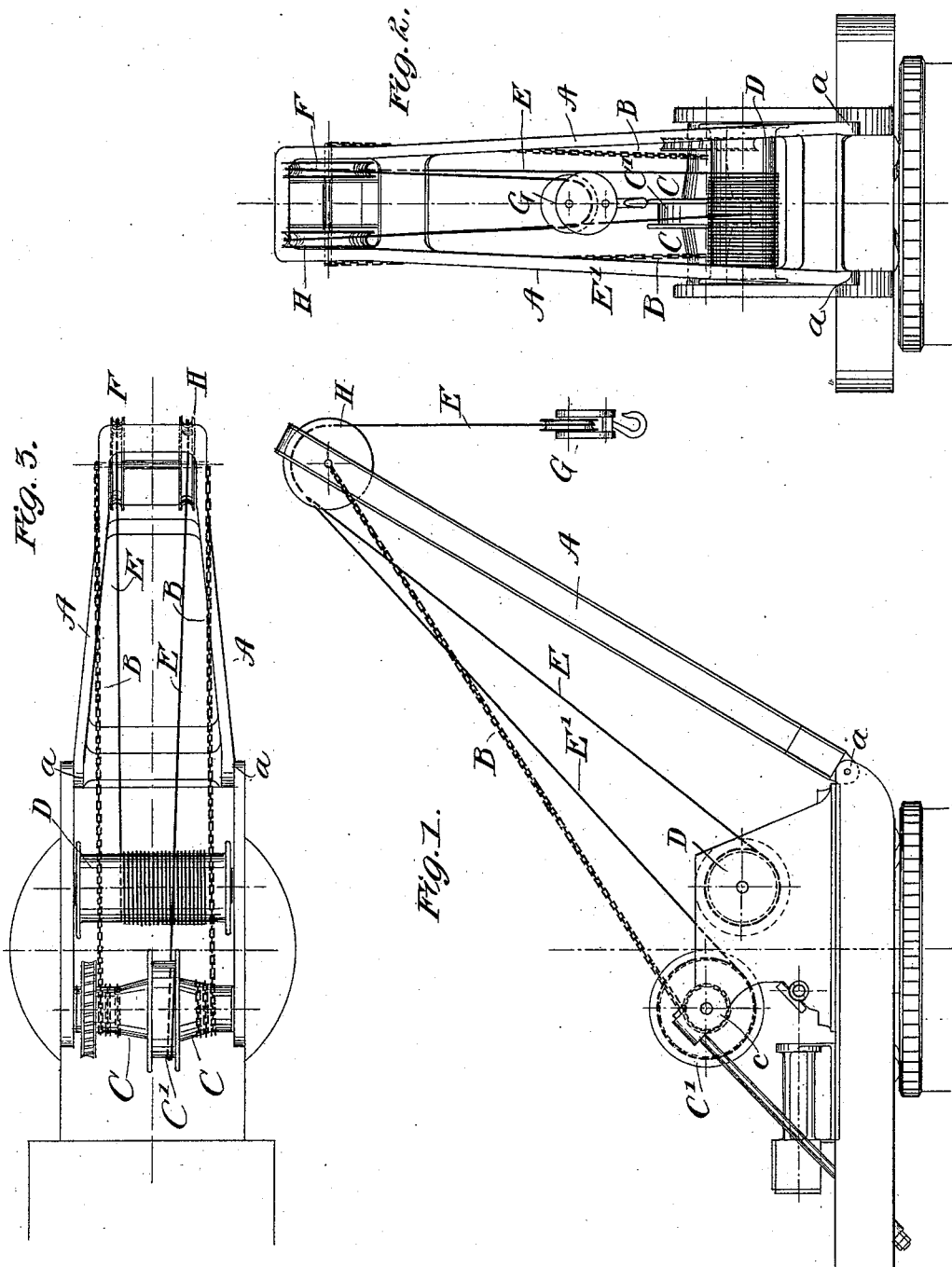


(No Model.)

A. GRAFTON.  
CRANE.

No. 523,705.

Patented July 31, 1894.



Witnesses:  
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Geo. E. Morse,

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by *Brimmer & Smith*  
his Attys.

# UNITED STATES PATENT OFFICE.

ALEXANDER GRAFTON, OF BEDFORD, ENGLAND.

## CRANE.

**SPECIFICATION** forming part of Letters Patent No. 523,705, dated July 31, 1894.

Application filed July 21, 1893. Serial No. 481,114. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER GRAFTON, engineer, of Vulcan Works, Bedford, England, have invented new and useful Improvements in Cranes, of which the following is a full, clear, and exact description.

This invention relates to cranes of that kind whereof the jib is pivoted so that it may be raised and lowered for the purpose of moving the load in a direction radial to the center post of the crane.

The object of my improvement is to provide simple and efficient means by which the load shall be maintained at practically the same height throughout the aforesaid radial motion, in order to relieve the jib-adjusting gear of the extra strain that would come on it were the load raised by the action of raising the jib for the purpose of moving the load toward the center of the crane.

I am aware that it has been the practice to maintain the load at practically the same height by compensating gear whereby the hoisting chain was paid out or wound in by the hoisting barrel during the hoisting and lowering motion of the jib, but this entails the use of special catches and clutches for connecting the hoisting barrel to the jib adjusting barrel and is objectionable by reason of the danger attending the use of such catches and clutches and on other grounds. To avoid these objections while attaining the same result of keeping the load at practically the same height throughout the raising and lowering motion of the jib and thereby relieving the jib adjusting gear of extra strain, as aforesaid, the jib-adjusting gear is caused to so act directly and automatically on the hoisting chain as to pay out the hoisting chain proportionally as the jib is raised and vice versa. For this purpose, the tail end of the hoisting chain (that is to say the end opposite to that attached to the main hoisting barrel) is attached to a second barrel formed integral with the jib-adjusting barrel (or to a barrel in gear therewith) and is wound thereon in such direction with regard to the jib-supporting or adjusting chains, that as the latter are wound up to raise the jib the hoisting chain is paid out and vice versa the relative diameters of the jib-adjusting drum and barrel connected therewith on which these two sets of chains

are wound being so proportioned that the load will be kept at, or nearly at, the same height throughout its radial motion.

Reference is to be had to the accompanying drawings, forming part of this specification, wherein—

Figure 1 is a side elevation; Fig. 2 an end elevation, and Fig. 3 a plan, of so much of steam-crane as is necessary to illustrate the working of my invention.

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

A is the jib pivoted at *a*, B the jib-supporting or adjusting chains attached to the jib-head, C the jib-adjusting drum or barrel on which the chains B are wound, D a hoisting barrel, and E the hoisting chain. The hoisting chain E is wound on the hoisting barrel D and passes thence over the jib-head sheave F, then down under the sheave of a snatch block G by which the load is suspended, and up to the jib-head, all in the ordinary way, but instead of the hoisting chain E being made fast by its tail end to the jib-head as usual, it is passed over a second sheave H at the jib-head and thence continued as at E' to a barrel C' formed integral with the jib-adjusting drum C on which it is wound in the reverse direction to the winding of the chains B. This barrel C' is of a larger diameter than the drum C on which chains B are wound.

The jib-supporting chains B are, for the sake of simplicity, shown as single purchase, or extending directly from the jib-head to the jib-adjusting barrel, but in practice it is preferred to make them double purchase by attaching the end of each chain B to a fixed point of the framing and passing the chain round a sheave connected by a rod or chain to the jib head, and thence to the jib-adjusting drum or barrel C. The relative diameters of the jib-adjusting drum C and the barrel C' will, therefore, be dependent among the other incidental conditions on whether single or double purchase jib-adjusting gear is used, but in any case the proportion is such, having regard to all the conditions of the case, that the load will remain at nearly the same height during the unwinding of the chain E and the winding up of the chains B.

Were the relative diameters of these two

parts C and C' constant, the load would move in a curved line, approximating only to a horizontal plane, in consequence of the angular motion of the jib. To correct this deviation from the horizontal, the parts C of the jib-adjusting drum or barrel on which the chains B wind, are preferably tapered or in the form of a fusee, or the part C' may be in the form of a fusee and the parts C cylindrical, so that in either case the relation between the motions of chains B and E will be so varied that practically absolute constancy of height of the load is obtained.

The crane is provided with the usual steam boiler and engine and with the usual gear for applying the power of the engine to work independently and separately or simultaneously, the hoisting barrel D the jib-adjusting drum C with the barrel C' connected to or formed integral therewith, and the sluing motion of the crane, all in the ordinary manner which it is unnecessary to describe.

As the hoisting drum C and the barrel C' formed integral therewith are wholly independent of the jib-adjusting barrel and each of the parts D and C, C' is operated by its own gear, it follows as an incidental advantage of this invention that the load may if required be lowered while the jib is being raised so as to simultaneously move the load radially inward and lower it as may be necessary, where precision in depositing the load is necessary as for instance in laying foundation blocks, fixing caissons, or placing heavy machinery on its foundations. To effect this it is only necessary to operate the hoisting barrel D concurrently with the jib-adjusting barrel so as to unwind the hoisting chain from both barrels D and C' simultaneously while the jib is being raised.

It will be obvious that a rope may be used instead of a chain for hoisting and that the expression "chain" herein employed covers this equivalent.

It will be further obvious that instead of winding the tail end E' of the hoisting chain

E on the barrel C' of the jib-adjusting drum it might be wound on a separate barrel in gear with the jib-adjusting drum so that the hoisting chain shall be unwound as the jib-supporting chains are wound in and the strain on the hoisting chain due to the weight of the load shall act in opposition to the strain on the jib adjusting chains B.

I claim—

1. In a crane, the combination of a barrel C', a jib, a jib adjusting drum C connected with the barrel C', a jib adjusting chain B connected to said jib adjusting drum for raising and lowering the jib, a barrel D, a chain E E' wound in an opposite direction to that of the jib adjusting chain C and having one end attached to the barrel C' and the other to the barrel D, the diameters of the jib adjusting drum C and the barrel C' being of different extent and such with relation to each other as to maintain the load at a practically constant height throughout the raising and lowering motion of the jib, as specified.

2. In a crane, the combination of a jib, an adjusting drum, a barrel C', and a chain for raising and lowering said jib, a barrel D, chain E E' having one end wound on the barrel D, the other end passed over sheaves on the jib and wound in an opposite direction from that of the jib-adjusting chain on the barrel C' integral with the jib adjusting drum, whereby the strain on the tail end of the chain will act in opposition to the strain on the jib adjusting chains and the chain E E' will be paid out as the jib adjusting chains are wound up so as to maintain the load at an approximately constant height throughout the raising and lowering motion of the jib or whereby the crane can be operated in the ordinary manner by the barrel D, as specified.

Dated this 27th day of June, 1893.

ALEXANDER GRAFTON.

Witnesses:

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