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3,486,737

APPARATUS FOR SKIDDING A LOAD ON A SUPPORT

Filed Jan. 30, 1968

3 Sheets-Sheet 1

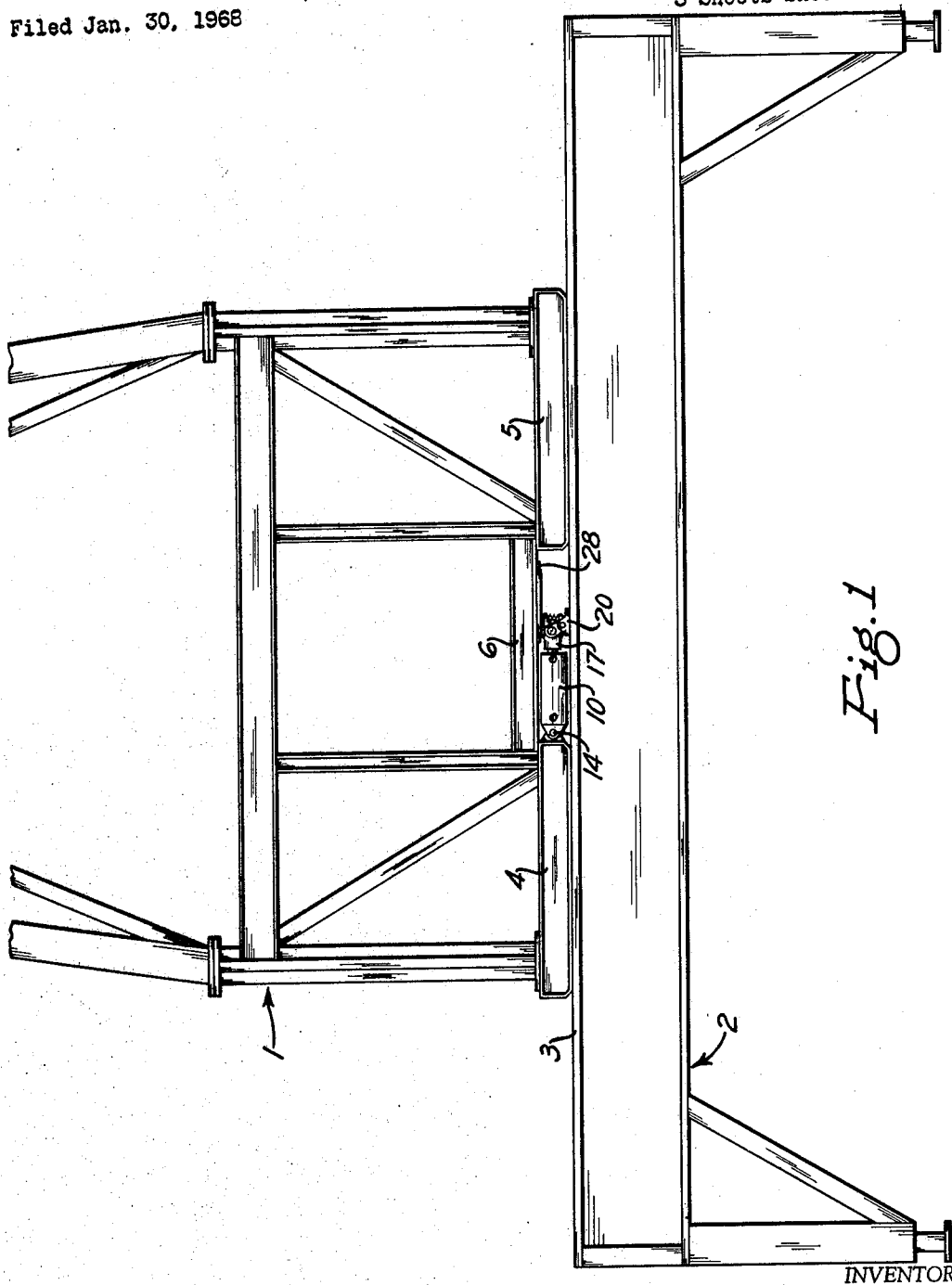


Fig. 1

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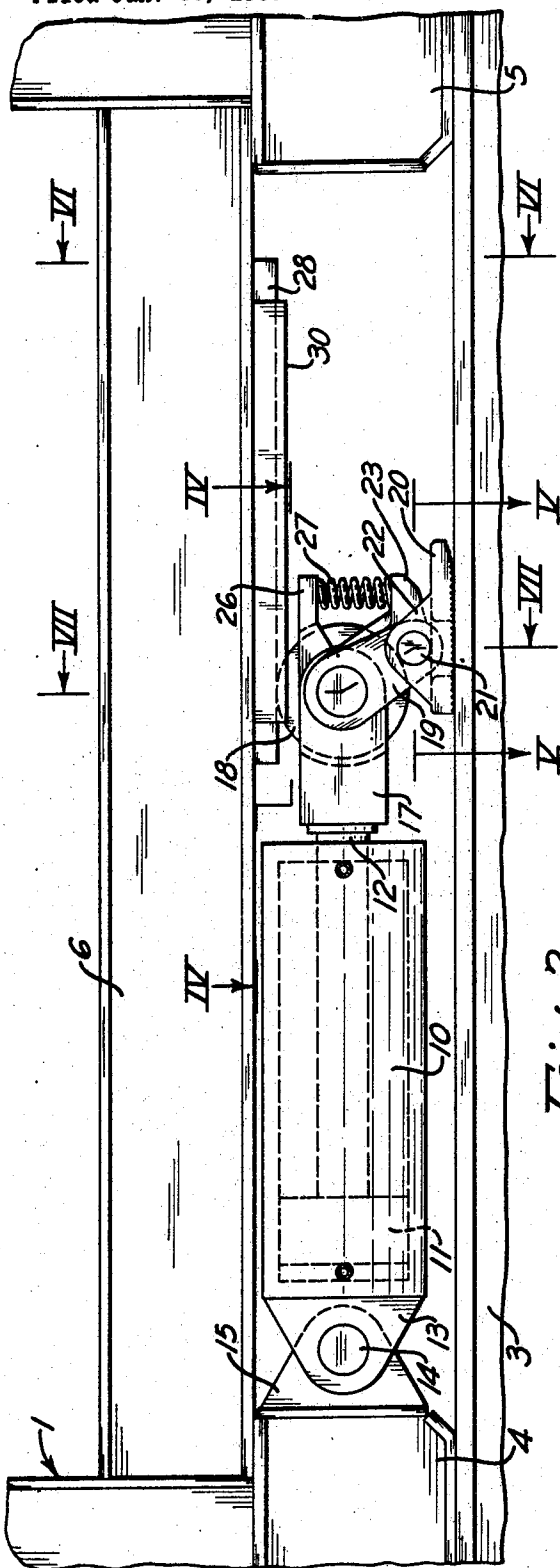


Fig. 2

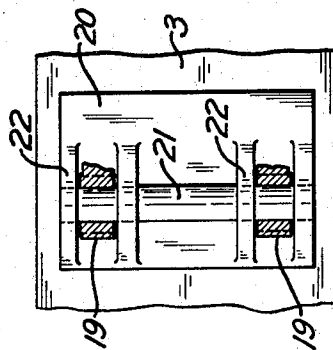


Fig. 5

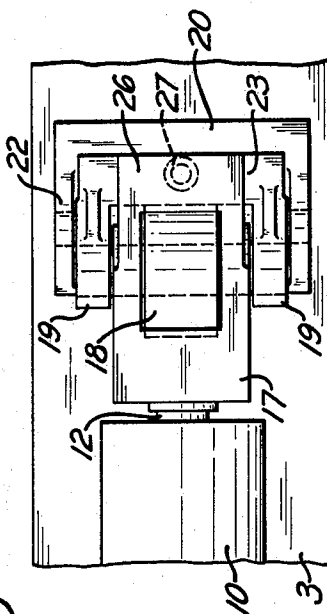


Fig. 4

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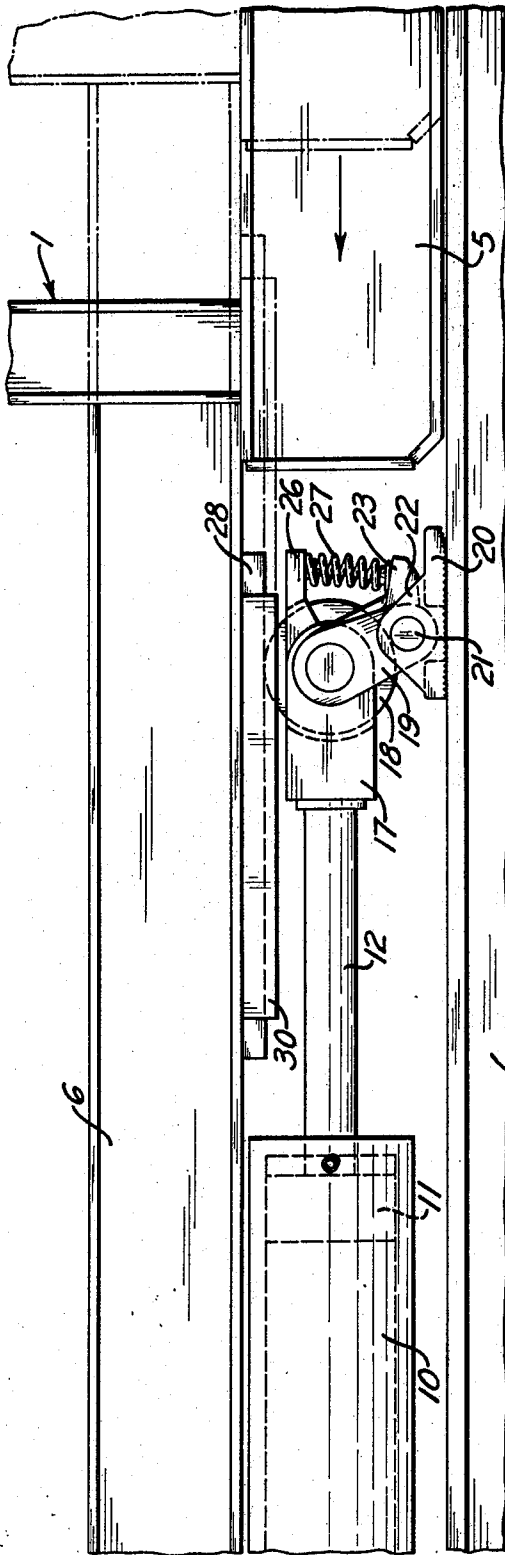


Fig. 3

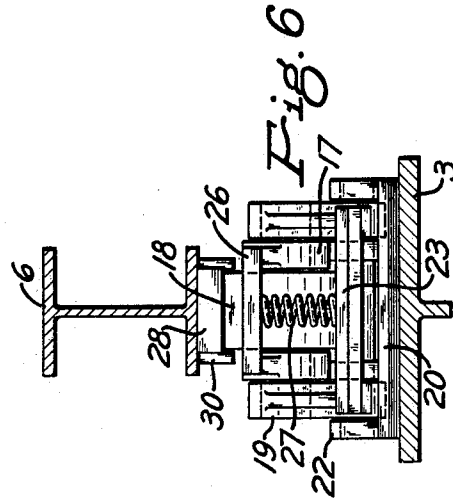


Fig. 6

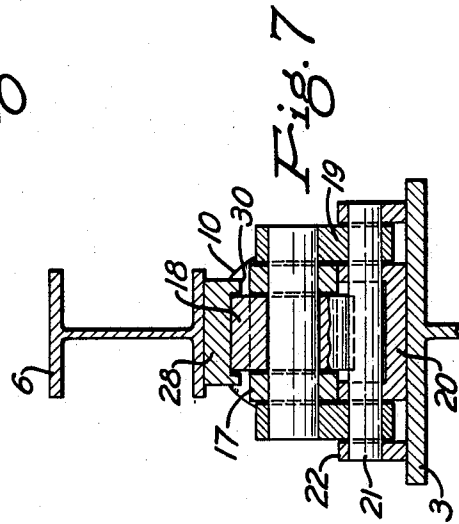


Fig. 7

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3,486,737

APPARATUS FOR SKIDDING A LOAD ON A SUPPORT

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10 Claims

ABSTRACT OF THE DISCLOSURE

A horizontally extendable device has one end connected to a load resting on a support, and a roller connected to the opposite end beneath the load. Lifting means are operable between the roller and the support to lift the roller when the extendable device is actuated, whereupon some or all of the load is transferred to the roller and through it and the lifting means to the support.

When it is desired to move a heavy load on a support in a straight line or in an arc, the moving sometimes is done by skidding the load. For example, when drilling wells from a platform at sea it is customary to skid the drilling rig on the platform from one well location to another. This commonly is done by means of double acting hydraulic cylinders that skid the rig in a series of short steps, between which the pistons are retracted in the cylinders for the next stroke. The skidding apparatus is furnished with lugs that project through holes in the platform. The holes are spaced to coincide with the stroke of the cylinders. Some platforms have no such holes, and cutting holes in their girders would be undesirable due to loss in strength.

It is among the objects of this invention to provide load skidding apparatus which does not require holes in the support, which is connected to the support only by friction, which makes use of friction provided by the weight of the load, and which reduces friction between the load and support to make the skidding possible.

The preferred embodiment is illustrated in the accompanying drawings, in which

FIG. 1 is a side view of an oil well derrick base on a substructure;

FIG. 2 is an enlarged fragmentary side view;

FIG. 3 is a similar view after the load has been skidded to the left;

FIGS. 4 and 5 are fragmentary horizontal sections taken on the lines IV—IV and V—V, respectively, of FIG. 2; and

FIGS. 6 and 7 are vertical sections taken on the lines VI—VI and VII—VII, respectively, of FIG. 2.

Referring to FIG. 1 of the drawings, a heavy load, in this case an oil well drilling rig 1, rests on a support that may be a marine platform 2 rigidly mounted above a body of water. The bottom of the drilling rig is formed by skids that are supported by parallel horizontal girders 3 forming part of the top of the platform. There are two skids 4 and 5 at each side of the rig and they are spaced apart lengthwise so that there is a long gap or recess between them that is covered by a horizontal beam 6 rigidly mounted in the rig. After the rig has drilled a well from one location on the platform, it is desirable to slide the rig along the supporting girders to another location where a second well can be drilled.

It is a feature of this invention that this sliding or skidding of the rig on the platform can be accomplished easily without attaching the skidding apparatus to the platform in any way except by friction. No holes, lugs or clamps are required for securing the skidding apparatus to the platform. In accordance with this invention, skidding apparatus is disposed in the gap in the bottom of

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each side of the rig. Each apparatus includes a horizontally extendable device of suitable form. It could consist of a horizontal screw jack, but a hydraulic ram is preferred because of the ease with which power can be supplied to it from an external source. As shown in FIG. 2, the cylinder 10 of the ram contains a double acting piston 11 connected to the inner end of a piston rod 12 that extends out of one end of the cylinder. One end of the ram is connected to the rig. Preferably, the head of the cylinder is provided with a clevis 13 that is connected by a horizontal pin 14 to a bracket 15 secured to the inner end of one of the skids, such as skid 4.

Another clevis 17 is secured to the outer end of the piston rod and rotatably supports roller means, such as one or more rollers 18, on a horizontal axis parallel to pin 14. The axles of the roller are journaled in clevis 17 and project outwardly from it to pivotally receive the upper ends of a pair of links 19. These links are inclined downwardly and outwardly away from the piston rod. The lower ends of the links are pivotally connected to a friction shoe 20 resting on top of the underlying platform girder. The pivotal connection can be made by means of a transverse pin 21 extending through the lower ends of the links and also through upwardly projecting bearing members 22 on the shoe. For best results, the lower ends of the links are integrally connected by a cross member 23 extending away from the cylinder and spaced from the top of the shoe. In such a case the links become, in effect, a single bifurcated link as shown in FIG. 4.

The outer end of clevis 17 also is provided with an integral cross member 26 spaced above cross member 23. Compressed between these two cross members there is a vertical coil spring 27 that urges the shoe downwardly and the roller upwardly while the apparatus is in its unextended position. When such a spring is used, it will press the roller lightly against an overlying track surface of the rig. Preferably, this surface is the bottom of a wear plate 28 that is secured to beam 6 at the top of the gap between the skids. The plate extends from the roller away from the cylinder a distance a little greater than the stroke of the piston.

While the ram is unextended, there is not enough downward pressure on the friction shoe to keep it from sliding on the supporting girder in case the piston rod were extended and pushed directly against the shoe. However, with the construction described, the moment the rod starts to move out of the cylinder, due to fluid under pressure being admitted to the opposite end of the cylinder, the lifting means, which include the links and shoe, are operated to lift the roller. That is, the upper ends of links 19 are swung to the right and upward. The links therefore press the roller tightly up against the wear plate and simultaneously press the shoe down on the supporting girder tightly enough to prevent the shoe from slipping. The roller, rising in an arc, tends to lift that side of the rig from the platform. It is not likely that the skids will be visibly raised from the platform, but in any event at least part of the weight of the rig will be transferred from the areas of the girder beneath the skids to the area engaged by the shoe. Consequently, the frictional resistance of the rig to sliding along the platform will be reduced and frictional engagement of the shoe with the platform will be increased greatly. When the links have swung far enough to cause the downward pressure on the shoe to produce more resistance to sliding than is offered by the rig, the piston rod stops moving and the cylinder starts to move to the left and pushes the rig along the platform, with wear plate 28 moving across the roller, as shown in FIG. 3. The plate preferably is provided with laterally spaced, downwardly extending flanges 30 that help keep the plate and roller centered. There is no danger

of the piston rod pushing the roller back over center and allowing the load to set down again, because link cross member 23 would engage the top of the shoe before that could happen. Of course, at the same time that the apparatus just described is lifting the rig and skidding it, the similar apparatus at the opposite side of the rig is doing the same thing.

After the cylinder has been extended as far as possible, delivery of hydraulic pressure to it is reversed to retract the piston rod. This swings the upper ends of the links toward the cylinder and thereby lowers the roller so that the entire weight of the rig is once again applied through the skids to the platform. With the release of the weight of the rig from the friction shoe, the shoe can slide easily on the platform, so the piston pulls the roller and shoe toward the cylinder preparatory to the next rig-pushing stroke of the skidding apparatus when the fluid pressure to the cylinder is reversed again. This step-by-step skidding of the rig can continue as long as desired. The roller runs back and forth along the wear plate during each cycle or, more correctly, the wear plate runs along the roller while the rig is being skidded and then the roller runs along the wear plate when the shoe is pulled toward the cylinder.

It will be realized that more than two skidding apparatuses can be used so that all of the load will be transferred to the rollers and friction shoes during skidding. On the other hand, there may be cases where it is desired to rotate the load around a vertical axis. That can be done by providing only a single skidding apparatus near one side of the load.

Although the skidding apparatus has been described as pushing the rig along the platform, it will be understood that by a simple reversal of some of the parts equivalent apparatus can be provided that will pull the rig along. All that has to be done is to locate the cylinder and piston rod on the right-hand side of the roller in the drawing and connect the head of the cylinder to skid 5 instead of to skid 4. The rod normally will be extended. When it is pulled into the cylinder, the roller will be swung up to lift the rig and then the rig will be pulled to the left by the cylinder.

According to the provisions of the patent statutes, I have explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. The combination with a load resting on a support, of skidding apparatus for skidding the load on the sup-

port, comprising a horizontally extendable device, means connecting one end of the device to said load, roller means connected to the opposite end of said device, and lifting means operable between said roller means and the support to lift the roller means when said extendable device is actuated, whereby to transfer at least some of the load to the roller means and thence through said lifting device to the support.

2. The combination recited in claim 1, in which the lower portion of said load is provided with an upwardly extending recess, and said skidding apparatus is disposed in said recess.

3. The combination recited in claim 1, in which said load is an oil well derrick, and said skidding apparatus is located at opposite sides of the derrick.

4. The combination recited in claim 1, in which said load is provided with a track surface overlying said roller means in a position to be engaged thereby and extending away from said extendable device.

5. The combination recited in claim 1, in which said extendable device is formed from a fluid pressure cylinder, a piston and piston rod.

6. The combination recited in claim 5, in which the outer end of said rod is connected to said roller means, and said connecting means connects the far end of the cylinder to said load.

7. The combination recited in claim 1, in which said lifting means include a link pivotally connected with said opposite end of said device on a horizontal axis and inclined downwardly and away from said device, and a friction shoe resting on said support and pivotally connected to the lower end of said link.

8. The combination recited in claim 7, in which said link is connected to said extendable device on the same axis as said roller means.

9. The combination recited in claim 7, including a spring pressing said shoe against said support.

10. The combination recited in claim 7, including a first rigid member projecting beyond said roller means from said extendable device, and a second rigid member projecting from the lower part of said link beneath said first member, and a spring compressed between said members and pressing the shoe against said support.

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