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W. G. HAGMAIER

CARRIAGE FEED

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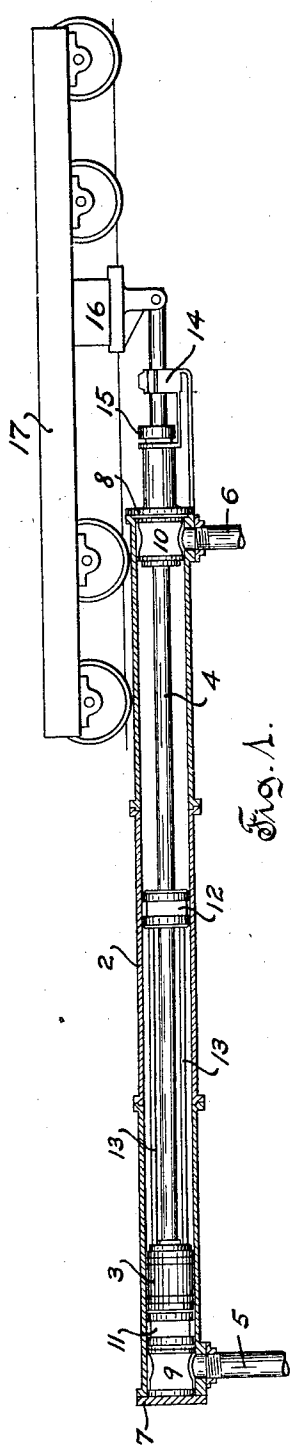


Fig. 1.

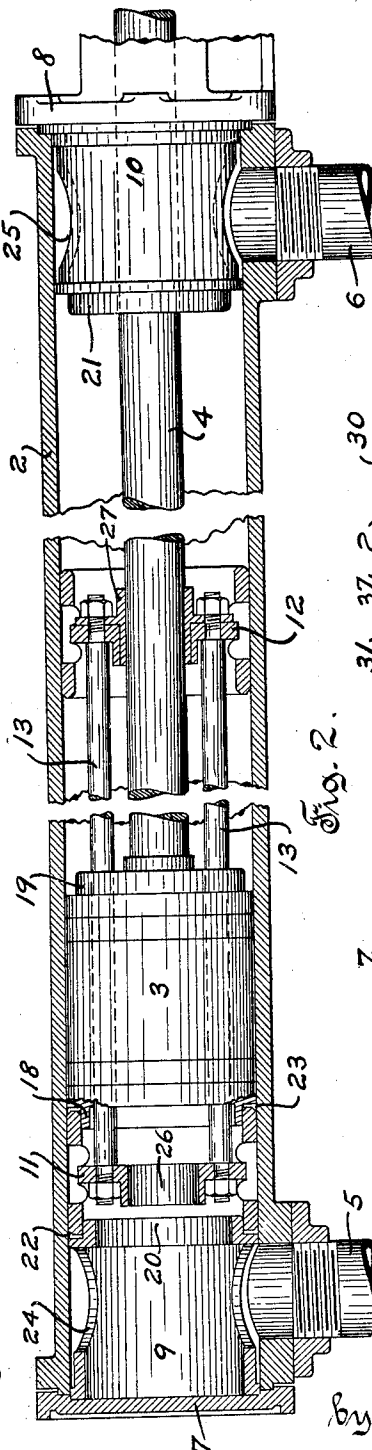


Fig. 2.

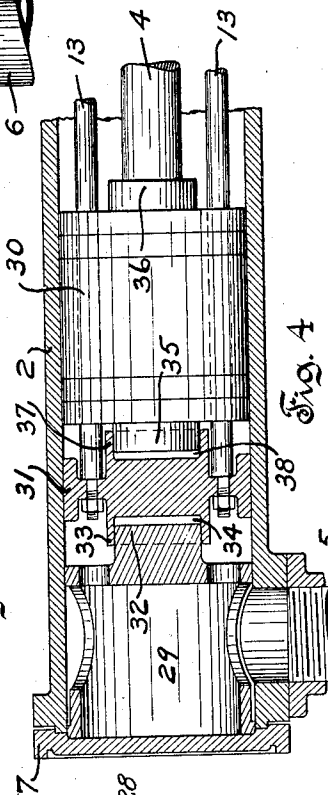


Fig. 3.

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CARRIAGE FEED.

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This invention relates generally to improvements in feed mechanisms for carriages or the like, and relates more specifically to improvements in the construction and operation of steam or air feeds especially applicable to saw mill carriages.

An object of the invention is to provide an improved feed mechanism which is simple in construction and efficient in operation.

It has heretofore been common commercial practice to utilize steam or air feeds for saw mill carriages, such a feed comprising a horizontal cylinder, a piston movable within the cylinder, a rod reciprocable by the piston, and a connection between the outer end of the rod and the underside of the carriage. As the required movement of the carriage is relatively great, the cylinder and piston rod of this type of steam feed, are necessarily very long and considerable difficulty is experienced in preventing undesirable sagging of the piston rod. The sagging of the piston rod results in excessive wear on the rod supports, and is often so great within the cylinder that the rod engages and cuts through the cylinder wall.

It is an object of the present invention to provide simple and efficient mechanism for preventing excessive sagging of the piston rod in a steam feed of this general type.

A clear conception of several embodiments of the invention and of the operation of mechanisms constructed in accordance therewith, may be had by referring to the drawing accompanying and forming a part of this specification in which like reference characters designate the same or similar parts in the various views.

Fig. 1 is a part sectional side elevation of a saw mill carriage having the improved steam or air operated feed mechanism associated therewith.

Fig. 2 is an enlarged fragmentary longitudinal sectional view of the improved steam or air operated feed mechanism.

Fig. 3 is an end view of one of the improved actuating members or spiders.

Fig. 4 is an enlarged fragmentary sectional view of a modified form of the improved steam or air operated feed mechanism.

As illustrated in Fig. 1, the carriage 17 is adapted to be moved back and forth along guiding rails by means of a piston 3 reciprocable within a cylinder 2, the piston 3

being connected to the carriage 17 by means of a piston rod 4 and a carriage connection 16. The cylinder 2 is of relatively great length, being disposed horizontally, and has a rear end head 7 and a front end head 8, the latter of which is provided with a stuffing box 15 through which the piston rod 4 extends. A bracket 14 associated with the front head 8 provides a support for the rod 4 beyond the stuffing box 15, and the outer end of the rod 4 beyond the bracket 14 may be suitably guided by resting upon a plank or otherwise, in order to prevent excessive sagging thereof. Fluid supply and exhaust connections or conduits 5, 6 communicate with the opposite ends of the cylinder 4 and with a suitable source of steam or air supply in a well known manner.

The mechanism disclosed in Figs. 1, 2 and 3, for eliminating excessive sagging of the piston rod 4 within the cylinder 2 in accordance with the present invention, comprises front and rear cushioning heads 10, 9 respectively secured within the cylinder 2 adjacent to the end heads 8, 7, the cushioning heads 9, 10 being provided respectively, with upper and lower fluid supply and exhaust ports 24, 25. Slidably disposed within the cylinder 2 between the cushioning heads 9, 10 and the opposite ends of the piston 3, are the members or spiders 11, 12, the actuating member or spider 11 being connected with the supporting member or spider 12 by means of parallel rods 13 which snugly fit but are slidable within longitudinal holes in the piston 3. As shown in Fig. 1, the rods 13 are of such length that when the piston 3 is at the rear end of the cylinder 2 the supporting spider 12 is located and supports the rod 4 approximately half way between the piston 3 and the front end of the cylinder. The actuating spider 11 has a central fluid admission and exhaust opening 26 therein, while the supporting spider 12 has a removable bushing 27 mounted centrally therein and engaging the rod 4. Each of the spiders 11, 12 is of open construction as shown in Fig. 3 and has a series of openings 28 extending directly therethrough in order to permit free transgression of fluid.

The cushioning head 9 is provided with an annular ridge 20 which is cooperable with the periphery of the rear end of the spider 11 to form a cushioning chamber 22. The

rear end of the piston 3 is provided with an annular ridge 18 which is likewise cooperable with the periphery of the front end of the spider 11 to provide a cushioning chamber 23. The front end of the piston 3 is provided with an annular ridge 19 cooperable with the periphery of the rear end of the supporting spider 12 to form a similar cushioning chamber, and the periphery of the front end of the spider 12 is cooperable with an annular ridge 21 on the cushioning head 10 to likewise provide an annular cushioning chamber. With this construction of the elements, annular cushioning chambers are provided for the spiders 11, 12 and for the piston 3 for extreme motion of these elements in either direction. The construction of cushioning chambers disclosed in Figs. 1 and 2, are especially suitable when dry fluid is utilized.

The modified form of cushioning mechanism illustrated in Fig. 4 is especially adapted for use with fluid such as moist steam which is apt to condense and to deposit water within the cylinder 2. In the modified construction the cushioning heads 29 are provided with central cushioning plungers 32 cooperable with ridges 33 on the spiders 31 to provide cushioning chambers 34. The piston 30, is provided with end cushioning plungers 35, 36 cooperable with ridges 37 on the spiders 31 to produce similar cushioning chambers 38 at the opposite ends of the spiders. Any condensation of steam within the cylinder 2 with the modified construction, will result in the flow of water of condensation toward the bottom of the cylinder and out through the conduits 5, 6 and will not interfere with the normal operation of the cushioning mechanism.

During normal operation of the improved feed mechanism, fluid under pressure may be admitted to one of the conduits 5, 6 while the opposite conduit is connected with the exhaust, thereby causing the piston 3 and the rod 4 to move the carriage 17 in an obvious manner. As the piston 3 advances toward the supporting spider 12 from the position in Fig. 1, the rod 4 slides within the bushing 27 and the piston 3 slides along the rods 13 until the forward end of the piston 3 reaches a point in close proximity to the spider 12. The ridge 19 on the forward end of the piston 3 then enters the spider 12 and confines fluid between the rear end of the spider 12 and the front end of the piston 3 thereby cushioning the blow. The advancing piston 3 then carries the spider 12 forward until the spider reaches a point in close proximity to the cushioning head 10 whereupon the ridge 21 likewise becomes effective to cushion the forward stroke of the piston 3 and of the spider 12. When steam is admitted through the con-

duit 6, the piston 3 moves along the rods 13 and the piston rod 4 slides within the bushing 27 until the piston 3 has reached approximately the central position within the cylinder 2 whereupon the ridge 18 at the rear end of the piston 3 cooperates with the forward end of the actuating spider 11 to cushion the blow by virtue of the cushioning chamber 23. The advancing piston 3 then moves the spider 11 rearwardly while the rods 13 act to likewise move the supporting spider 12 rearwardly and to furnish a movable support for preventing sagging of the rod 4 within the cylinder 2. When the piston 3 approaches the rear end of its stroke the ridge 20 becomes effective to provide a cushioning chamber 22 for cushioning rearward motion of the piston 3 and of the spider 11. It will thus be noted that the supporting spider 12 which is operable by the piston 3 through the actuating spider 11 and the rods 13, never permits an unsupported length of the piston rod 4, greater than half the length of the cylinder 2, to exist within the cylinder, thereby eliminating excessive sagging and consequent destruction of the cylinders.

The operation of the modified construction disclosed in Fig. 4 will be obvious from the foregoing description of the operation of the mechanism disclosed in Fig. 2. The cushioning chambers 34, 38 of Fig. 4, by virtue of their location away from the wall of the cylinder 2, will not permit incompressible fluid or liquid to accumulate therein, thus making this structure especially applicable where a condensable fluid is utilized. The bushing 27 may be readily renewed when excessively worn, and the pistons 3, 30 may likewise be provided with renewable bushings embracing the connector rods 13.

It should be understood that it is not desired to limit the invention to the exact details of construction and operation herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

It is claimed and desired to secure by Letters Patent:

1. In combination, a cylinder, a piston movable within said cylinder, a rod movable by said piston, a rod supporting member within said cylinder at one side of said piston, and an operating member within said cylinder at the opposite side of said piston for moving said supporting member along said cylinder.

2. In combination, a cylinder, a piston movable within said cylinder, a rod movable by said piston, a rod supporting member within said cylinder and embracing said piston rod at one end of said piston, and an operating member within said cylinder at the opposite end of said piston and movable thereby to

transport said supporting member along said cylinder.

3. In combination, a cylinder, a piston movable within said cylinder, a rod movable by said piston, a member for supporting said rod on one side of said piston, and means cooperable with the opposite side of said piston to move said supporting member along said cylinder.

4. In combination, a cylinder, a piston movable within said cylinder, a rod movable by said piston, a rod supporting member adjacent to one end of said piston, means at the opposite end of said piston for moving said supporting member, and means for cushioning said piston at the opposite ends of its stroke.

5. In combination, a cylinder, a piston movable within said cylinder, a piston rod, a member for supporting said rod adjacent to one end of said piston, means cooperable with the opposite end of said piston to move said supporting member along said cylinder, and means for cushioning said piston when engaging said supporting member and said moving means and also at the ends of its stroke.

6. In combination, a cylinder, a piston movable within said cylinder, a piston rod, a rod supporting member movable between said piston and one end of said cylinder, and operating means for said supporting member movable between said piston and the opposite end of said cylinder, said supporting member and said operating means being disposed entirely within the bore of said cylinder.

7. In combination, a cylinder, a piston movable within said cylinder, a piston rod, a member for supporting said rod disposed between said piston and one end of said cylinder, a member for actuating said supporting member disposed between said piston and the opposite end of said cylinder, and means for cushioning said members.

8. In combination, a cylinder, a piston

movable within said cylinder, a piston rod, a rod supporting member movable between said piston and one end of said cylinder, an actuating member movable between said piston and the opposite end of said cylinder, and means directly connecting said members and penetrating said piston.

9. In combination, a cylinder, a piston movable within said cylinder, a rod movable by said piston, a member located entirely within said cylinder for supporting said rod on one side of said piston, and means located entirely within said cylinder and cooperable with the opposite side of said piston to move said supporting member along said cylinder.

10. In combination, a cylinder, a piston movable within said cylinder, a rod projecting from one side of said piston and movable thereby, a rod supporting member located entirely within said cylinder at the rod end of said piston, and an operating member located entirely within said cylinder at the opposite end of said piston for moving said supporting member along said cylinder.

11. In combination, a cylinder, a piston movable within said cylinder, a piston rod, a rod supporting member movable longitudinally of said rod between said piston and one end of said cylinder, and operating means for said supporting member movable between said piston and the opposite end of said cylinder.

12. In combination, a cylinder, a piston movable within said cylinder, a piston rod, a rod supporting member movable longitudinally within the bore of said cylinder and between said piston and one end of said cylinder, and operating means for said supporting member movable longitudinally within the bore of said cylinder between said piston and the opposite end of said cylinder.

In testimony whereof, the signature of the inventor is affixed hereto.

WILLIAM G. HAGMAIER.