

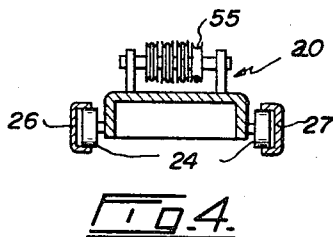
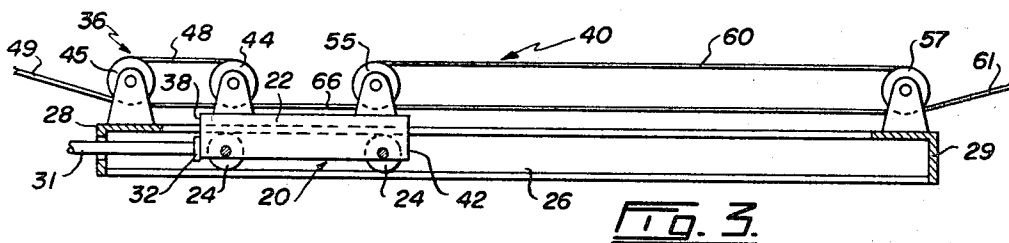
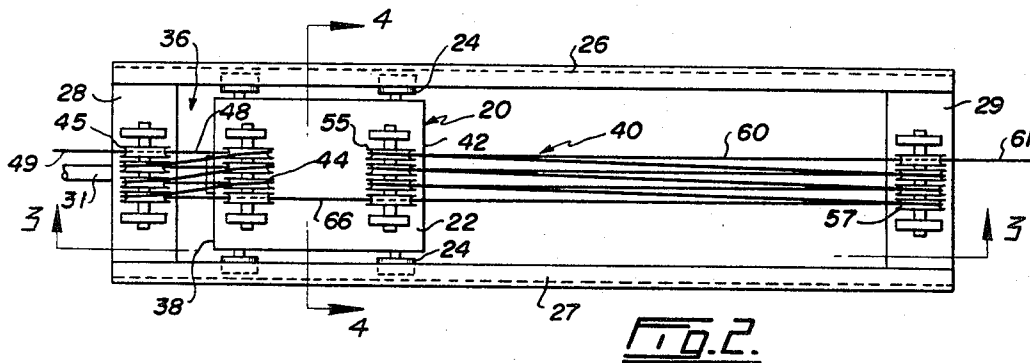
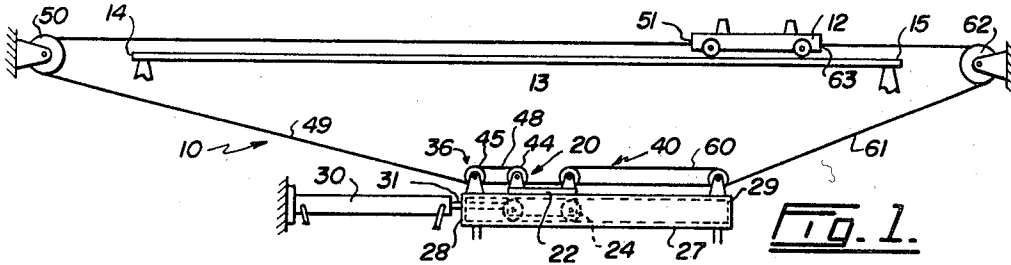
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RECIPROCAL CARRIAGE OPERATING APPARATUS

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RECIPROCAL CARRIAGE OPERATING APPARATUS

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ABSTRACT OF THE DISCLOSURE

Apparatus including a shuttle reciprocated by the piston rod of a hydraulic cylinder, a multiple block and tackle extending between one end of the shuttle and an adjacent fixed point and having a cable extending to a reciprocal carriage, and another multiple block and tackle extending between the opposite end of the shuttle and an adjacent fixed point and having a cable extending to said carriage, whereby operation of the hydraulic cylinder causes the shuttle to reciprocate which, in turn, causes the carriage to reciprocate through magnified strokes.

This invention relates to reciprocal carriage apparatus and particularly to sawmill carriages.

An object of the present invention is the provision of apparatus for moving a carriage back and forth along a relatively long path by means of a reciprocating piston which travels a comparatively short distance.

Another object is the provision of a simple fluid cylinder arrangement for reciprocating a sawmill carriage over a relatively long course at a speed greater than that of the fluid arrangement.

A still further object is the provision of reciprocal carriage apparatus of very simple construction and operation.

As this invention is particularly applicable to a sawmill carriage operation, it will be so described herein.

There are many different forms of apparatus in existence for reciprocating sawmill carriages. However, the prior apparatus for this purpose either is very complicated if the travel of the carriage is relatively long, or the movement of the carriage is limited. Furthermore, most of the prior devices are relatively complicated in construction and operation, difficult to maintain and/or expensive in construction.

Reciprocal carriage apparatus according to the present invention includes a shuttle connected to the ram of a fluid cylinder, a first multiple block and tackle extending between the shuttle and a first end of the course of travel thereof and having a tackle cable extending away therefrom and adapted to be connected to a carriage adjacent one end thereof, and a second multiple block and tackle extending between the shuttle and a second end of said course and having a tackle cable extending away therefrom and adapted to be connected to the carriage adjacent a second end thereof. With this arrangement, the reciprocation of the shuttle along said course by the ram is magnified through the first and second multiple block and tackles to cause the carriage connected to said cables to reciprocate along a longer course. The invention also contemplates the inclusion of the carriage mounted for movement along a course and connected to the cables of the block and tackles.

An example of this invention is illustrated in the accompanying drawings, in which:

FIGURE 1 is a diagram illustrating reciprocal carriage apparatus according to the invention,

FIGURE 2 is a plan view of one form of shuttle with associated block and tackles,

FIGURE 3 is a longitudinal section taken on the line 3-3 of FIGURE 2, and

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FIGURE 4 is a cross section taken on the line 4-4 of FIGURE 2.

Referring to the drawings, 10 represents reciprocal carriage apparatus including a carriage 12 mounted for movement back and forth along tracks 13 between ends 14 and 15 thereof. If this is a sawmill carriage, it will include the necessary mechanism, not shown, for retaining a log positioned at one side so as to be cut by a saw as the carriage moves past the latter.

A shuttle 20 is provided for causing carriage 12 to reciprocate. This shuttle may be in any desired form, and in this example, it consists of a platform 22 carried by wheels 24 mounted in opposed rails 26 and 27 which, in this example, are in the form of channel means opening towards each other, see FIGURE 4. Suitable means is provided for reciprocating shuttle 20 back and forth on rails 26 and 27 between ends 28 and 29 thereof. The preferred way of doing this is by means of a hydraulic cylinder 30 having the ram 31 thereof connected to shuttle 22 at 32, although a pneumatic cylinder could be used for this purpose. As the controls for cylinder 30 are standard, they do not need any description herein. The reciprocation of ram 31 and, consequently, shuttle 20, may be manually controlled through a control valve, or the control valve may be operated by means of a solenoid controlled by switches located at opposite ends of track 13 where they are engaged and reversed by carriage 12.

A block and tackle arrangement 36 is provided at end 38 of the shuttle, and another block and tackle arrangement 40 is provided at opposite end 42 of said shuttle.

Block and tackle arrangement 36 includes a set 44 of similar, parallel blocks mounted for rotation on shuttle 20, and another set of corresponding blocks 45 mounted at the end 28 of rails 26-27. There is one block in set 45 for each block in set 44. A tackle cable 48 is threaded through the blocks of sets 44 and 45, and said cable has an end 49 extending away from arrangement 36 around a block or pulley 50 spaced from the shuttle rails and back to end 51 of carriage 12 to which said cable end is connected.

Block and tackle arrangement 40 includes a set of similar blocks 55 mounted on shuttle 20, and another set of similar blocks 57 mounted at the opposite end 29 of rails 26-27. A tackle cable 60 is threaded through sets of blocks 55 and 57, and has an end 61 extending away from the shuttle rails and around a block or pulley 62, the free end of this portion of the cable being connected to end 63 of carriage 12.

Cables 48 and 60 may be separate from each other, in which case, an end of each of these cables after being threaded through their respective blocks is anchored to shuttle 20. On the other hand, 48 and 60 may be sections of a single cable so that a portion 66 of this single cable extends between adjacent end blocks of sets 44 and 55, as shown in FIGURE 2.

The operation of apparatus 10 is quite simple. When shuttle 20 is at one end 28 of rails 26-27, carriage 12 is near the end 15 of tracks 13, as shown in FIGURE 1. When cylinder 30 is operated to move shuttle 20 towards the opposite end 29 of its rails, the position shown in FIGURE 1, the distance between sets of blocks 44 and 45 increases so that cable 48 is drawn in by block and tackle arrangement 36 thereby drawing carriage 12 towards the end 14 of its tracks. At the same time, the space between sets of blocks 55 and 57 lessens so that cable 60 runs out from block and tackle arrangement 40, thereby allowing the carriage to move at this time. When cylinder 30 is operated to move shuttle 20 in the opposite direction, the above-described action is reversed, and carriage 12 is moved back to its first position.

In this example, there are four blocks in each of the sets 44, 45, 55 and 57. This means that the movement of

shuttle 20 is magnified approximately eight times to cause carriage 12 to move eight times the distance of travel of the shuttle. In other words, if the shuttle moves 20 feet, the carriage will move about 160 feet. Thus, a relatively small movement of hydraulic ram 31 and shuttle 20 causes the carriage to move a comparatively long distance.

It is obvious that apparatus 10 is comparatively simple in construction and operation. The movement of the ram is magnified by a multiple block and tackle which is simple in construction and easy to maintain. The shuttle and its tracks can be located in any desired position relative to the carriage on its tracks since it is only necessary to lead the ends of the tackle cables in to the carriage so that movement of the cables will reciprocate the carriage along the tracks thereof. The relative movement of the shuttle and carriage will always be the same for given sets of blocks and tackles.

What I claim as my invention is:

1. Reciprocal carriage apparatus comprising a shuttle, a fluid cylinder having a ram projecting therefrom and connected to the shuttle to move the latter back and forth along a course, a first multiple block and tackle extending between the shuttle and a first end of said course and having a tackle cable extending away therefrom and adapted to be connected to a carriage, and a second multiple block and tackle extending between the shuttle and a second end of the course and having a tackle cable extending away therefrom and adapted to be connected to said carriage, whereby the reciprocation of the shuttle along said course by the ram is magnified to cause the carriage connected to said cables to reciprocate along a longer course.

2. Reciprocal carriage apparatus comprising a shuttle, a fluid cylinder having a ram projecting therefrom and connected to the shuttle to move the latter back and forth along a course, first and second pulleys spaced outwardly from first and second ends of said course, a first multiple block and tackle extending between the shuttle and said first end of the course and having a tackle cable extending away therefrom around said first pulley and adapted to be connected to a carriage, and a second multiple block and tackle extending between the shuttle and said second end of the course and having a tackle cable extending away therefrom around said second pulley and adapted to be connected to said carriage, whereby the reciprocation of the shuttle along said course by the ram is magnified to cause the carriage connected to said cables to reciprocate along a longer course.

3. Reciprocal carriage apparatus comprising rails, a shuttle having wheels riding on the rails, a fluid cylinder having a ram projecting therefrom and connected to the shuttle to move the latter back and forth along the rails, a first multiple block and tackle extending between the shuttle and a first end of the rails and having a tackle cable extending away therefrom and adapted to be connected to a carriage, and a second multiple block and tackle extending between the shuttle and a second end of the rails and having a tackle cable extending away therefrom and adapted to be connected to said carriage, whereby the reciprocation of the shuttle along said rails by the ram is magnified to cause the carriage connected to said cables to reciprocate throughout a greater distance than the shuttle.

4. Reciprocal carriage apparatus comprising a shuttle, a fluid cylinder having a ram projecting therefrom and connected to the shuttle to move the latter back and forth along a course, first, second, third and fourth identical sets of multiple parallel blocks, said first and second sets being mounted on the shuttle and said third and fourth sets being mounted at opposite ends of said course, a first tackle cable threaded through the first and third sets of blocks and extending away therefrom and adapted to be connected to a carriage, and a second tackle cable threaded through the second and fourth sets of blocks and extending away therefrom to be connected to a carriage,

whereby the reciprocation of the shuttle along said course by the ram is magnified to cause the carriage connected to said cables to reciprocate along a longer course.

5. Reciprocal carriage apparatus comprising a carriage mounted for reciprocal movement, a shuttle, a fluid cylinder having a ram projecting therefrom and connected to the shuttle to move the latter back and forth along a course, a first multiple block and tackle extending between the shuttle and a first end of said course and having a tackle cable extending away therefrom and adapted to be connected to said carriage, and a second multiple block and tackle extending between the shuttle and a second end of the course and having a tackle cable extending away therefrom and adapted to be connected to said carriage, said shuttle being near an end of said course when the carriage is near an end of its reciprocal movement in one direction, whereby the reciprocation of the shuttle along said course by the ram is magnified to cause the carriage connected to said cables to reciprocate along a longer course.

6. Reciprocal carriage apparatus comprising a carriage mounted for reciprocal movement, a shuttle, a hydraulic cylinder having a ram projecting therefrom and connected to the shuttle to move the latter back and forth along a course, first and second pulleys spaced outwardly from first and second ends of said course, a first multiple block and tackle extending between the shuttle and said first end of the course and having a tackle cable extending away therefrom around said first pulleys and adapted to be connected to said carriage, and a second multiple block and tackle extending between the shuttle and a second end of the course and having a tackle cable extending away therefrom around said second pulley and adapted to be connected to said carriage, said shuttle being near an end of said course when the carriage is near an end of its reciprocal movement in one direction, whereby the reciprocation of the shuttle along said course by the ram is magnified to cause the carriage connected to said cables to reciprocate along a longer course.

7. Reciprocal carriage apparatus comprising a carriage mounted for reciprocal movement on tracks, rails, a shuttle having wheels riding on the rails, a fluid cylinder having a ram projecting therefrom and connected to the shuttle to move the latter back and forth along the rails, a first multiple block and tackle extending between the shuttle and a first end of the rails and having a tackle cable extending away therefrom and adapted to be connected to said carriage, and a second multiple block and tackle extending between the shuttle and a second end of the rails and having a tackle cable extending away therefrom and adapted to be connected to said carriage, said shuttle being near said first end of the rails when the carriage is near its reciprocal movement on the tracks in one direction, whereby the reciprocation of the shuttle along said rails by the ram is magnified to cause the carriage connected to said cables to reciprocate along a longer course on the tracks.

8. Reciprocal carriage apparatus comprising a carriage mounted for reciprocal movement, a shuttle, a fluid cylinder having a ram projecting therefrom and connected to the shuttle to move the latter back and forth along a course, first, second, third and fourth identical sets of multiple parallel blocks, said first and second sets being mounted on the shuttle and said third and fourth sets being mounted at opposite ends of said course, a first tackle cable threaded through the first and third sets of blocks and extending away therefrom and adapted to be connected to said carriage, and a second tackle cable threaded through the second and fourth sets of blocks and extending away therefrom to be connected to the carriage, said shuttle being near an end of said course when the carriage is near an end of its reciprocal movement in one direction, whereby the reciprocation of the shuttle along said course by the ram is magnified to cause

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the carriage connected to said cables to reciprocate along a longer course.

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