Oct. 14, 1958 F. O. SNOW, JR 2,856,030

RAIL CLAMPS FOR TRAVELING BRIDGES, OVERHEAD CRANES, TOWERS AND THE LIKE

Filed Sept. 6, 1956 3 Sheets-Sheet 1

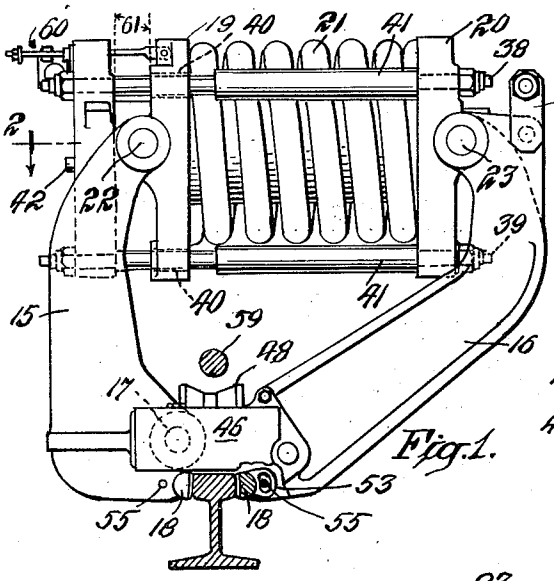


Fig. 1.

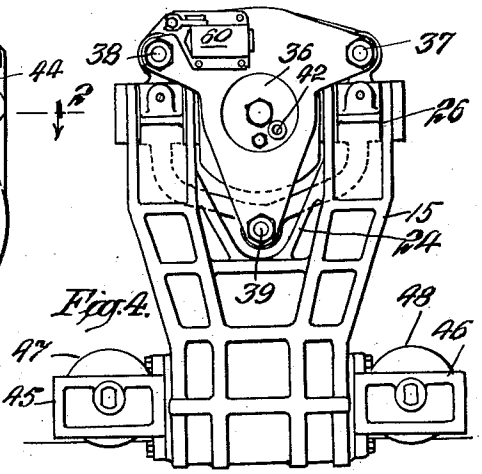


Fig. 4.

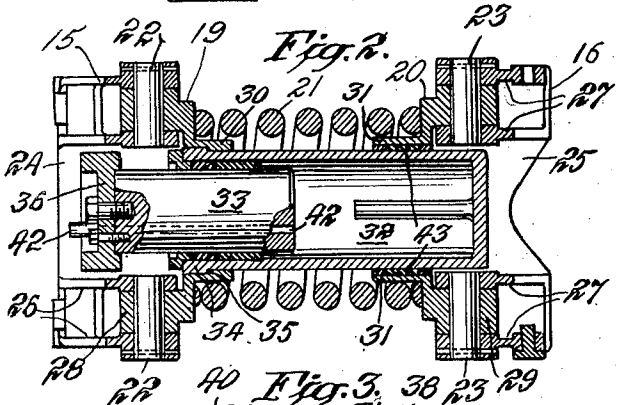


Fig. 2.

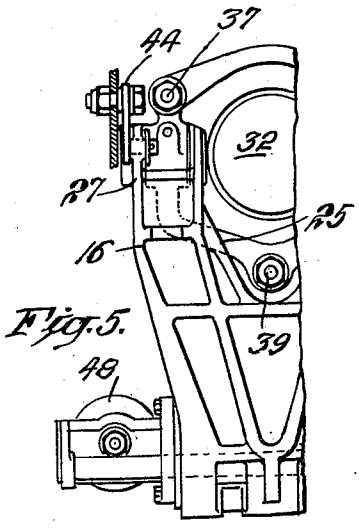


Fig. 5.

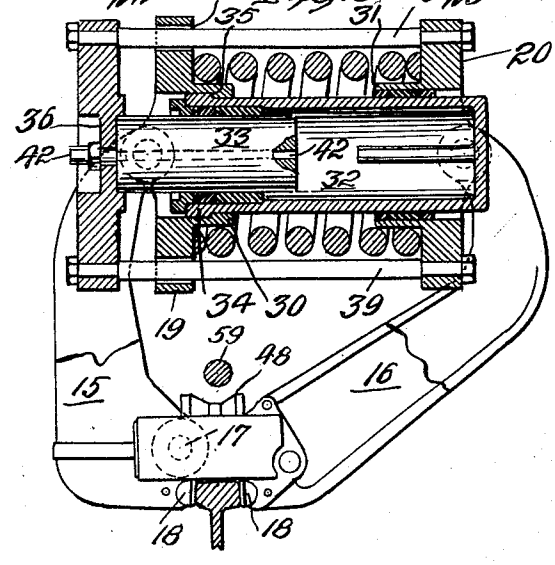


Fig. 3.

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Fig. 6.

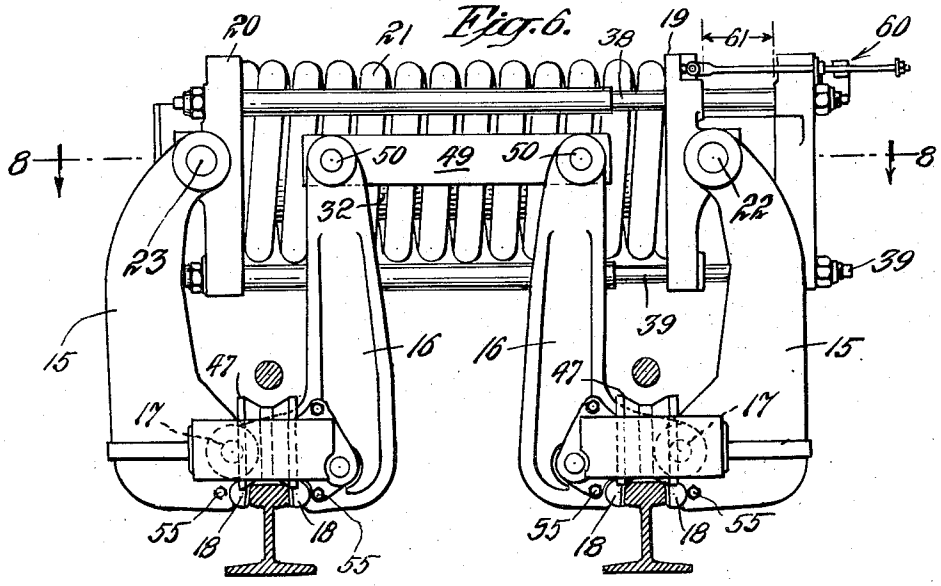
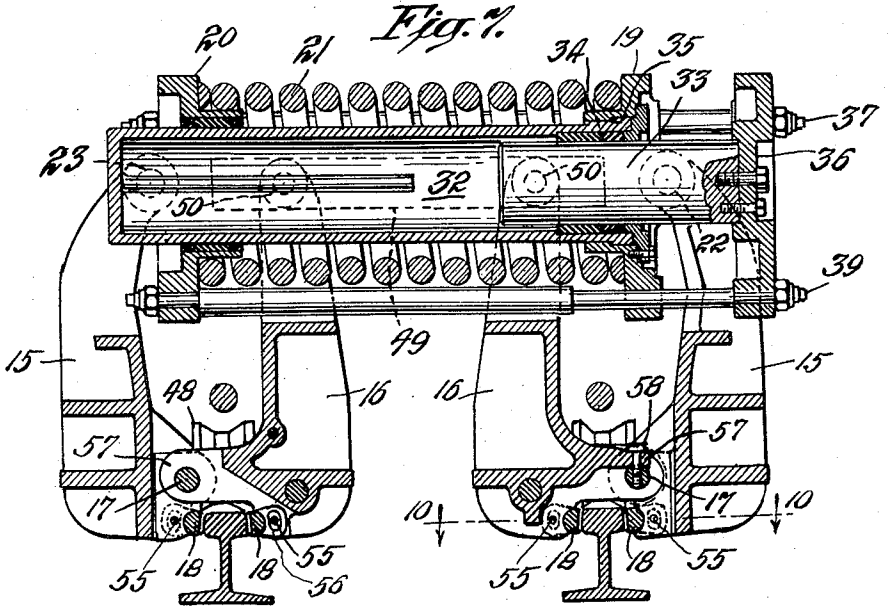


Fig. 7.



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Fig. 8.

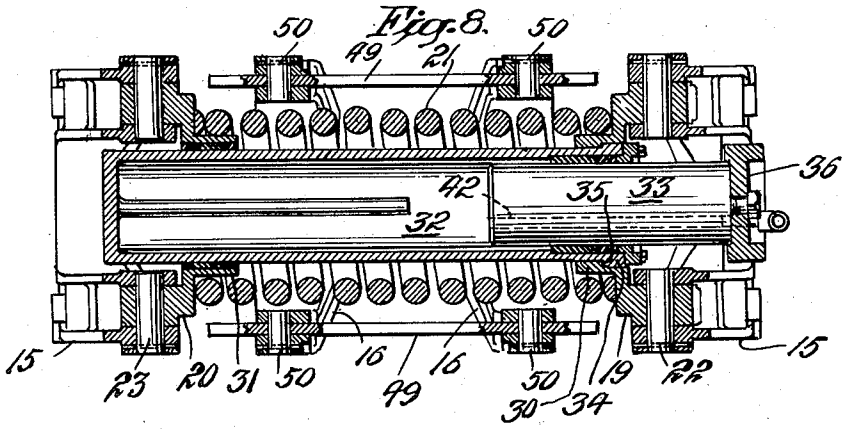


Fig. 9.

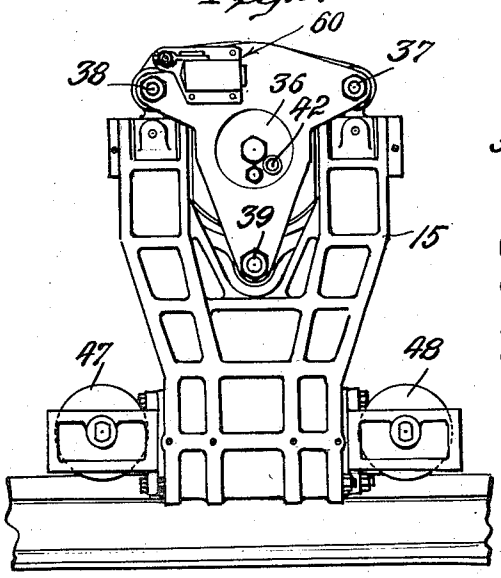


Fig. 10.

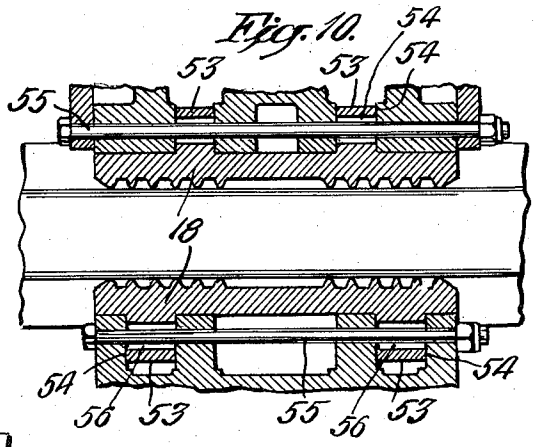
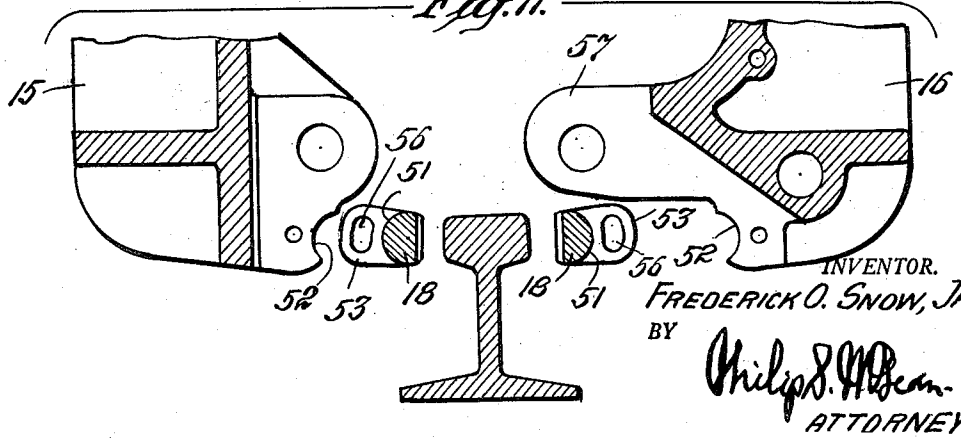


Fig. 11.



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RAIL CLAMPS FOR TRAVELING BRIDGES, OVERHEAD CRANES, TOWERS AND THE LIKE

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Application September 6, 1956, Serial No. 608,258

1 Claim. (Cl. 188—43)

The invention herewith disclosed relates to rail clamps for holding bridges, towers, cranes and other such like structures mounted and traveling on rails.

Objects of the invention are to provide powerful clamp mechanism which will be positive and quick in action both for gripping and releasing the rail and which will consist of but few simple parts compactly arranged and taking up but small space and, therefore, well adapted for use where space for such installations is limited.

Other important objects of the invention are to provide a safe, reliable clamp construction having these characteristics, which can be produced at reasonable cost and which will be self-adjusting in respect to the rail and practically free from servicing or maintenance requirements.

The foregoing and other desirable objects have been attained in this invention by novel features of construction, combinations and relations of parts, including in particular, a novel combination and arrangement of heavy coiled springs for setting the clamping jaws on the rails and hydraulic cylinders and pistons disposed within the same coiled springs but cross connected so as to compress the springs and thus have the reverse effect of opening or releasing the jaws.

Other important features of the invention are set forth and will appear in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate practical commercial embodiments of the invention but structure may be modified and changed as regards such illustration, all within the true intent and scope of the invention as hereinafter more fully defined and claimed.

Fig. 1 in the drawings is a front elevation of one of the single rail clamps as applied to a rail, the latter shown in section and the so-called stationary jaw of the clamp partly broken and in section to better illustrate one of the clamping shoes.

Fig. 2 is a horizontal sectional view on substantially the plane of line 2—2 of Fig. 1, showing location of the hydraulic cylinder and piston within the spring between the clamp jaw forming levers.

Fig. 3 is a broken diagrammatic view drawn to show how the expansive force of the spring is effective to force the ends of the jaw levers apart and the expansive movement of piston and cylinder is effective to draw the levers together and to compress the spring.

Figs. 4 and 5 are views of the left and right-hand ends of the clamp shown in Fig. 1.

Fig. 6 is a front elevation of a double rail form of clamp, the rails being shown in section.

Fig. 7 is a vertical sectional view of the double rail form of clamp.

Fig. 8 is a broken horizontal sectional view on substantially the plane of line 8—8 of Fig. 6.

Fig. 9 is a right-hand end elevation of the double rail clamp.

Fig. 10 is an enlarged broken sectional view of companion clamp shoes taken on substantially the plane of line 10—10 of Fig. 7.

Fig. 11 is an exploded broken sectional view of companion clamp jaws, shoes and rail.

As shown in Fig. 1, each clamp consists in the main of a pair of opposed rugged clamp levers **15, 16** fulcrumed together at **17** and carrying rail clamping shoes **18** at their lower ends and abutments **19, 20** at their upper ends for a powerful jaw closing coiled spring **21**.

These spring abutments are of annular formation to match the circular spring and carry horizontal pins **22, 23** for pivotal connection with the levers.

Levers **15** and **16** are forked at **24, 25**, as shown in the end views Figs. 4 and 5, to leave the center of the spring open at both ends of the clamp and the forked ends of the levers are shown as bifurcated at **26, 27** to engage opposite ends of the pins or journals **22, 23**, Fig. 2, at opposite sides of the lugs **28, 29** on the abutments or heads **19, 20** carrying these pivot pins. This construction provides adequate strength, balance and alinement of parts.

The spring abutment or pressure heads **19, 20** are shown in Fig. 2 as carrying annular hubs **30, 31** for centering and holding the ends of the spring in proper alinement.

With this construction the spring may be as heavy and powerful as needed to apply requisite gripping force to the rail.

Releasing operation of the clamp is effected by a hydraulic couple consisting of cylinder and piston **32, 33** disposed concentrically within the helical spring and connected, the cylinder with spring abutment **19** and the piston with spring abutment **20**.

Fig. 2 shows how the cylinder is connected with abutment **19** by having the annular flange **34** at the open end thereof shouldered at **35** within the hub **30** and Figs. 1 and 3 show how the piston is connected with the opposing spring abutment **20** by having a flange or head **36** attached over the outer end thereof and connected by triangularly related stays or tie bolts **37, 38, 39** with abutment head **20**. These tie rods pass freely through clearance openings **40** in spring abutment **19** and movement of the abutment heads toward each other is limited by spacer tubes **41** surrounding the tie rods.

Admission and release of hydraulic or other actuating fluid to and from the cylinder may be by way of a bore or passage **42**, Fig. 2, through the head of the piston.

It will be clear, particularly from the diagrammatic view, Fig. 3, that admission of pressure fluid into the cylinder space will effect separation of cylinder and piston to compress the spring, the cylinder connected at **34, 35** with abutment head **19** to shift that toward the right and the piston connected by flange **36** and tie rods **37, 38, 39** acting to pull spring abutment **20** toward the left.

The free end of the cylinder, at the right in Fig. 2, is shown as slidingly centered in a packed guide bushing **43** in the hub **31** of spring abutment **20**.

The pivot pin **17** forming the fulcrum connection between the jaw levers is shown in Fig. 1 as located to the left or at one side of the rail center, thus constituting the right-hand lever what might be considered the stationary jaw and the left-hand lever **15** the movable jaw. This arrangement may be desirable where it is necessary to keep projection at one side of the track at a minimum. Fig. 1 shows how the stationary jaw lever **16** may be extended inward of the track to locate the main body of the clamp at the inside of the track. In this view a shackle is indicated at **44** for linking the upper end of the stationary clamp jaw to the sill or overstanding structure of the truck in which the clamp is mounted.

Figs. 1, 4 and 5 further show how the stationary jaw may carry journal boxes **45, 46** at opposite ends of the same in which tapered flange rollers **47, 48** are journaled in anti-friction bearings for riding and centering the clamp on the rail.

Figs. 6, 7, 8 and 9 illustrate a double rail form of the clamp differing from that described, particularly in that the pair of clamp jaws are duplicated but connected to be operated in the same way by a single helical spring and by a cross connected piston and cylinder elements contained within the spring.

In Figs. 6 and 7 the relatively movable and stationary jaw levers of each pair are designated **15** and **16** as before, but in this case the movable levers **15** of the two pairs, located at the outside are pivotally connected with the spring abutments **19, 20** and the stationary jaw levers **16** of the two pairs are pivotally connected together at their upper ends in generally parallel relation by links **49** and pivot pins **50**. Consequently, the single spring acting against the movable levers **15** is effective to close both sets of clamp jaws by rocking the movable jaws about fulcrums **17** toward the linked together fixed jaws **16**.

The cylinder **32** within the spring is directly connected as before with the one spring abutment **19** and the piston **33** is connected by flange **36** and tie rods **37, 38, 39** with the other spring abutment ring **20**.

Pressure within the expansion chamber will therefore be effective to separate cylinder and piston and through connections described to pull the abutments toward each other to compress the spring and release the clamp jaws.

Thus, heavy spring pressure is always effective to set and lock the clamps on the rails and application of hydraulic pressure is effective to instantly release the clamps.

The clamp shoes **18** are made self-adjusting and self-clearing by constructing them, as shown in Figs. 10 and 11, with arcuate bearing faces **51** at the back riding in corresponding bearing grooves **52** in the clamp jaws and by loosely linking them in this relation through the provision of parallel sided lugs **53** engaging in corresponding seats **54** in the jaws and loosely confined in this relation by bolt rods **55** extending through arcuate slots **56** in such retaining lugs.

This construction enables the clamp shoes to immediately adjust themselves to the sides of the rail heads and to separate or fall away from the rails and to clear themselves and the rails of any obstructions.

Fig. 7 shows how the fulcrum pins at **17** may be fixed in lateral extensions **57** of the stationary or relatively fixed jaw levers by securing bolts **58**.

A motor driven pump unit is usually provided, with oil reservoir and piped to the hydraulic cylinder by means of flexible oil pipe.

A rail clamp limit switch **60**, Figs. 1, 4, 6 and 9, is usually provided, operated by piston and cylinder.

The distance at **61** Figs. 1 and 6 between spring abutment **19** and piston head **36** provides visual indication of the amount of wear of the clamp shoes. Decrease of this dimension indicates the relative amount of wear of the shoes and at times the need for replacement of shoes.

In the normal operation of the clamp, the pump motor is energized by putting the propelling master used in the control of these rail clamps on the first point in either direction. In 3 to 5 seconds, usually the clamps are fully released and the propelling circuit is established through the rail clamp limit switch. This circuit is maintained so long as the clamps are kept released by holding the propelling master in the "On" position.

Bringing the master back to "Off" position cuts the propelling circuit, cuts off the pump motor, and automatically sets the rail clamps.

A metering valve is usually built into the hydraulic circuit and adjusted to delay the setting of the clamps so that the structure will normally come to rest through the action of the propelling brakes before the clamps actually set, to prevent unnecessary wear of the clamping shoes and damage to the rails.

What is claimed is:

A rail clamp comprising upright clamp levers pivotally mounted intermediate their ends and having railhead clamping jaws at their lower ends, spring abutment rings pivoted on horizontal axes in opposing relation on the upper ends of said levers, a coiled clamp closing expansion spring in thrust applying engagement at opposite ends with said spring abutment rings, a cylinder housed within said spring and surrounded by said rings, said cylinder being fixedly connected at one end in supported engagement with one of said spring abutment rings and having a sliding bearing at the opposite end in the other of said rings, a piston supported in said cylinder and having an operating connection with said other opposed spring abutment ring, said cylinder and piston forming the companion elements of an expansion couple with the elements connected to the respective clamp levers and means for supplying and releasing actuating pressure fluid to and from said expansion couple to release and to permit spring actuated closing of said railhead clamp jaws.

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