SAWMILL CARRIAGE SETWORKS

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Claims, 4 Drawing Figures

ABSTRACT

A sawmill carriage, mounted for reciprocation parallel to the plane of a saw, supports a plurality of knees for reciprocation perpendicular to the plane of the saw each by means of an elongated fluid pressure piston-cylinder unit. Each knee is secured in selected positions of adjustment releasably by a fluid pressure powered pawl mounted on the knee and engageable with the teeth of an elongated rack extending parallel to the line of movement of the knee. Operation of the carriage, knees and pawls is controlled from a position remote from the carriage.

6 Claims, 4 Drawing Figures
SAWMILL CARRIAGE SETWORKS
BACKGROUND OF THE INVENTION

This invention relates to sawmill setworks, and more particularly to a sawmill carriage setworks of simplified and therefore economical construction capable of controlled operation from a position remote from the carriage.

Remotely controlled sawmill carriage setworks provided heretofore are characterized generally by a capability of setting to a multiplicity of fractional dimensions in order to accommodate the production of a wide variety of lumber dimensions. Such setworks are of complex and costly construction. On the other hand, there are a large number of small sawmills, such as stud mills, which produce only one or a very few varieties of standard dimension lumber. Sawmills of this type have no need for such complex setworks, and therefore the excessive capital expenditure required for such setworks cannot be justified.

One known form of more simplified setworks provided heretofore utilizes an elongated bar secured to each knee and provided with a plurality of longitudinally spaced, tapered sockets adapted selectively to releasibly receive a wedge mounted on the carriage for movement toward and away from said sockets. This form of setworks utilizes excessive floor space adjacent the carriage to accommodate movement of the sockets-containing bars through the required range of movement of the knees. This type of setworks also requires control mechanism capable of aligning each of the tapered sockets precisely with the wedge member. Moreover, the tapered sockets and wedge member are exposed and thus susceptible to the deposit of sawdust and other debris, resulting in inaccurate setting of the knees.

SUMMARY OF THE INVENTION

In its basic concept, the setworks of this invention utilizes a powered pawl member movable with the sawmill carriage knee and arranged for releasable engagement with the teeth of an elongated rack mounted on the carriage adjacent the knee.

It is by virtue of the foregoing basic concept that the principal objective of this invention is achieved; namely, to overcome the aforementioned disadvantages of prior sawmill carriage setworks.

The foregoing and other objects and advantages of this invention will appear from the following detailed description, taken in connection with the accompanying drawing of a preferred embodiment.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a fragmentary plan view of a sawmill carriage having incorporated therewith a setworks embodying the features of this invention.

FIG. 2 is a fragmentary view in end elevation as viewed from the bottom in FIG. 1.

FIG. 3 is a fragmentary, foreshortened schematic diagram of hydraulic and electrical control mechanism by which the setworks is operated from a position remote from the carriage.

FIG. 4 is a fragmentary view in end elevation of a modified form of rack and pawl component of the setworks.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The sawmill carriage illustrated in the drawing includes an open rectangular framework 10 supported on wheels 12 which, in turn, are supported on laterally spaced elongated rails 14. The carriage thus is supported for longitudinal reciprocation adjacent and parallel to the plane 16 of a saw, in manner well known in the art.

The carriage framework supports a plurality of longitudinally spaced head blocks 18, there being two such head blocks illustrated. The head blocks extend transversely of the carriage normal to the plane 16 of the saw and terminate at their forward ends adjacent said plan. An upstanding knee 20 is supported slidably on each head block for movement along the latter. A log is adapted to be supported slidably upon the head blocks in abutment with the knees and is secured releasably to the latter by retractable dogs mounted on the knees, in well known manner. The drawing illustrates one such dog 22 associated with each knee, the dog being powered by an extensible fluid pressure piston-cylinder unit which includes a cylinder 24 and a piston rod 26. This unit preferably is of the air pressure type, although an hydraulic unit may be employed, if desired.

Means is provided for reciprocating the knees along the head blocks. In the embodiment illustrated, such means is provided by an extensible hydraulic piston-cylinder unit associated with each knee and including a cylinder 28 and a piston rod 30. The cylinder is mounted pivotally adjacent the rearward end of the associated head block, by means of opposed stub shafts 32 supported by upstanding bracket 34 secured to the head block. The forward end of the associated piston rod 30 is connected pivotally to the knee by means of a pivot shaft 36. Hydraulic lines 38 communicate with the opposite ends of the cylinder for extending and retracting the piston rod, as explained more fully hereinafter.

Means is provided for coupling the plurality of knees together for simultaneous and equal movement. In the embodiment illustrated, there is connected to each knee an elongated chain 40 contained in a central channel 42 in the head block. The chain is trained around front and rear sprockets 44 and 46, respectively. The rear sprockets are interconnected by a common coupling shaft 48. In this manner movement of one knee results in simultaneous and equal movement of the other knee.

Accordingly, the plurality of knees may be driven by a single source of power, such as a single piston-cylinder unit engaging one of the knees, or a source of rotary power engaging the coupling shaft. The use of a piston-cylinder unit with each knee is preferred, however, for its simplicity, minimum size and speed of operation.

Means also is provided for establishing precise incremental movements of the knees through predetermined distances. In accordance with the present invention, such means is provided by an elongated rack 50 associated with at least one of the knees. In the preferred embodiment illustrated, one such rack is mounted on the carriage framework adjacent and parallel to each head block, i.e. parallel to the line of reciprocating movement of the associated knee. Each rack includes a
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plurality of longitudinally spaced teeth 52 which project upward toward the bottom side of the knee. Associated with each rack is a pawl member 54 mounted at one end pivotally on the knee by means of a pivot shaft 56. The opposite end of the pawl member is movable arcuately toward and away from the rack teeth. Such movement of the pawl member is provided, in the embodiment illustrated, by an extensible fluid pressure piston-cylinder unit, preferably of the air pressure type, which includes a cylinder 58 and a piston rod 60. One end of the cylinder is secured pivotally to the knee by means of a pivot shaft 62 mounted on a bracket extending from the knee. The projecting end of the associated piston rod is connected pivotally to the pawl member by means of a pivot shaft 64. Fluid pressure lines 66 communicate with the opposite ends of the cylinder to effect extension and retraction of the unit and corresponding engagement and disengagement of the pawl member relative to the rack.

In the embodiment illustrated in FIG. 2, the rack teeth 52 and pawl member 54 are shaped to provide incremental settings of the knee in the forward direction of movement of the knee toward the plane 16 of the saw. Each tooth is tapered in said forward direction and the pawl is provided with a correspondingly tapered rearward surface. Thus, as the pawl is driven downward into engagement with a tooth, the sloping surface of the pawl slides downward along the confronting sloping surface of the tooth and moves the knee forward to the final precise set point determined by abutment of the confronting forward surface of the pawl and the rearward surface of the next adjacent tooth of the rack.

Although the rack tooth and pawl configuration shown in FIG. 2 accommodates setting of the knees in both forward and rearward directions of movement, the configuration shown in FIG. 4 is preferred for this purpose. Thus, each tooth 52' is tapered uniformly in both directions and the pawl 54' is correspondingly tapered, whereby its apex becomes centered between adjacent teeth at the final set point of the knee in either direction of movement of the latter.

In the embodiment illustrated, the forward end of each rack supports a forwardly projecting threaded shaft 68 which extends through an aligned opening in the bracket 70 secured to the carriage framework. A pair of lock nuts 72 are mounted in the threaded shaft on opposite sides of the bracket. Secured to the rearward end of the rack is a laterally projecting flange 74 provided with an elongated slot 76 which extends parallel to the longitudinal dimension of the rack. A lock bolt 78 extends freely through the slot and is secured in a threaded opening in the carriage framework. Tightening of the bolt thus clamps the flange securely to the carriage framework. By means of the threaded shaft 68 and flange slot 76 the elongated rack may be adjusted transversely relative to the carriage framework. This facilitates the making of minute adjustments in the distances between the plane 16 of the saw and the confronting face of the knee 20.

The setsworks described hereinbefore is capable of operation from a position remote from the carriage. Thus, referring to FIG. 3 of the drawing, the hydraulic lines 88 from each cylinder 28 is connected through a solenoid operated valve 80 and hydraulic lines 82 selectively to the outlet and return sides of a hydraulic pump 84. As shown in FIG. 1, the pump is mounted on a base plate 86 secured to the carriage framework between the longitudinally spaced head blocks. An electric motor 88 mounted on the base plate is coupled to the pump for driving the latter.

In similar manner, the air pressure lines 66 from each of the cylinder 58 are connected through a solenoid valve 90 and elongated flexible lines 92 to a source of compressed air remote from the carriage. The lines are supported by a pantograph, in well known manner.

The coils 94 and 96 of the solenoid valves 80 and 90, respectively, are connected through elongated flexible conductors 98 to a control unit 100 mounted remotely from the carriage. It will be understood that the control mechanism includes means for activating the hydraulic piston-cylinder units to move the knees preselected approximate distances, corresponding to distances between one or more rack teeth 52. The final set point of the knee is established by abutment of the confronting forward surface of the pawl 54 and rearward surface of the next adjacent tooth, as explained hereinbefore.

Means is provided for insuring against premature operation of the piston-cylinder units which drive the knees, until the walls 54 have been retracted from the rack teeth 52. In the embodiment illustrated, an electric switch 102 is mounted on each knee adjacent the pawl, with the switch actuator arm 104 positioned for engagement by the pawl during retraction of the latter. Each switch is connected in series in the electric circuit of the solenoid valve coil 94 of the associated piston-cylinder unit. Each switch is open when the pawl is in engagement with its associated rack and is closed when the pawl is retracted.

The operation of the setsworks described hereinbefore is as follows: A log is deposited upon the head blocks 18 and secured against the knees 20 by dogs, including dogs 22, by appropriate operation of controls at the unit 100, as will be understood. The knees then are driven forward, by application of hydraulic pressure to the cylinders 28, until the log intercepts the plane 16 of the saw sufficiently to remove a slab cut from the log. The carriage then is moved forward past the saw to remove the slab cut. The log then is turned through 90° intervals to remove the remaining slab cuts, as will be apparent.

If the operator now desires to cut a 2 inch slab from the timber, he activates the cylinders 28 to move the knees forward a distance of one tooth 52 (assuming the spacing between teeth is two inches). He then activates cylinders 58 to extend the paws 54 toward the teeth 52, as previously explained, and then moves the carriage past the saw to sever the slab. If he desires to cut a four inch slab from the timber he activates the cylinders 28 to move the knees forward a distance of two teeth, as will be apparent.

From the foregoing it will be appreciated that the present invention provides a remotely controlled sawmill carriage setsworks which is of simplified construction for economical manufacture and which provides for setting of the knees rapidly and with precision from a position remote from the carriage.

It will be apparent to those skilled in the art that various changes in the size, shape, number, type and arrangement of parts described hereinbefore may be
made without departing from the spirit of this invention.

Having now described our invention and the manner in which it may be used, we claim:

1. In combination with a sawmill carriage having a plurality of knees mounted thereon for movement toward and away from the plane of a saw,
   a. an elongated rack member associated with at least one of the knees and mounted on the carriage parallel to the line of movement of the knee, the rack member having a plurality of longitudinally spaced teeth each positioned a predetermined distance from the plane of a saw,
   b. means interengaging the carriage and rack member for securing the latter in fixed position relative to the carriage and the plane of a saw,
   c. a pawl member mounted on the knee for movement toward and away from the rack member for releasable engagement with the teeth thereof, whereby interengagement of the pawl member and rack member secures the knee in fixed position relative to the carriage and the plane of a saw,
   d. pawl drive power means interengaging the knee and pawl member for reciprocating the latter, and
e. knee drive power means interengaging the carriage and knee independently of the rack member for moving the knee toward and away from the plane of a saw when the pawl member is disengaged from the rack member.

2. The combination of claim 1 including control means positioned remotely from the carriage and operable to effect selective movement of the knees and pawl member.

3. The combination of claim 1 wherein the means interengaging the carriage and rack member includes adjustment means for adjusting the rack member longitudinally relative to the carriage and the plane of a saw.

4. The combination of claim 1 wherein

5. The combination of claim 1 wherein
a) the pawl drive power means comprises an extensible fluid pressure piston-cylinder unit interengaging the pawl and knee, and
b) control means communicates a source of fluid under pressure selectively with said piston-cylinder unit.

6. The combination of claim 1 wherein
a. the knee drive power means comprises an extensible fluid press-cylinder unit interengaging the pawl member and knee,
b. the knee drive power means comprises an extensible fluid pressure piston-cylinder unit interengaging the carriage and at least one of the knees,
c. coupling means interengages the plurality of knees to effect simultaneous and equal movement of said knees, and
d. control means positioned remotely from the carriage is operable to connect fluid under pressure selectively to said piston-cylinder units.