No. 650,130. Patented May 22, 1900.

D. D. LEWIS.

SAFETY DEVICE FOR CRANES.

(Application filed Jan. 16, 1900.)

(No Model.) 2 Sheets—Sheet 1.

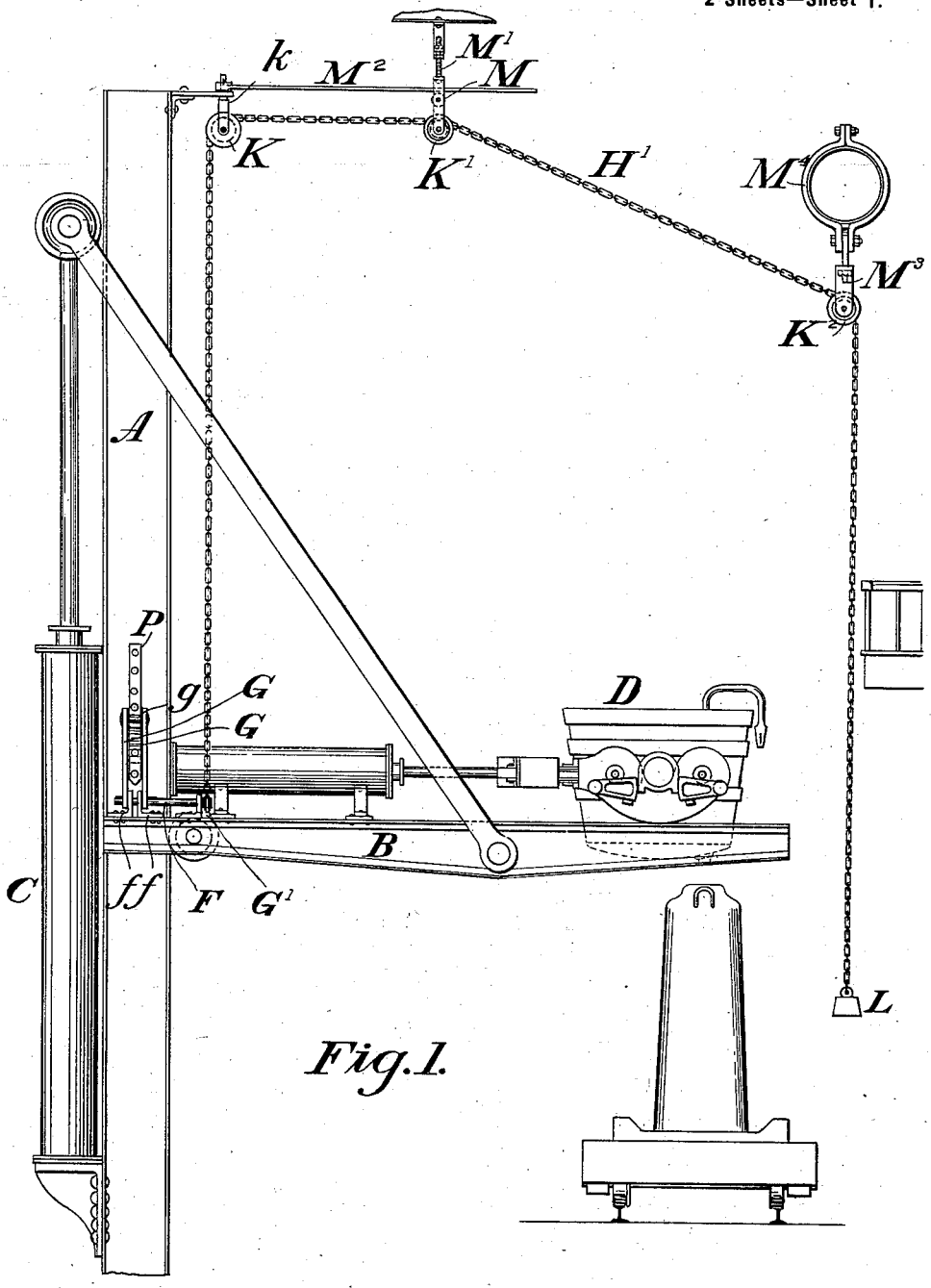

Fig. 1.

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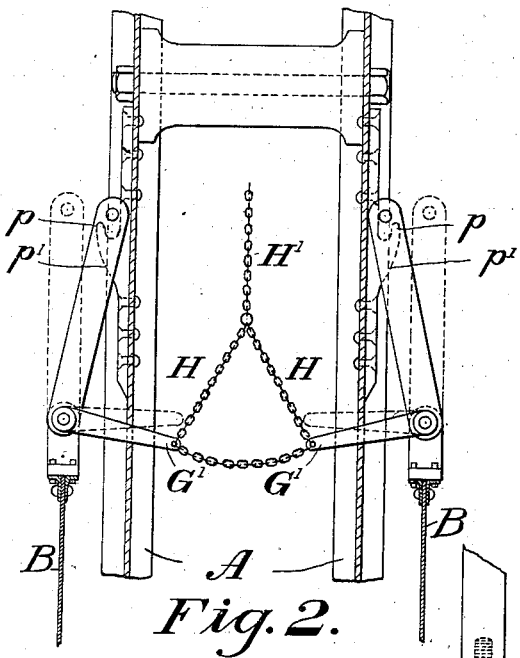

Fig. 2.

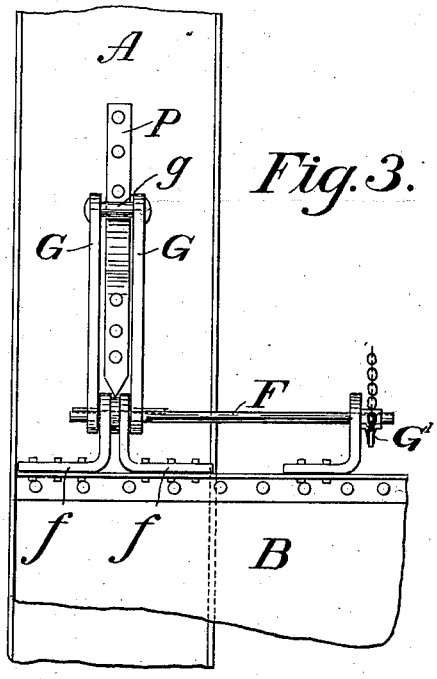

Fig. 3.

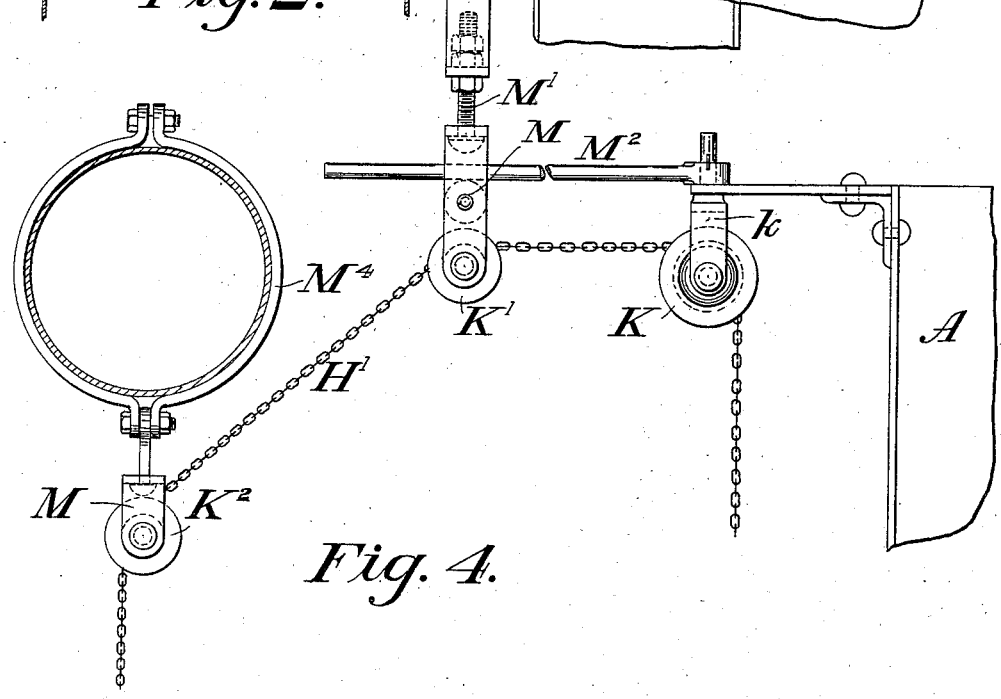

Fig. 4.

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DAVID D. LEWIS, OF LORAIN, OHIO.

SAFETY DEVICE FOR CRANES.

SPECIFICATION forming part of Letters Patent No. 650,130, dated May 22, 1900.

Application filed January 16, 1900. Serial No. 1,627. (No model.)

To all whom it may concern:

Be it known that I, DAVID D. LEWIS, of Lorain, in the county of Lorain and State of Ohio, have invented a new and useful Improvement in Safety Devices for Cranes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention has relation to a safety device for cranes, and is more particularly designed for use in connection with the heavy cranes employed in the Bessemer-steel practice for handling the ladles which receive the molten metal from the converters and carry it to the ingot-molds. It is, however, useful in connection with vertically moving and swinging cranes generally.

The object of the invention is to provide means which will in case of breakage or derangement of the hydraulic or other crane-operating mechanism operate automatically to catch the crane-arm, and thereby prevent accident.

With this object in view my invention consists in the combination, with a crane-post and movable crane-arm, of coöperating safety devices carried by said post and adapted upon the descent of said arm to engage each other, and thereby support the arm and its load; also, in the provision of means whereby in the normal operation of the crane such engagement may be prevented and the crane-arm be lowered without obstruction.

The invention also consists in the novel construction and combination of parts, all as hereinafter described, and pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of a ladle-crane embodying my invention; Fig. 2, a front view of a portion of the same on a larger scale; Fig. 3, a detail view of one of the safety-links detached, and Fig. 4 a detail view showing in side elevation the arrangement of guide-pulleys for the operating-chain.

The letter A designates the vertical crane-post, which turns in bearings at its upper and lower ends. B is the bifurcated horizontal crane-arm, which embraces the post A and moves up and down on guides thereon by the action of a hydraulic cylinder C. D is a ladle supported on trunnions on said arm. These parts are in general of any well-known construction and need not be further described.

Secured to each lateral member of the crane-arm are brackets *f*, in which are journaled short rocker-shafts F, running parallel with the crane-arm. Fastened to each of said shafts is a pair of upwardly-extending links G, connected at their upper ends by a pin *g*. At the opposite end portion of said shaft is an arm G′, which extends transversely over toward the other shaft. Connected to the inner ends of the two arms G′ are short chains H, which are connected to each other and also to the lower end of a chain or cable H′. The chain H′ extends upwardly to a point near the top of the crane-post A, thence horizontally over guide-pulleys K, K′, and K^2, and thence down within reach of the crane-operator's platform, its lower end extending below said platform and provided with counterweights L. The guide-pulley K is hung from an arm *k*, connected to the post A. The pulley K′ is journaled in a bracket M, swiveled to a depending support M′, (see Fig. 4,) said bracket being engaged by a horizontally-extending rod M^2, secured to the arm *k*. The guide-pulley K^2 is journaled in a bracket M^3, which is swiveled to a suitable overhead support M^4. It will be readily seen that the three guide-pulleys, being supported in the manner described, will follow the swinging movement of the crane-arm to maintain the same relation thereto in all positions of the said arm.

P P designate the hook-plates, one of which is firmly secured to each side of the crane-post A. On each of these plates is a hook projection *p*, led up to by a curved surface *p′*. These hooks are so placed that when the crane-arm is at its highest elevation the pins *g* of the links G will be slightly above the hooks, but in position to engage the same should the crane-arm fall. (See the full-line position, Fig. 2.) In this position should any accident occur to the hydraulic or other crane-operating mechanism of a character to let the crane-arm fall the link-pins *g* will at once engage the hooks, and thus support said arm with its load. In the normal operation of lowering the crane-arm it is necessary for the operator to pull on the chain H′, which rocks the shafts F and throws the links G

sufficiently away from the post A to clear the hooks *p* in their descent.

It will be readily seen that the device is useful in other connections than that shown and described where cranes of this type are employed. Hence I do not wish to limit myself to its use in this connection; nor do I wish to limit myself to the details of construction and arrangement which I have herein shown and described, as these may be varied without departing from the spirit and scope of my invention as set forth in the appended claims.

Having thus described my invention, what I claim, and desire to protect by Letters Patent, is—

1. The combination with a crane-post, and a vertically-movable crane-arm, of coöperating safety devices carried by said arm and post, in position to automatically engage each other upon the descent of the said arm and thereby support the latter, together with means for normally preventing such engagement.

2. The combination with a crane-post, and a vertically-movable crane-arm, hooks secured to said posts, and links adapted to engage the said hooks and support said arm in elevated position, together with means for preventing such engagement in the normal operation of the crane.

3. The combination with a crane-post and a vertically-movable crane-arm, of a swinging link on said arm arranged to automatically engage said post to support said arm, and means for preventing such engagement in the normal operation of the crane.

4. The combination with a crane-post, and a vertically-movable crane-arm, of a swinging link on said arm, a hook on the crane-post arranged to be engaged by the said link, and means for moving said link to normally prevent such engagement.

5. The combination with a crane-post, and a vertically-movable crane-arm, of swinging links on said arm, two hooks secured to said post and arranged to be engaged by the respective links, and means common to both links for moving them out of position to engage the said hooks.

6. The combination with a crane-post having hooks secured thereto, and curved surfaces leading up to the said hooks, of swinging links arranged, as the crane-arm rises, to ride up said curved surfaces into position to engage said hooks upon the descent of said arm, and means for swinging the links away from the post to prevent such engagement.

7. The combination with a crane-post having hooks secured to opposite sides thereof, a vertically-movable crane-arm having swinging links pivoted thereto and arranged to engage the respective hooks, arms connected to the pivots of said links, and means connected to the said arms for swinging the said links, substantially as described.

8. In a safety device for cranes, the combination with the rotary crane-post, the vertically-movable crane-arm supported by said post, and the swinging safety-links pivoted to the crane-arm and arranged to engage hooks on the said post, of the arms connected to the pivots of the said links, the counterweighted chain or cable, connected to said arms, and the swiveled guide-pulleys for said chain or cable.

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

DAVID D. LEWIS.

Witnesses:

H. M. DAVIES,

D. W. LAWRENCE.