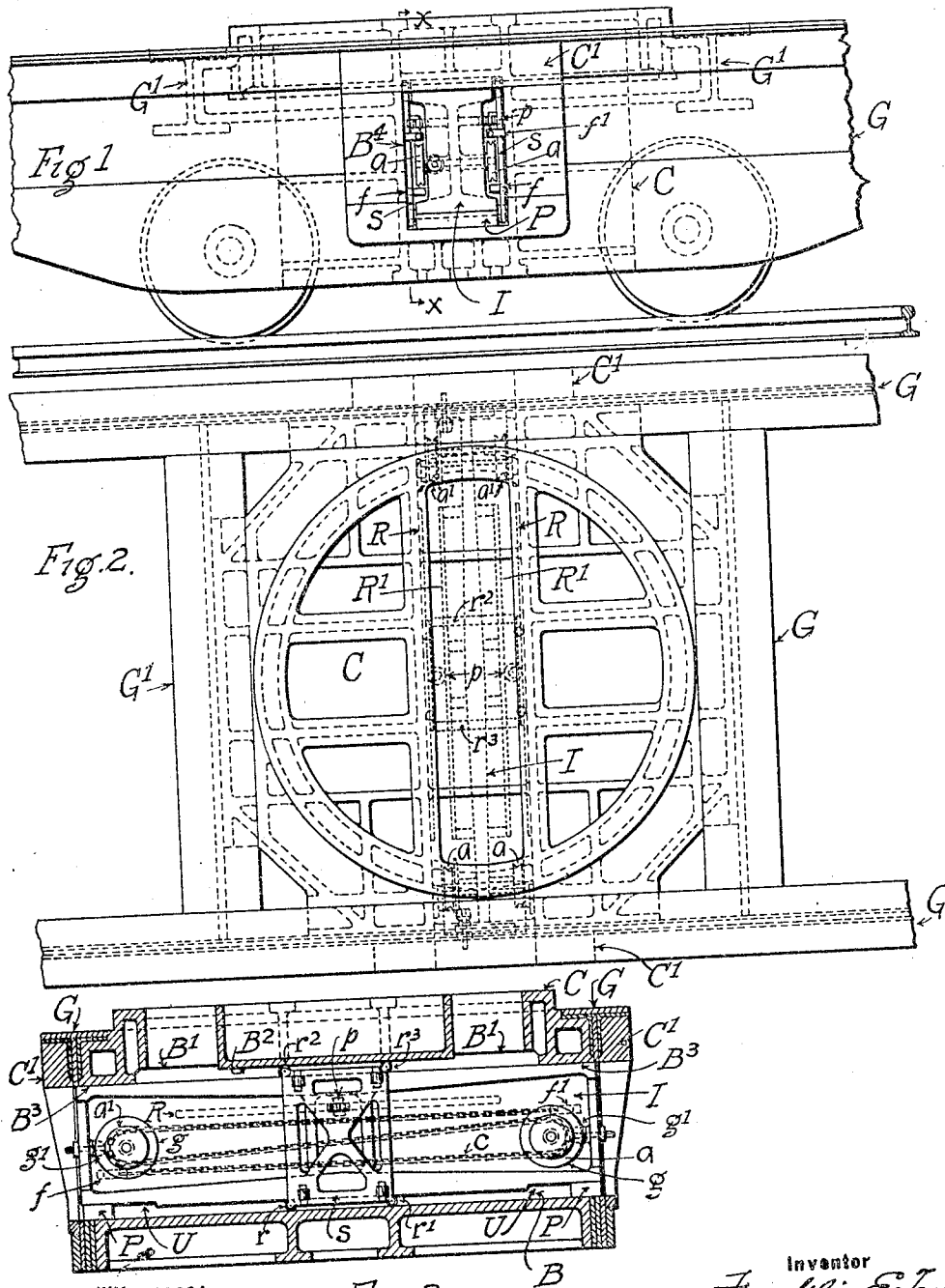


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JACK BEAM.
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3 SHEETS—SHEET 1.

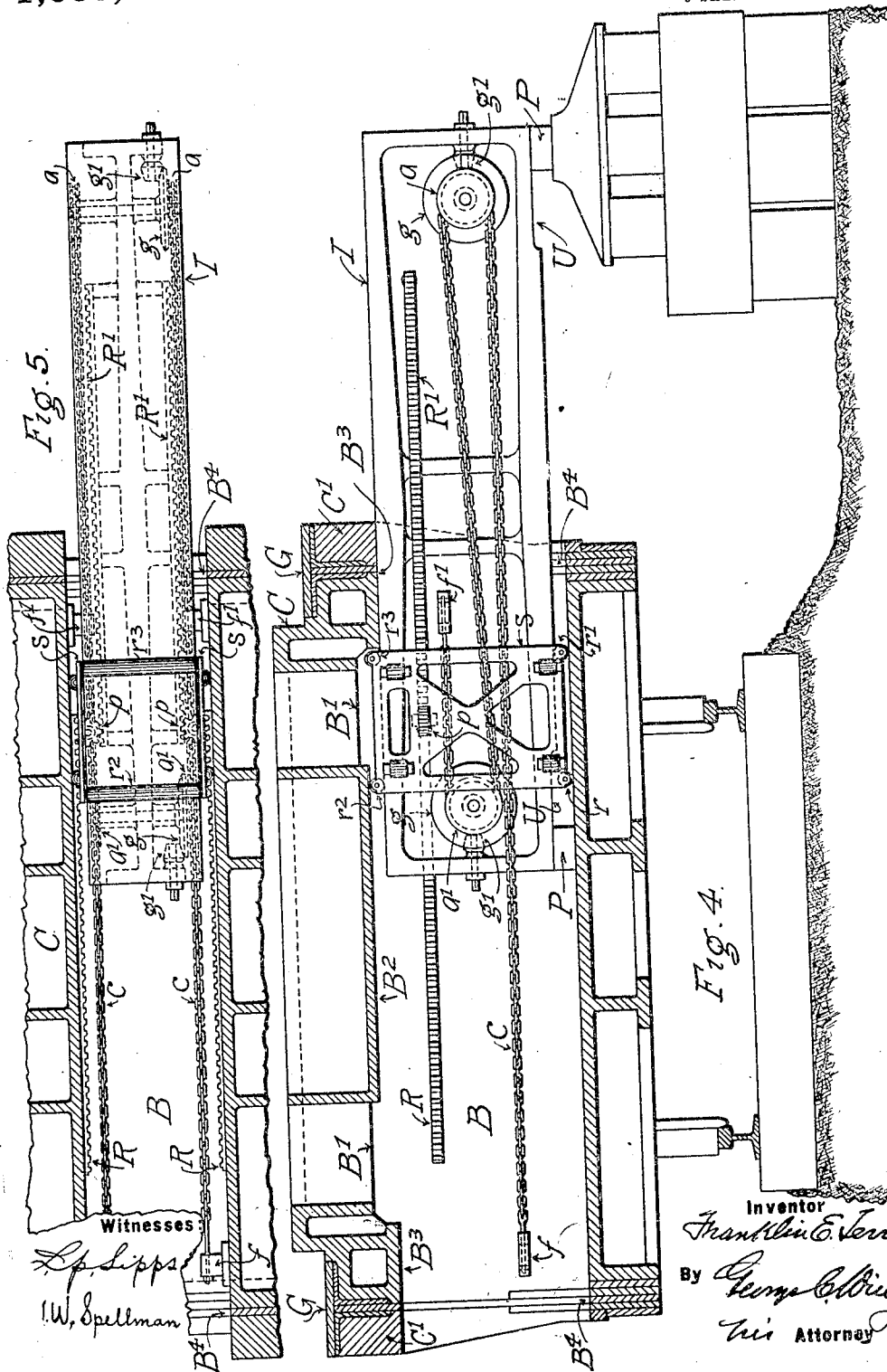


Witnesses:
L. P. Lipps
G. W. Spellman

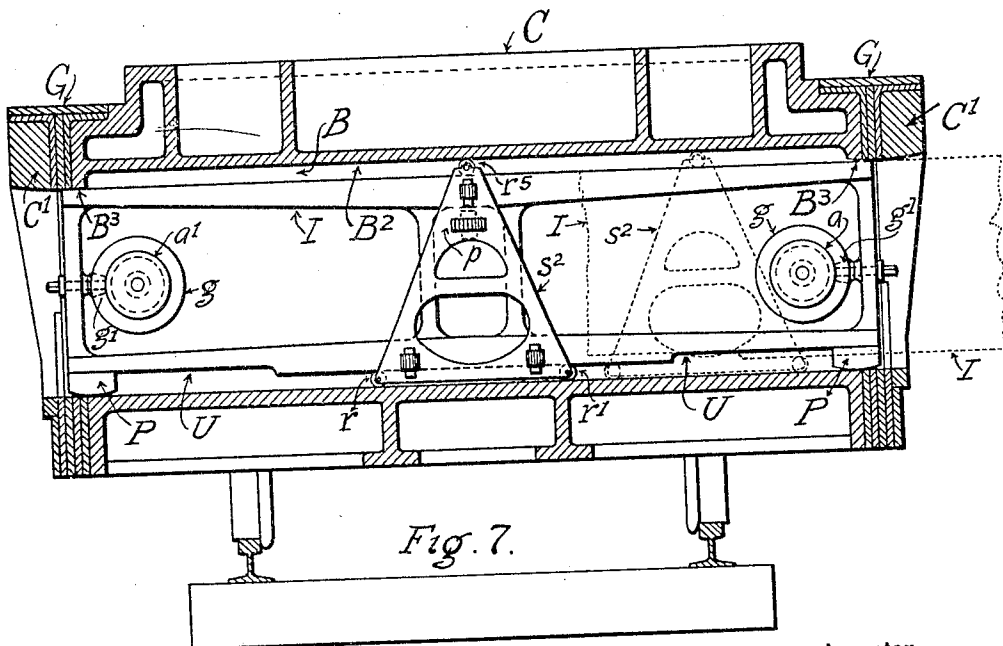
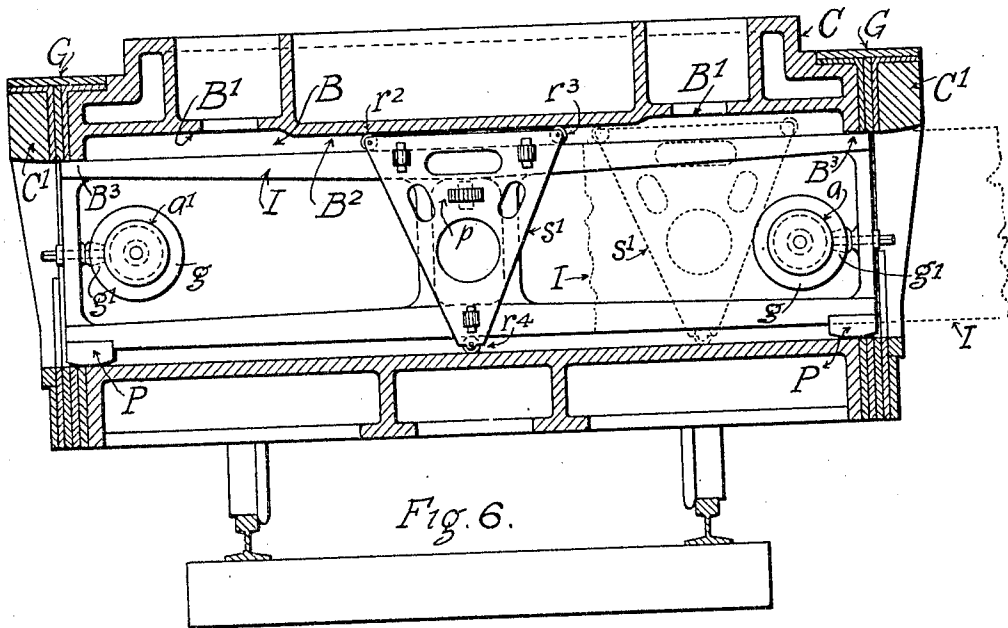
Fig. 3.

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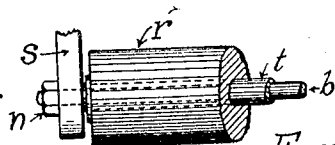
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UNITED STATES PATENT OFFICE.

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JACK-BEAM.

1,035,267.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANKLIN E. TERRILL, a citizen of the United States, residing in the city of Cleveland, county of Cuyahoga, and State of Ohio, have invented a certain new and useful Improvement in Jack-Beams, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, that form a part of the specification, wherein similar parts are designated by the same letter in each case.

The improvement is of a character that will have its more general application and use in connection with, and as a feature of wrecking cranes to increase their stability in action, and insure the same against overturning, or undue strain upon the parts, when abnormal loads are undertaken. To this end, as is well understood, cranes of this class are customarily provided at the corners of the same with so-called jack-arms or beams, that may be let down or extended, beneath or in line with the boom and load, in a manner to widen the area of the crane's base in that direction. Similarly, and as supplemental to these corner jack-arms described, a horizontal girder or "jack-beam" is so mounted at the middle point of the crane as to lie transversely within the frame during transit, but to be capable of being drawn out therefrom in action, through its length on either side, until one end remains and is upheld by the crane itself, and the other end rests upon blocks, or other exterior supports provided for the purpose.

The design of the present invention is to so fashion and mount jack-arms and beams, in wrecking-cranes of the kind referred to, that their extension and jacking-up may be brought about with a minimum of force, and, without any crushing of the parts involved. This result is accomplished by the method relating the beam to the crane proper that is now to be pointed out and described.

In the drawings Figure 1 is a side view of the portion of a crane wherein the improvement is immediately located. Fig. 2 is a plan view of the portion shown in Fig. 1. Fig. 3 is a transverse sectional view, through the line x, x , of Fig. 1, when the lateral jack-beam is in its withdrawn position. Fig. 4 is an enlarged side-view of the jack-beam, when extended, with a transverse sectional view of the supporting por-

tion of the crane itself. Fig. 5 is a plan view of the beam, as shown, in Fig. 4 and of surrounding portions of the crane-body. Fig. 6 is a side view of a modified form of mounting the beam within the crane, with dotted lines to indicate its relation thereto when withdrawn. Fig. 7 is a like view of a further modification of the method of so mounting the same, and Fig. 8 shows one end of the rollers used in the previous figures with a portion of the axles of the same.

The crane-body or frame itself comprises longitudinal side-beams or girders G , that are connected together by the cross-girders G^1 . Supported by these several girders, centrally of the frame as a whole, I locate a four-sided steel casting C , to serve, primarily, as the base and support for the usual turn-table of the crane, and as a housing B , for the center jack-beam I . To this end the casting itself is made box-shaped on its under side, cross-wise of the crane, with the ends of the box-shaped portion meeting and corresponding in dimension and outlines with openings B^4 in the opposite girders G . A bearing-plate or casting C^1 preferably surrounds these openings, on the exterior face of the girders, the upper cross part or portion of the plates, as shown, being substantially thicker than the remaining portion of the same, and slightly rounded along their lower outer edges, as indicated in Figs. 6 and 7.

The top or upper side of the rectangular housing B , is interrupted and uninclosed, through cross-portions thereof B^1, B^1 , near the ends of the same, for the purpose to be more fully explained. The under surface of the top-side of the housing is preferably in two parallel planes, namely, the superficial central portion B^2 , lying between said open spaces B^1 , and the relatively lower superficial portions B^3 at the housings' ends.

The jack-beam proper I , is mounted within the housing B , upon rollers r, r^1 , that extend across the bottom of the housing at suitable distances from each other to afford a stable bearing and equilibrium for the beam when in its normal position within the crane. This spacing between the rollers is maintained by engaging them axially at their ends with two upright parallel plates or castings s , within and at the sides of the housing for the purpose. Across and near the top of the plates s , and similarly engag-

ing the same, rollers r^2 and r^3 are arranged to receive the upward thrust of the jack-beam as it is drawn out, and, as a desirable means for steadying the movements of the jack-beam within said housing, I show pinions p , duly journaled within the plates, at suitable points to mesh with racks R and R^1 located respectively, along the housing and jack-beam through the distance to be traveled by said rollers in their destined use. As shown, said plates s are held in their fixed parallel relations with each other by means of tubes t , that pass through said rollers axially into bearing, at each end, against the plates, in which position they are firmly held by rod-bolts b , which pass through the plates, and the intermediate tubes t , and are secured in such position by the end-nuts n , the whole making up a sort of roller-carriage for said beam. As will be evident the rollers r and r^1 , when thus threaded on said tubes between the side plates s , will be free to turn and move, with their sustaining plates s , in the same direction as the jack-beam I when the latter is drawn in or out of the housing, upon and over said roller-carriage. The distance said rollers will travel, will, of course, always be but one-half the distance traveled by the beam in the same time.

The jack-beam I , itself, as shown, consists, in the main, of a single I beam casting, of suitable dimensions to be located within the housing at a movable fit. Across the underside of the lower flange of said beam, at each end of the same, I provide bars or downwardly projecting protuberances P , to serve as contact or bearing pieces for the beam, and, thereby relieve the rollers from the crushing force to which they would otherwise be subjected, when said beam is extended from the housing and jacked up into its load-sustaining position. Said protuberances may be of rectangular section, convex, or rocker-shaped, or of any other suitable form for the purpose, and, if desired, for convenience in assembling the apparatus, they may be removable with respect to their places on the beam. They, of course, should not extend so far below the beam as not to clear the floor of the housing when the beam is resting upon the rollers in its normal position.

It is evident that, as soon as the center of gravity of the beam I , as the latter travels outwardly with the roller-carriage, has overhauled the forward one of said rollers, the beam will fulcrum upon the forward roller and its inner end be tilted out of bearing with the rear roller. The latter roller, under such conditions, will become idle, but, in order to insure that it shall not again come into bearing with the beam and be subjected to a crushing force by the same when the outer end thereof is jacked up, the ends

of the beam, on the under surface of its lower flange, are cut away in rabbet-like recesses U , from the point as just stated where the front roller, for the time being, takes on the entire weight of the beam in its outward travel and the rear roller becomes idle. By reason of this recess, and of the downwardly projecting contact or bearing pieces P , when said projecting end is raised, the bearing-piece P , at the inner end of the beam, will at once meet the floor of the housing and become the fulcrum (instead of the rear roller as would otherwise be the case) around which the beam is moved upwardly, into an operative position, to and against the bearing-plate C^1 .

The location of the upper or thrust rollers, corresponding with r^2 and r^3 in Figs. 3 to 6, and r^5 , in Fig. 7, in order to best serve their functions, should be such that when the center of gravity of the beam, in its travel, has overhauled, or passed the forwardmost lower roller, the thrust-roller, if there be but one, (Fig. 7) or the rearmost of a set of such rollers, shall be behind a vertical from said supporting roller; and, the location and dimensions of said upper spaces B^1 , B^1 , must be such as to afford ample clearance upward for the thrust-roller, if there is but one or for the forwardmost of the thrust-rollers, (if there are more than one) when the beam I , having been withdrawn from its housing, is jacked up against the bearing plate C^1 .

Figs. 6 and 7 disclose modifications of the roller-carriage feature shown in the other figures, with corresponding variations in the extent of the trackways, and the manner of providing for the clearances referred to. In Figs. 6 and 7, the retaining plates s^1 and s^2 , instead of being rectangular like the plates s , are triangular, with the rollers in engagement with the same at the several angles. The plates themselves—and, in consequence, the thrust and supporting rollers—are arranged reversely in the two figures, there being but one supporting roller r^4 , in the modification illustrated in Fig. 6, with two upper or thrust-rollers, r^2 and r^3 , while, in Fig. 7, there is but one upper or thrust roller r^5 , with two lower or supporting rollers r and r^1 . In each modification, however, as will be seen, whether the two rollers that are in tandem, serve as thrust or as supporting rollers, they will afford, in either case, all the resistance required against any premature tilting of the beam I , as it is drawn outwardly with the roller-carriage. It is also plain that, in either of said modifications, the same provision for clearance for the rearmost roller of the pair must be made as in the roller-carriage arrangement shown in the earlier figures, which is done by cutting away the beam as at U in such figures when the base-rollers serve

to support the beam, or by cutting away the top of the housing, as at B¹, when the pair of rollers serve to take the thrust. As to the roller, in the apex of the plate, however, it is further apparent that no provision corresponding with the spaces B¹, and U, will be required. As a means for actuating the jack-beam in and out of said housing, I show a chain-gear system, wherein chains c, c, are fastened, at one of their terminals to the crane-body or frame at f, thence forwardly, at each side, respectively, of the housing, through the same to and around pocket-chain wheel a, a, at the farther end of the beam I, thence backwardly to and around similar pocket-chain wheels a¹, a¹, in the opposite end of said beam, to an anchorage f¹ on said frame.

g and g¹ are, respectively, a bevel gear and pinion, at each end of the beam, for actuating the chain-gear system described; these may be operated by a crank.

In Figs. 6 and 7, I show the castings C¹ and P as arc-shaped along their bearing surfaces, in order to more equally distribute the strains at such points.

The jack-beam being in its normal position within the housing, and resting and duly balanced upon the rollers r and r¹ as shown in Fig. 3, in order to extend the same into operative position at the side of the crane at which the load is to be picked up, the bevel gear and pinion g and g¹, are cranked in a direction to pull against the anchorage f¹. Thereupon, the end of the beam to which wheels a¹ are attached, will be brought toward the anchorage at f¹, and the other end correspondingly projected outwardly over and upon its supporting roller or rollers in the housing B. Its advance will necessarily be at twice the distance in the same time as said roller or rollers which will result in the center of gravity of the beam (which at the start was midway of the several rollers involved) changing from its original location with respect to said rollers, to a point forwardly of the same. The beam will consequently tend to tilt downwardly over its then supporting roller, as to the forward portion of the same, and upwardly against the thrust-roller that is farthest from said tilting point as to the rear portion. In the meantime, however, when the rollers are in pairs, the rearmost supporting roller will have been relieved of strain, and be below the recessed portion U of the beam, while the foremost of the thrust-rollers will have passed below a space B¹, with ample clearance, in the one case, from the beam I, and in the other, from the housing B when the beam is finally jacked up at the outer end. This is next done in the usual manner and the crane is ready for its load. When the load is taken on, under the conditions just assumed, the crane will manifestly be

sustained by the beam at the three points P, C¹ and P, and, the rollers themselves will be entirely out of bearing and without superimposed weight or strain.

What I claim and wish to secure by Letters Patent, is:—

1. The combination, with a supporting frame-work, of rollers movably mounted therein, a jack-beam movably mounted on said rollers, said beam having a bearing-piece projecting downwardly at the end, and having its lower portion near said end suitably recessed to be out of contact with the rollers on which it is mounted when said beam, having been moved outwardly from said frame-work, is extended and rotated upwardly upon said bearing-piece, substantially as shown and described.

2. The combination, with a supporting frame-work, of rollers movably mounted therein, a jack-beam suitably mounted on said rollers to be moved outwardly thereon from said frame-work, bearing pieces projecting downwardly from the ends of said beam, and suitable recesses in the lower side of the beam to permit the latter to be raised upwardly around said bearing-pieces without contact with said rollers when one of said rollers is beneath the same, substantially as shown and described.

3. In a wrecking crane, or similar apparatus, having a housing through the same, the combination of a roller-device in said housing adapted to travel along the floor of the housing, a jack-beam movably mounted on the rollers in said device, having downwardly extending bearing pieces at the ends thereof, and suitable clearance spaces along said ends for said rollers when the beam is rotated upwardly around said pieces, substantially as shown and described.

4. In a wrecking crane, or similar apparatus, having a housing through the same, the combination of a roller-device within said housing comprising one or more rollers in bearing with the floor of the housing, and one or more rollers in bearing with the top thereof, a jack-beam, having downwardly extending bearing-pieces at the ends, movably mounted upon the rollers in bearing with said floor, together with clearance spaces in said beam and housing for said rollers when the beam is rotated upwardly around said pieces, substantially as shown and described.

5. In a wrecking crane or similar apparatus, having a housing through the same, the combination of a roller-device in said housing provided with rollers, at the bottom and top thereof, in operative bearing, respectively, with the bottom and top of said housing, a jack-beam movably supported, within said carriage, on the bottom rollers and in bearing with the rollers at the top, said beam being provided with downwardly ex-

tending bearing pieces at the ends, and suitable clearance spaces in said beam, and housing for said rollers when beneath the same and the beam is rotated upwardly
5 around said pieces from an extended position with respect to the crane, substantially as shown and described.

6. In a wrecking crane, or similar apparatus, the combination of rollers movably
10 mounted therein, a jack-beam, movably mounted on said rollers, having downwardly extending bearing-pieces at the ends thereof, and suitable recesses therein to give clearance to said rollers when said beam is raised
15 upwardly around said bearing-pieces, from an extended position with respect to said crane, together with suitable means for moving said beam on said rollers, outwardly and inwardly of said crane, substantially as
20 shown and described.

7. The combination, with a supporting

frame-work, of rollers movably mounted therein, a jack-beam movably mounted on said rollers and having the lower portion suitably recessed to be out of contact with
25 the rollers, when the beam is moved outwardly from the frame-work and rotated upwardly upon its inner end, substantially as shown and described.

8. In a wrecking crane, or similar apparatus, having a housing in the same, the
30 combination of a roller-device within said housing comprising rollers in bearing with the floor of the housing, and rollers in bearing with the top thereof, a jack-beam, mov-
35 ably mounted on said lower rollers, having downwardly extending bearing-pieces at the ends, substantially as shown and described.

FRANKLIN E. TERRILL.

In presence of—

L. P. SIPPS,

W. L. WESTCOTT.