaced that they are adapted to engage the centering abutments 36 on the containers A, incident to the lowering of the lifting coupler frame 1 and to center the coupler squarely upon the container A, thus facilitating the task of the crane operator in coupling the apparatus to a container preparatory to the operations of hoisting and shifting the container from one location to another.

The operation of the lifting coupler is as follows: When it is desired to shift the position of a container A, the lifting coupler is transferred by means of the overhead crane to a point substantially above the container. The load engaging links 2 are held in spread position through the action of the spring 18, as shown in Fig. IV. Upon lowering of the coupling frame 1 the horns 40 of the centering arms 37 will strike the roof of the container and with further lowering of the lifting coupler the centering arms 37 will slide freely over the roof of the containers, spreading the arms to a greater angle. Eventually, one of the bars 41 will strike an abutment 36 of a lifting hook 35, and when such engagement is effected, upon further lowering of the coupling frame 1, and under the influence of its weight, the centering arms 37 will cause the coupling frame 1 to shift laterally to a position square with the container as indicated in Fig. V.

With the coupling frame squarely centered over the container A, the crane operator proceeds to energize the electromagnetic cylinders 30, causing the load engaging links 2 to swing into the bights of the hooks 35. Accordingly, when the lifting coupler is again raised, the links 2 will assume the position shown in Fig. II, and the container will be in readiness for shifting.

It will be especially observed that the radius action of the centering arms 37 materially assists the crane operator who need not carefully position the lifting coupler when lowering it onto a container, for the coupling frame 1 will automatically shift to centered position on the top of the container. Moreover, the apparatus of this invention dispenses with the necessity of an additional operator riding the lifting coupler, for all of the operations involved in centering the coupler and in moving the load engaging links 2 are performed from the crane operator's station.

While I have described one example of the practice of my invention, with reference to a specific form of lifting coupler and railroad shipping container, it will be apparent that many changes may be made both in the form of the coupler and in the form of the container, without departing from the spirit of my invention as defined in the annexed claims.

Having thus described my invention, I claim:

1. In combination with a container having lifting attachments and centering abutments at the top thereof, a lifting coupler having means for engaging said lifting attachments, and having pivotally mounted depending arms normally maintained in angular spread relation, said arms being adapted, upon the lowering of the coupler onto a container, to slide over the top of the container into engagement with said abutments, thereby centering the coupler with respect to said lifting attachments.

2. In combination with a container having lifting attachments and centering abutments at the top thereof, a lifting coupler having means for engaging said lifting attachments, and having
5 pivotally mounted depending arms normally maintained in angular spread relation, and bars carried on said arms near the ends thereof and extending substantially at right angles thereto in a horizontal plane, said bars being adapted,
10 upon the lowering of the coupler onto a container, to slide over the top of the container into engagement with said abutments, thereby centering the coupler with respect to said lifting attachments.

3. In combination with a container having hooks at the top thereof, a lifting coupler having a frame with links pivotally attached thereto and adapted to engage said hooks, means for swinging said links outwardly and inwardly, and arms
15 pivotally mounted on and depending from said frame, said arms being maintained in angular spread relation and being adapted, upon the lowering of the frame onto a container to be spread to a greater angle with engagement of their ends with the container hooks, thereby centering the coupling frame with respect to said
20 hooks.

4. In a lifting coupler of the character described, a frame, load engaging links pivotally attached thereto at opposite sides of the frame, remote controlled means on said frame for swinging said links inwardly and outwardly, and means
30 for centering the frame with respect to the load to be lifted comprising arms depending from said frame in angular spread relation between said links, said arms having a pivotal connection with the frame aforesaid whereby they are adapted to be swung outwardly and upwardly when the coupler is lowered onto the load to be lifted.

5. In a lifting coupler of the character described, a frame, load engaging links pivotally attached thereto at opposite sides of the frame, remote controlled means on said frame for swinging said links inwardly and outwardly, means
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for centering the frame with respect to the load to be lifted comprising arms depending from said frame in angular spread relation between said links, said arms having a pivotal connection with the frame aforesaid whereby they are adapted
80 to be swung outwardly and upwardly when the coupler is lowered onto the load to be lifted, and bars carried on said arms near the free ends thereof, said bars extending in a horizontal plane at substantially right angles to said arms. 85

6. In a lifting coupler of the character described, a frame, load engaging links pivotally attached thereto at opposite sides of the frame, remote controlled means on said frame for swinging said links inwardly and outwardly, and means
90 for centering the frame with respect to the load to be lifted comprising arms depending from said frame in angular spread relation between said links, said arms having a pivotal connection with the frame aforesaid whereby they are adapted to be swung outwardly and upwardly when the coupler is lowered onto the load to be lifted, and said arms terminating in smoothly rounded
95 horns with bars carried thereon, the bars extending in a horizontal plane at substantially right angles to said arms. 100

7. In a lifting coupler of the character described, a frame, pairs of load engaging links pivotally attached thereto at opposite sides of the frame, remote controlled means on said
105 frame for swinging said links inwardly and outwardly, and means for centering the frame with respect to the load to be lifted comprising pairs of arms depending from the frame with a pair at each end thereof, the arms of each pair being maintained in angular spread relation and having a pivotal connection with the frame aforesaid whereby they are adapted to be swung outwardly and upwardly when the coupler is lowered
110 onto the load to be lifted, and bars extending from near the end of each arm to near the end of the corresponding arm at the opposite end of the frame. 115

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