



# UNITED STATES PATENT OFFICE.

THOMAS JAMES, OF BRADDOCK, PENNSYLVANIA.

## CRANE.

SPECIFICATION forming part of Letters Patent No. 453,006, dated May 26, 1891.

Application filed September 15, 1890. Serial No. 364 962. (No model.)

To all whom it may concern:

Be it known that I, THOMAS JAMES, of Braddock, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Cranes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 shows in side elevation the jib of a crane and my improved mechanism for moving the trolley longitudinally on the jib. Fig. 2 is a plan view thereof.

In cranes used in mills and steel plants it is necessary to employ some power mechanism for moving the trolley back and forth on the jib. A hydraulic cylinder is the mechanism most available for this purpose, but as heretofore used the cylinder must have a length of stroke equal to the length of travel of the trolley, and the inconvenient length of such cylinder and its great weight have so incumbered the cranes as to impede their operation and materially to increase their cost. To remedy this serious practical difficulty is the object of my invention, which makes it possible to use a cylinder of short stroke and of comparatively small and convenient size and light weight.

In the drawings, 2 represents the mast of a crane. 3 is the jib, 4 a usual strengthening strut or brace, and 5 is the trolley, to which the burden of the crane is connected and which is adapted to be moved back and forth on the jib.

6 is a double-acting cylinder set on the jib and having the usual fluid inlet and discharge ports 7 8 at its ends. This cylinder is of short stroke, and its plunger 9 is attached to a cross-head 10, which moves in a suitable guide 11. This guide preferably forms part of a standard or casting 12, which is bolted to the jib, as shown in Fig. 1. The cross-head is connected with the trolley by a system of levers *a b c d*, constituting a parallelogram, the levers *a* and *b* being pivotally connected at one end to the cross-head, the levers *c d* pivotally connected with the trolley, and the levers *a* and *b* being pivotally connected with the le-

vers *c* and *d*, respectively. These levers are preferably made of flanged beams, such as I-beams, star-iron, &c., so that they shall have sufficient rigidity without excessive weight. In order to maintain proper parallelism of the levers and to cause them to act in the manner hereinafter described, I connect the levers *a* and *b* by diagonal lever-arms or toggles 13 to a fixed point on the jib, which point may be on the standard 12. The levers *a b c d* constitute a lazy-tong system of levers, and their action is to multiply the extent of motion of the plunger 9. Thus if the plunger be projected to the end of its stroke from its most retracted position, (shown in Fig. 1,) the effect is to straighten the lazy-tong levers into nearly upright positions and to retract the trolley a distance much greater than the length of the plunger's stroke, as indicated by dotted lines. A reverse movement of the plunger will project the trolley on the jib.

The advantages of my improvement will be appreciated by those skilled in the art. The trolley-moving mechanism is reduced to a very small compass, expense is saved, and by affording more space on the jib for the operation of the trolley the effective capacity of the crane is correspondingly increased.

Modifications in the form and arrangement of the parts within the scope of my invention, as hereinafter defined, will suggest themselves to the skilled mechanic.

I claim—

1. In crane mechanism, the combination, with the trolley and jib, of a motor adapted to move the trolley on the jib, and lazy-tong levers connecting the moving part of the motor with the trolley and adapted to multiply the motion of the motor, substantially as and for the purposes described.

2. In crane mechanism, the combination, with the trolley and jib, of a motor adapted to move the trolley on the jib, and levers *a, b, c, d*, and 13, constituting lazy-tongs, connecting the moving part of the motor with the trolley, substantially as and for the purposes described.

3. In crane mechanism, the combination,

with the trolley and jib, of a motor adapted  
to move the trolley on the jib, a cross-head  
guide and a cross-head connected with the  
moving part of the motor, and lazy-tong le-  
5 vers connecting the cross-head with the trol-  
ley, substantially as and for the purposes  
described.

In testimony whereof I have hereunto set  
my hand this 9th day of September, A. D.  
1890.

THOMAS JAMES.

Witnesses:

THOMAS W. BAKEWELL,  
W. B. CORWIN.