Aug. 27, 1935. M. MOLINELLI 2,012,399

SLUING MECHANISM FOR PORTABLE CRANES

Original Filed March 24, 1932

Fig. 1.

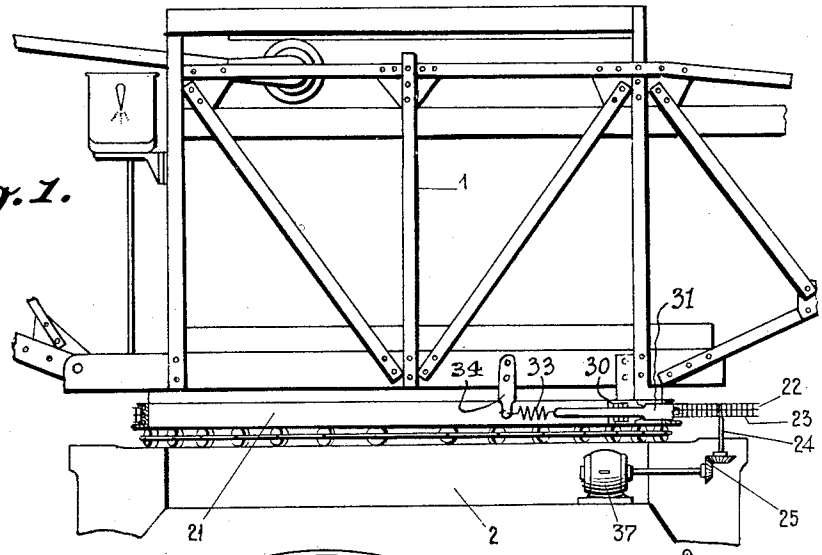


Fig. 2.

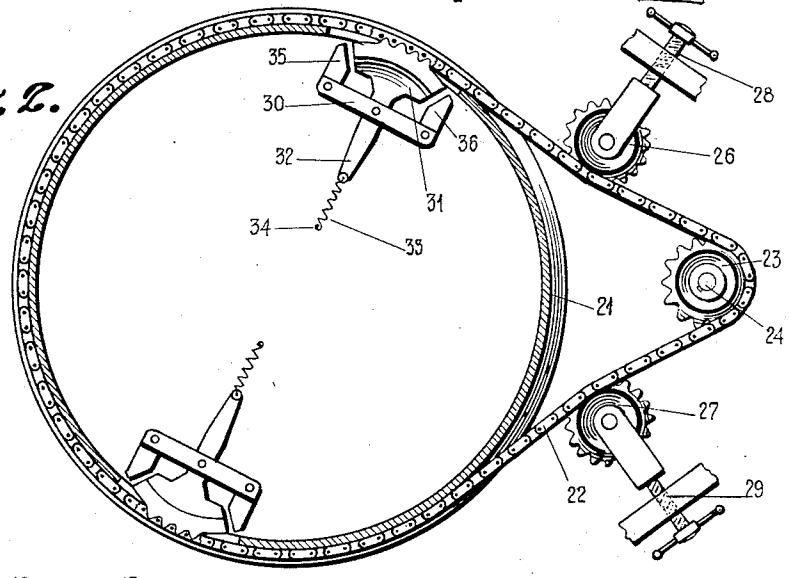
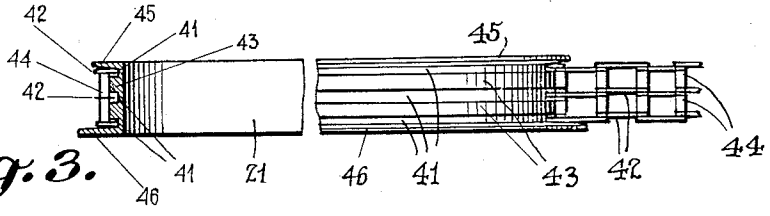


Fig. 3.



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SLUING MECHANISM FOR PORTABLE CRANES

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3 Claims. (Cl. 74—244)

This application is a division of the application filed on March 24, 1932, Serial Number 601,013.

The invention relates generally to portable cranes, such as are used for emergency jobs, as for rescuing trains, motor cars, boats and the like, or for building roads, railways and other buildings for which it is not convenient to assemble a stationary crane, whilst one must hoist very heavy loads, as posts of telephonic or electric lines, feeders etc., and more particularly it relates to an improved sluing mechanism for such cranes.

Sluing mechanisms are already known, in which an endless chain engages with a few teeth of a large sprocket wheel fixed to the jib, but such mechanisms have the same inconveniences as those comprising toothed wheel drives; the great sprocket wheel, which must generally be cast, is indeed very large and heavy, so that the weight of the crane and its dimensions result excessively high and the capacity of the crane must be kept small, if the crane has to be able to travel on common roads.

Sluing mechanisms are also known comprising a chain wound about a crown, which is provided with a series of indentations connected by grooves and preventing slipping of the chain around the crown. When under load, however, the chain stretches out and its links do not engage with the indentations, so that slipping of the chain may occur. These mechanisms have also the inconvenience of too great dimensions and weight, since the crown must be cast.

Sluing mechanisms are further known having ropes fixed by elastic means to a crown, but such mechanisms do not permit the crane to completely revolve about its axis.

The object of the invention is a sluing mechanism having a very low weight and very small dimensions, so that the overall width of the crane may be kept inside of limits suitable for a vehicle, and being at the same time simple, strong and able to make the crane turn completely and in each direction about its axis.

In carrying out the invention a flexible means is provided, connecting a crown fixed on the superstructure or on the base of the crane to a driving wheel operated by a motor. The crown is provided with means adapted to transmit motion by allowing the flexible means to stretch out, and which may consist of sprocket segments pivotally mounted on the crown and returned by a spring, when unloaded into a middle position between two rigid or elastic abutments. Means are also provided for tensioning the flexible means. According to an improved embodiment of the invention the flexible means is a roller chain and the crown has projecting annuli on which the said rollers bear, so that the chain may freely stretch out and slip about the crown.

The appended drawing illustrates diagrammatically a slueing mechanism according to the invention, and there are:

Fig. 1 a lateral view of a portion of a crane embodying a sluing mechanism according to the invention,

Fig. 2 a plan of same, and

Fig. 3 a sectional view of the crown.

According to the figures, the superstructure 1 running by rollers upon a circular rail carries a crown 21 about which a chain 22 is wound and meshes with a sprocket wheel 23 fixed on a shaft 24 driven by a sluing motor 37 through a gearing 25. The chain is tensioned in the zone between wheel 23 and crown 21 by a pair of sprocket wheels 26, 27 which may be pressed against it by means of screws 28, 29. The crown 21 has a special cross-sectional shape (see Fig. 3), permitting the chain to slip freely about it, its rollers 44 rolling upon projecting annuli 43 of said crown, whilst the links 42 are engaged freely by suitably shaped grooves 41 of crown 21, which are limited by rims 45, 46. Thus any friction between chain and crown is avoided and the chain may easily stretch itself under the stresses.

The crown is provided with cross members 30 on which are pivoted sprocket segments 31 carrying levers 32 subjected to the action of a spring 33 fixed to the element 34 of the superstructure. The said segments 31 are arranged inside of slots of the crown and project with their toothed part from the external profile of the crown and mesh with chain 22. The segments 31 may rock about their pivots when drawn by the chain and prop up against abutments 35, 36, thus trailing the crown and the superstructure of the crane.

With this arrangement the inconveniences due to stretching of the chain under load or on account of wear, etc. are fully avoided; as a matter of fact, two or more such segments are provided, distributed along the periphery of the crown, and when the length of the portion of chain comprised between the segments varies on account of wear, etc., said segments rock about their pivots and allow the chain to maintain its tension by rolling freely with its rollers on the annuli 43 of the periphery of the crown. Thus the whole effort is transmitted from the chain to the crown through a single segment, since the others are normally in a non-contacting position.

When the segment carrying the load of the

chain arrives, by revolving of the crown, at the point where the chain abandons the crown, it disengages itself from the chain. The latter slides then by a given amount along the periphery of the crown, until another segment, rocking about its pivot, rests against one of its abutments (35 or 36) and takes the load of the chain. The segment which has disengaged from the chain rocks about its pivot, under the pull of the spring 33, and rests in a position between abutments 35 and 36. When this segment arrives at the point where the chain applies itself again upon the crown, it engages again with the chain. In doing so, it may happen that the teeth of the segment be positioned exactly before the gaps of the chain, and then engagement occurs very easily; but it may also happen that the teeth of the segment be more or less displaced from this ideal position and come into contact with the rollers of the chain. In this case the rollers will bear against the bevelled flanks of the teeth, and by rolling along the said flanks, they will push the teeth laterally, thus making the segment to rock about its pivot until a position is reached, where the teeth of the sprocket segment may exactly engage with the gaps of the chain. The distance of abutments 35, 36 is made so great that such a position may be found in any case; it suffices to this purpose that the sprocket segment can rock about half a pitch in each direction from its resting position.

The sluing mechanism described and illustrated is intended to be indicated merely as an example and many modifications thereof are possible within the invention, in accordance with the appended claims. Thus the grooved crown may be fixed either to the superstructure or to the turntable, whilst the sluing motor could be mounted on the other of said parts; the motor may be either an electric, or a steam, a hydraulic, a pneumatic or an internal combustion engine, or a driven shaft operated by any source of power, either separate or common with the driving means for actuating the various other parts of the crane; the flexible means for actuating the crown may be of any type other than a chain, such as an endless rope, a belt or the like; the coupling means may be other than sprocket segments, such as single yielding, projecting teeth; they may rotate about any centre, even the centre of the crown itself, and they may also have no pivots, being slidable along a guide way or the like; said coupling means may rest against resilient, elastic or yielding abutments.

I am aware that prior to my invention portable cranes have been made with a sluing mechanism comprising endless flexible means driving a crown, therefore I do not claim such a combination broadly, but I claim:

1. In a sluing mechanism for cranes, a crown, a driving wheel, an endless flexible means driven by the driving wheel and operating about the crown, tensioning means for the flexible means, pivotally mounted members on the crown, to couple with the flexible means and pairs of stop devices firmly joined with the crown, of which each one borders on two sides of one of the pivotally mounted members and limits displacement of said members in regard to the crown.

2. In a sluing mechanism for cranes, a crown, an endless flexible means operating about a part of the crown and including rollers, ring struts jutting out from the crown, coacting with the rollers of the flexible means, said rollers resting and rolling on the said struts, pivotally mounted spokes on the crown, means on the spokes to join the said spokes with the flexible means, stop devices firmly fixed to the crown to limit the oscillations of the spokes caused by displacements of the flexible means, and means for returning the spokes to their normal intermediate position when the joining means of the spokes become disengaged from the flexible means.

3. In a sluing mechanism for cranes, a crown having slots in the periphery, a driving wheel for the crown, a chain driven by the driving wheel and operating about the crown and including rollers and ring struts, toothed segments pivotally connected to the crown and projecting through the slots in the periphery of the crown and movable tangentially to the periphery and capable of engaging the chain, pairs of stop devices connected with the crown, of which each pair is arranged to limit the oscillations of a segment, and springs for returning each segment to an intermediate position between the corresponding stop device pair when the segment becomes disengaged from the chain.

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