(No Model.)

G. R. RAY.

MECHANISM FOR RECIPROCATING SAW MILL CARRIAGES.

No. 412,791. Patented Oct. 15, 1889.

Fig 1

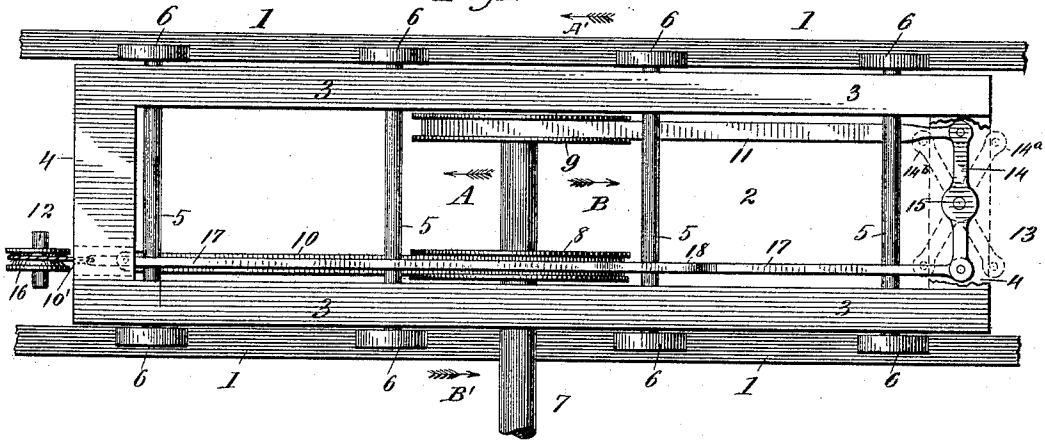


Fig. 2.

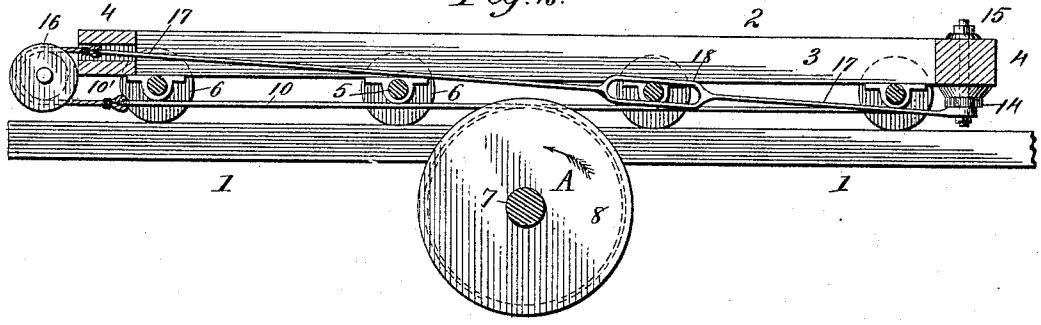


Fig. 3.

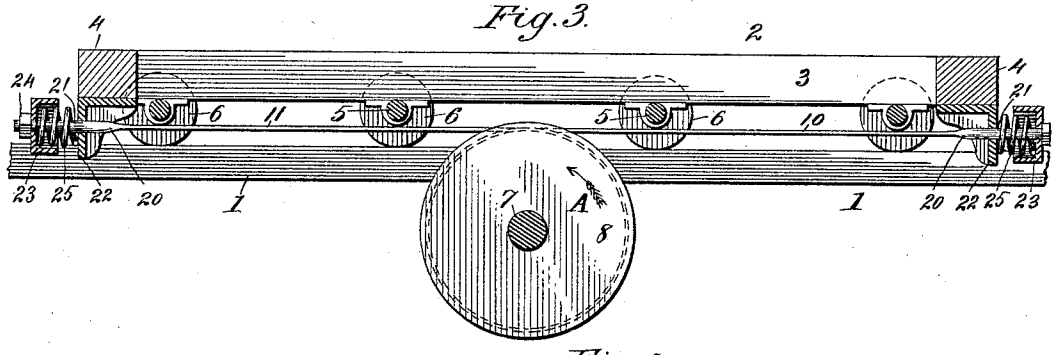
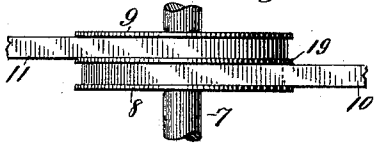


Fig. 4.



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UNITED STATES PATENT OFFICE.

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MECHANISM FOR RECIPROCATING SAW-MILL CARRIAGES.

SPECIFICATION forming part of Letters Patent No. 412,791, dated October 15, 1889.

Application filed May 24, 1889. Serial No. 311,961. (No model.)

To all whom it may concern:

Be it known that I, GEORGE R. RAY, a citizen of the United States, residing at Manistee, in the county of Manistee and State of Michigan, have invented certain new and useful Improvements in Mechanism for Reciprocating Saw-Mill Carriages; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates, generally, to mechanism for reciprocating saw-mill carriages, and particularly to that class of carriage-reciprocating mechanisms in which the carriages are operated by ropes or cables attached thereto and wound upon and unwound from drums secured upon the driving-shafts; and it consists in the improved construction and arrangement or combination of parts hereinafter fully disclosed in the description, drawings, and claims.

The objects of my invention are, first, to provide improved mechanism for reciprocating saw-mill carriages without encountering side draft upon the same and the slipping and uneven wrapping or winding of ropes or cables upon spirally-grooved drums, which are usually incident to their employment; second, to provide improved mechanism for reciprocating saw-mill carriages by bands employed in connection with drums mounted upon a single shaft, and, third, to provide improved means for taking up and compensating for uneven or unequal winding and unwinding of said bands upon and from said drums. These objects are attained by the mechanism illustrated in the accompanying drawings, forming part of this specification, in which the same reference-numerals indicate the same parts, and in which—

Figure 1 represents a plan view of my improved mechanism for operating saw-mill carriages, showing a part of the carriage broken away and as much of the other parts as is necessary to illustrate my invention; Fig. 2, a longitudinal vertical section of the same mounted upon the track; Fig. 3, a longitudinal vertical section of a modified form of my invention, and Fig. 4 a plan view of the double drum I prefer to employ in connection therewith.

In the drawings, the numeral 1 indicates the track, upon which the carriage 2 travels. This carriage may be of any suitable construction; but, as shown, it consists, mainly, of the two longitudinal sills or timbers 3, the cross or end pieces 4, which connect said sills or timbers, and the shafts or axles 5, which are journaled beneath said timbers and carry the track-wheels 6 upon their ends. A shaft 7 is suitably transversely supported and journaled below the carriage-track and provided with two drums 8 and 9, to which are secured the flat wire or flat sheet-metal bands 10 and 11, which are wound around the peripheries of said drums in opposite directions, the coils being wound one outside of or upon the other, and the drums being of the same width as said bands. These bands are connected at their outer ends to the opposite ends 12 and 13 of the carriage; hence as they are wound upon the drums in opposite directions, when one band is wound upon one drum, by revolving the same the other band will be unwound from the other drum, thus causing said bands to reciprocate the carriage. An engine or other suitable motor is connected to the drum-shaft 7, and serves to revolve the same in opposite directions alternately, being provided with any ordinary means for reversing said shaft, so that the carriage may be reciprocated under the control of the attendant. As the thickness of the layers or coils of the bands upon the drums will slightly increase and decrease as they are wound upon and unwound therefrom, owing to the fact that said bands are wound upon the drums with one coil or layer upon another, it is necessary to provide suitable devices for compensating for the shortening and increasing of the lengths of said bands as they are wound upon and unwound from said drums; hence I have invented, as illustrated in the drawings, two equivalent devices for accomplishing this compensation, one of said devices, which is applicable to both long and short carriages, having a long or short throw or distance of travel, being illustrated in Figs. 1 and 2, and the other device, which is more especially applicable to short carriages, having a short throw or distance of travel, being illustrated in Figs. 3 and 4.

The compensating mechanism illustrated

in Figs. 1 and 2 consists of a lever 14, which is mounted on the under side of one of the end or cross pieces 4 of the carriage and fulcrumed or pivoted upon a bolt 15, which is passed through said end or cross piece and arranged in a line with the center of said carriage, this lever being plainly shown in full and dotted lines in Fig. 1, in which the end or cross piece is broken away to show said lever beneath the same. One end of the belt or band 11 is secured to the drum 9 and its other end is pivotally connected to one end of this lever; also one end of the belt 10 is suitably secured to the drum 8 and wrapped around the same; thence it extends some distance to the left, and is provided with a short piece of cable chain 10′, or the like, which passes around a guide-pulley 16, where it is connected with a rod or bar 17, having a slotted portion 18, which fits and moves over one of the axles or shafts 5 of the carriage in the line of the draft of one pair of the wheels 6, the right end of said rod or bar being pivotally connected to the other end of said lever. Supposing the drums to be of the same diameter that the carriage is arranged centrally over the drive-shaft, that an equal amount of band is on each of the drums, that said shaft and drums are revolved in the direction of the arrow A, and that the carriage is moved to the left or in the direction of the arrow A′, it will be obvious that the drum 9 will wind on slightly more length of the band 11 than the drum 8 will unwind of the band 10. This slight difference in the length of the bands is compensated for by the vibration of the lever 14, which will swing upon its center to the extent of the difference in the length of said bands. This would result in tightening the belt 10, and causing the lever 14 to assume the position indicated by the dotted lines 14^a in Fig. 1. Then as the belt 11 continues to wind upon the drum 9 as the carriage moves on to the left and drum 8 pays off more of the band 10, said lever will assume the position shown by the full lines in Fig. 1, and then when the carriage has reached the full extent of its travel to the left and the revolution of the drum-shaft and drums is reversed and the carriage drawn in the direction of the arrow B′ or to the right, the drum-shaft and drums revolving in the direction of arrow B, the drum 8 will wind on slightly more length of the band 10 than the drum 9 will unwind of the band 11, when said lever will assume the position shown in dotted lines 14^b in Fig. 1. During this operation the band 10 on the drum 8 will pass to the left, where it is secured to the cable chain 10′, which passes around the guide-pulley 16, and is there connected to the slotted rod or bar 17, which, having its right end pivotally connected to one end of the lever 14, will cause the same to swing upon its center to the extent of the slight difference in the length of bands, as shown in the dotted lines last named. This slotted rod or bar, the guide-pulley 7, and the band 10 only move the carriage to the extent of this slight difference in the length of said bands.

The reciprocating and compensating mechanisms just described are especially adapted for long carriages having a long throw or distance of travel, although they may be used for short carriages having a short throw; but the modified form of my invention shown in Figs. 3 and 4 is especially adapted for short carriages having a short throw or travel. In this reciprocating and compensating mechanism the drums 8 and 9 are keyed upon the drum-shaft 7 side by side, or are formed in one piece, as shown in Fig. 4, in which a mere flange 19 separates them. The inner ends of the bands 10 and 11 are respectively secured to these drums, being wound thereon in opposite directions, and to the inner ends of the screw-threaded rods 20, which are adapted to slide through the holes 21, formed in the flanges 22, which are secured upon the under sides of the end or cross pieces 4 of the carriage. Caps 23 are placed upon the outer ends of said rods, and are held thereon by the nuts 24, which press against the closed ends of said caps; also, coiled springs 25 are wrapped around said rods within said caps and bear against the outer sides of the downwardly-extending portions of the flanges 22 and against the ends of the caps 23.

In the operation of this form of my invention, when the drum-shaft and drums are revolved in the direction of the arrow A, and the carriage is moved from right to left, the drum 8 will wind on slightly more length of the band 10 than the drum 9 will unwind of the band 11. This slight difference in the length of said bands will be compensated for by the springs 25, which will be compressed to the extent of the difference in the length of said bands. When the motion of the drum-shaft and drums is reversed, and the carriage is drawn from left to right by the band 11 being wound upon the drum 9, then the drum 8 will pay off slightly more length of the band 10 than the drum 9 will unwind of the band 11 during the first half of the movement of the carriage. This slight difference in the length of said bands will be taken up by the expansion of said springs 25. At the center of the travel of the carriage these springs will be just tight enough to place slight tension upon both bands. It will thus be evident that the bands will pull slightly against the springs surrounding the rods; that the tension of said springs can be adjusted by adjusting the caps upon said rods by means of the nuts; that when the carriage is centrally above the drum-shaft, or at the middle of its throw or travel, the springs will both be equally expanded and exert but small tension upon the bands; that they will be gradually compressed and permitted to expand as the carriage approaches and leaves the ends of its throws or movements, and thus that said springs fulfill the same office as the lever in compensating

for increase of draft upon or slack in said bands. The length of the bands in the carriage having the compensating lever and in the carriage having the springs receives no adjustment or action of the compensating devices when the center of each carriage is directly above the drum-shaft or at the middle of its throw or course of travel in either direction, since at that point the lever will stand at a right angle to the track, while the springs will exert sufficient force to place slight tension upon the bands and prevent lost motion; also, as these springs are placed between the flanges on the ends of the carriage and the caps which surround them, and are held in place by the nuts on the ends of the screw-threaded bolts, said springs when compressed will start the carriage at each of its return movements and prevent all shock thereon, and at the same time will avoid sudden jerks upon the bands; also, as said springs are inclosed by said caps they will be protected against injury from shocks caused by suddenly stopping or reversing the drum-shaft and drums, as the inner ends of said caps will strike the downward extensions of the flanges on the ends of the carriage, and thus protect said springs by preventing their undue compression; also, by winding the bands upon the drums in coils, one upon the other, they will at all times pull upon and reciprocate the carriage in a straight line, and thus there will be no side draft upon said carriage, nor any slipping or displacement of said bands, as their flat coils will be evenly wound and held one upon the other by the flanges on the peripheries of the drums.

My bands are made very light, and yet very strong, being constructed, preferably, from flexible steel of comparatively slight thickness, although they may be made from flat wire; but this is not as desirable in all respects as the thin flexible steel, which is not only lighter than the flat wire, but lighter than the usually-employed Manila or hemp ropes having the same strength; also, my bands are of less length and have fewer coils than the ropes usually employed and wound on spirally-grooved drums, and therefore being subjected to less wear and tear than ropes thus wound they last longer; also, they are lighter and less noisy than the racks and pinions employed for reciprocating carriages.

Having thus fully described the construction and arrangement or combination of the several parts of my improved reciprocating and compensating mechanisms for saw-mill carriages, and the operation and advantages thereof, what I claim as new is—

1. In mechanism for reciprocating saw-mill carriages, the combination, with a revolving and reversible shaft provided with two drums, of a saw-mill carriage and two flat bands which are connected to the opposite ends of said carriage and wound upon said drums in opposite directions and in coils one upon the other, substantially as described.

2. In mechanism for reciprocating saw-mill carriages, the combination, with a revolving and reversible shaft provided with two drums, of a saw-mill carriage and two flat steel bands which are connected to the opposite ends of said carriage and wound upon said drums in opposite directions and in coils one upon the other, substantially as described.

3. In mechanism for operating saw-mill carriages, the combination, with a carriage, of a revolving and reversible drum-shaft provided with two drums, two flat steel bands connected to the opposite ends of said carriage and wound upon said drums in opposite directions and in coils one upon the other, and compensating mechanism for adjusting the tension and slack of said bands as they are wound upon and unwound from said drums, substantially as described.

4. In mechanism for operating saw-mill carriages, the combination, with a carriage, of a revolving reversible drum-shaft provided with two drums, two flat steel bands connected to the ends of said carriage and wound upon said drums in opposite directions and in coils one upon the other, and a compensating lever fulcrumed upon said carriage and connected with the ends of said belts or bands, substantially as described.

5. In mechanism for operating saw-mill carriages, the combination, with the carriage 2, of the revolving reversible drum-shaft 7, provided with the two drums 8 and 9, the lever 14, fulcrumed at one end of said carriage, the guide-pulley 16, journaled at the other end of said carriage, the rod or bar 17, pivotally connected to one end of said lever, the band 10, secured to said rod or bar, passed around said pulley 16, and wound upon said drum 8 in coils one upon the other, and the band 11, pivotally connected to the other end of said lever and wound upon the other drum 9 in an opposite direction to the other band 10 and in coils one upon the other, substantially as described.

6. In mechanism for operating saw-mill carriages, the combination, with the carriage 2, of the revolving reversible drum-shaft 7, provided with the two drums 8 and 9, the lever 14, fulcrumed at one end of said carriage, the pulley 16, journaled at the other end of said carriage, the rod or bar 17, formed with the slot 18 and pivotally connected to one end of said lever, the band 10, secured to said rod or bar, passed around said pulley 16, and wound upon said drum 8 in coils one upon the other, and the band 11, pivotally connected to the other end of said lever and wound upon the other drum 9 in an opposite direction to the other band 10 and in coils one upon the other, substantially as described.

7. In mechanism for operating saw-mill carriages, the combination, with the carriage 2, of the revolving reversible drum-shaft 7, provided with the two drums 8 and 9, the lever 14, fulcrumed at one end of said carriage, the pulley 16, journaled at the other end of

said carriage, the rod or bar 17, formed with the slot 18 and pivotally connected to one end of said lever, the cable chain 10′, connected to the other end of said rod or bar and passed around said guide-pulley, the band 10, connected to the other end of said cable chain and wound upon said drum 8 in coils one upon the other, and the band 11, pivotally connected to the other end of said lever and wound upon the other drum 9 in an opposite direction to the other band 10 and in coils one upon the other, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE R. RAY.

Witnesses:

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SAMUEL J. CHAPMAN.