No. 623,779. Patented Apr. 25, 1899.

A. GRAFTON.

CRANE.

(Application filed Nov. 12, 1898.)

(No Model.)

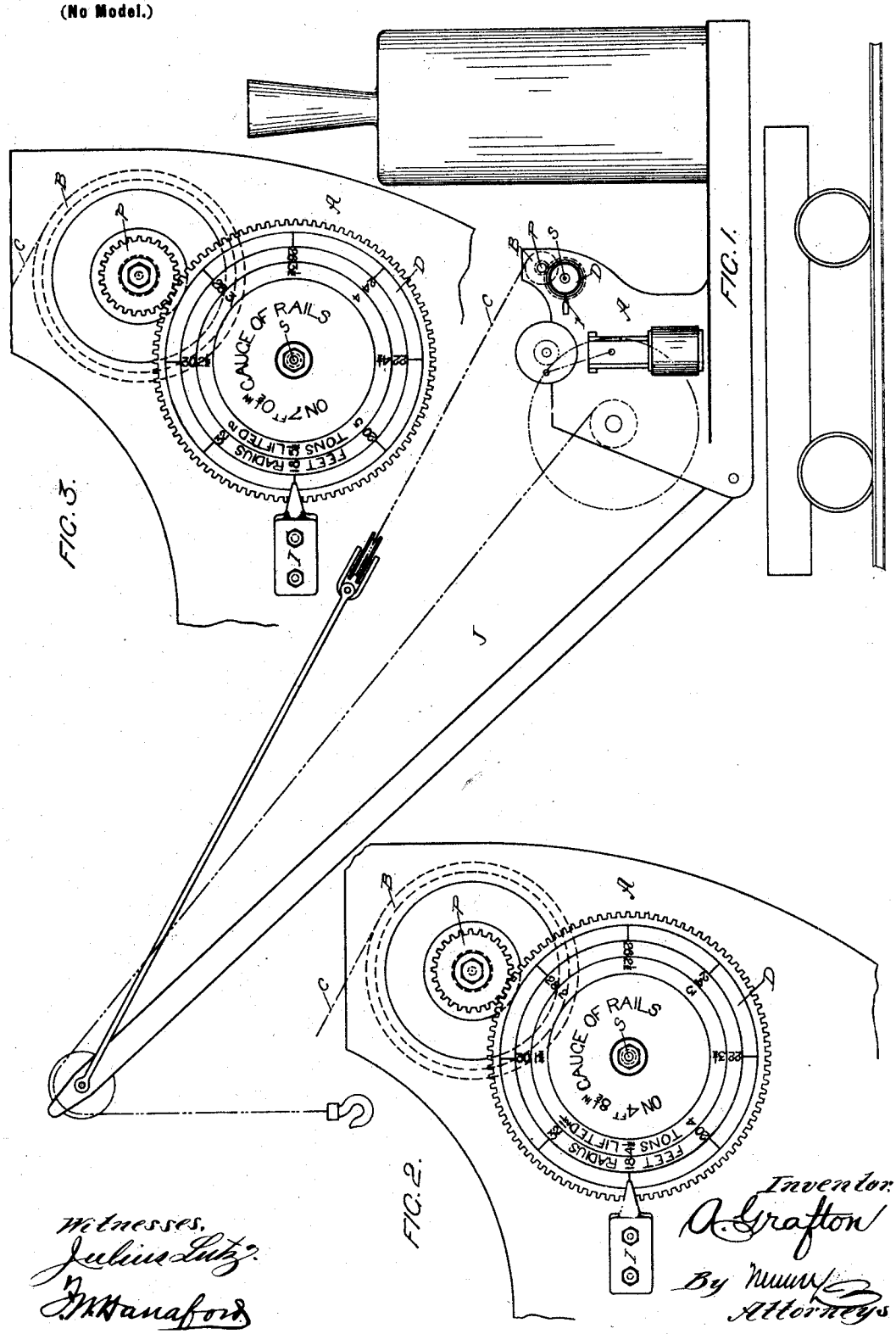


FIG. 1.

FIG. 3.

FIG. 2.

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UNITED STATES PATENT OFFICE.

ALEXANDER GRAFTON, OF BEDFORD, ENGLAND.

CRANE.

SPECIFICATION forming part of Letters Patent No. 623,779, dated April 25, 1899.

Application filed November 12, 1898. Serial No. 696,255. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER GRAFTON, engineer, a resident of Vulcan Works, Bedford, in the county of Bedford, England, have invented new and useful Improvements in Cranes, (for which an application for patent has been filed in Great Britain, dated June 7, 1898, No. 12,686,) of which the following is a full, clear, and exact description.

This invention relates to cranes (especially portable cranes) which are provided with a so-called "derrick-motion" for varying the radius of the crane by varying the vertical angle of the jib; and the invention has for its object to provide means of automatically indicating to the person in charge of the crane the radius of the crane for the time being and the maximum load which may be safely carried at that radius, having regard to the stability of the crane and the strength of the various parts, the indicator serving also to denote the radius which should be adopted in order that a given maximum load may be safely carried.

The invention consists in the combination, with the jib-adjusting gear and in particular with the barrel whereon the jib adjusting and supporting chains are wound or the pulley around which they pass, as the case may be, of a dial and index, whereof the one is carried by a rotatable axis in gear with the said chain barrel or pulley, so as to be revolved thereby, the gearing being so proportioned that the said rotary part will make less than one complete revolution for the maximum number of revolutions of the barrel or pulley required for effecting the adjustment of the jib between the extreme limits employed in practice. This rotary part may be either the dial or the index, the dial being in either case marked with a circular scale or scales denoting the radius of the crane at each of various different adjustments of the jib and the maximum load corresponding to each such radius, so that both indications may be read off at once by reference to the index.

In the case of a portable crane provided with a double set of wheels adapted to run either on rails of ordinary or of extra-wide gage the dial may have two scales differing in the ratio of the load to the radius of the crane in correspondence with the difference of stability of the crane when on a broad or a narrow wheel-base, the scales being either concentric upon the same face of the dial or being preferably on opposite faces of the dial, which would in that case be reversible, so that only one scale is visible at a time.

The invention is illustrated in the accompanying drawings, forming part of this specification, wherein—

Figure 1 is a diagrammatic view of a crane provided with the indicator. Figs. 2 and 3 are face views of the indicator, showing opposite sides of the dial.

The same letters of reference denote like parts in all the figures.

In the example illustrated the dial rotates and the index is stationary. The dial D has engraved or otherwise marked on it a circular scale of, say, eight radial divisions, more or less, corresponding to, say, every two-feet variation of radius of the crane from, for example, eighteen feet to thirty-two feet. The dial is mounted to rotate upon a center stud S, fixed to the main side frame A of the crane and in such position as to be readily visible to the driver whether he be standing on the footplate or on the ground. The periphery of the dial is toothed and in gear directly or through intermediate gear-wheels with a pinion P, fast on the outer end of the journal of the derrick-barrel B, whereon the chains C for adjusting and supporting the jib J are wound, the ratio of the gearing and the divisions of the scale being in such proportion to the jib-adjusting gear that the readings on the dial with reference to a stationary index I, mounted on the side frame A of the crane, will correspond for all adjustments of the jib with the horizontal distances from the crane center to the load-carrying hook. The dial shown is reversible and is removably mounted on its center stud S, on which it is retained by a nut, so that it may be readily reversed, as shown in Figs. 2 and 3.

In order that the division of the scale should correspond accurately with the adjustment of the jib for a given number of revolutions of the barrel, it is desirable that the division should be set off in the first instance by actual reference to a crane, so that the necessary allowance may be made by the contrac-

tion of the scale for the varying angular relation of the jib to its supporting-chains in its different positions of adjustment.

It will be obvious that the dial instead of being itself toothed may be a plain-edged disk affixed to an underlying toothed wheel permanently in gear with the pinion, the rotary connection of the dial with the toothed wheel being, for instance, by a steady-pin on the latter entering a hole in the former, so that when the dial is reversed its correct position with regard to the index and to the then position of the jib will be necessarily insured.

In order to compensate for stretching of the jib-supporting chains, the indicator-radius reading may be corrected from time to time by reference to actual measurement of the crane radius by shifting the intergearing of the teeth of the pinion with that of the dial or the dial-carrying wheel to the extent of one tooth or more, as required.

The index I is preferably at one side of the dial, so that the radius and load readings which come opposite thereto may be read off in one horizontal line; but it will be obvious that the index might be fixed in the vertical or any other radial position.

If the index be the rotating part, it would be fixed on and rotate with the hub of a gear-wheel, such as D, which would not in that case be marked as a dial, the index moving in that case over a fixed dial bearing in concentric circles the two scales of radii and loads corresponding to the broad and narrow wheel-base.

Where, as in the case of some cranes, the barrel on which the jib-adjusting chain C is wound is situated low down near or beneath the foot-plate, the chain being led over a pulley situated in the position here shown as occupied by the barrel B, the pinion P instead of being fast with the barrel would be fast on the shaft of said pulley and turn therewith, so that the indicator would be operated by the passage of the chain over the said pulley in the same way as by the winding of the chain on the barrel, the construction and operation of the indicator being in other respects the same as above described.

I claim—

1. In a crane provided with a derricking or jib-adjusting gear, the combination with the said jib-adjusting gear, of an indicator consisting of a rotatable part geared with the jib-adjusting chain through the medium of its barrel or pulley, so as to be rotated concurrently with the adjustment of the jib and of a stationary part, the one said part being divided to indicate with reference to the other said part the radius of the crane for the time being and the maximum load which may be carried at each radius, substantially as specified.

2. In a portable crane provided with a derricking or jib-adjusting gear, the combination with the said jib-adjusting gear, of an indicator consisting of a dial rotatable in reference to a stationary pointer, the dial being geared with the jib-adjusting chain barrel or pulley, and being divided to indicate for all positions of jib adjustment the radius of the crane for the time being and the maximum load which may be carried at each radius, substantially as specified.

3. In a portable crane provided with a derricking or jib-adjusting gear, the combination with the said jib-adjusting gear, of an indicator consisting of a reversible dial mounted to rotate in reference to a stationary index, the dial being geared with the jib-adjusting chain barrel or pulley, and being divided on both its faces with scales of radii and loads corresponding to various positions of jib adjustment, the load indications of the scales differing for the same radius in proportion to the difference of stability of the crane according as it is standing on a railway of ordinary gage or of extra wide gage, as described.

Signed by the said ALEXANDER GRAFTON this 1st day of November, 1898.

ALEXANDER GRAFTON.

In presence of—

C. G. CLARK,

T. W. KENNARD.