

899,005.

A. E. BROWN.
CRANE BOOM.
APPLICATION FILED APR. 1, 1908.

Patented Sept. 15, 1908.

6 SHEETS—SHEET 1.

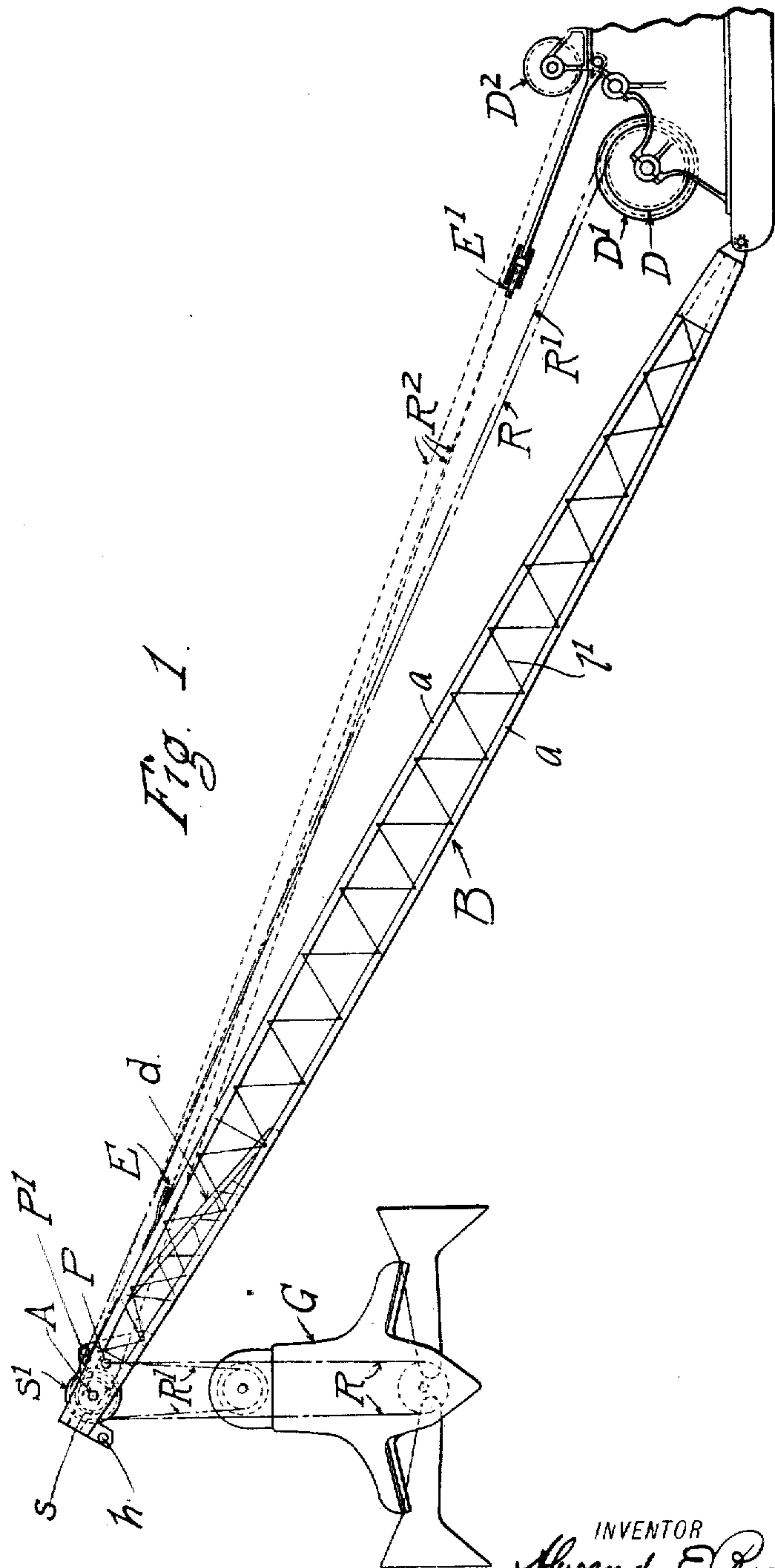


Fig. 1.

WITNESSES:

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W. Roberts

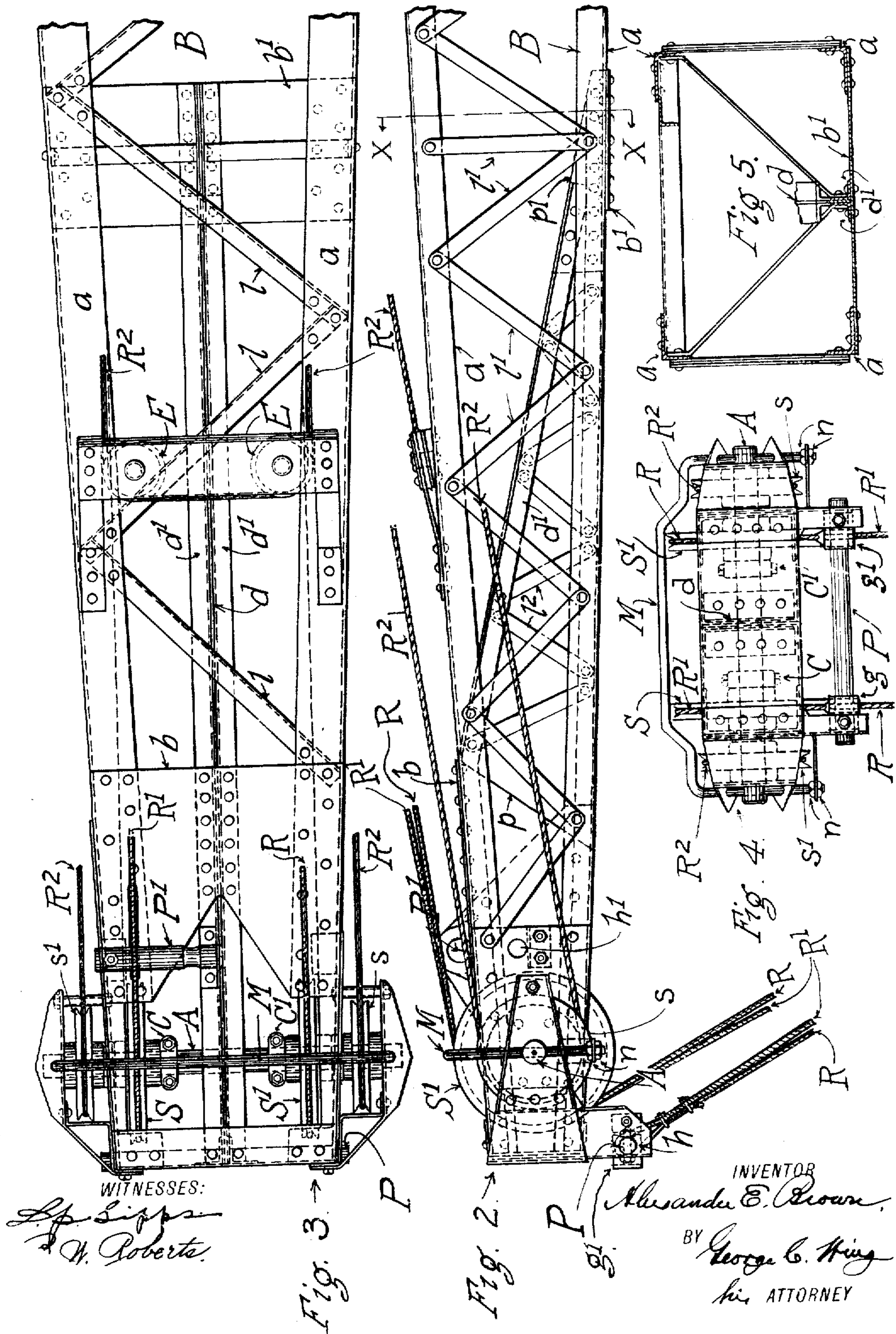
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6 SHEETS—SHEET 2.



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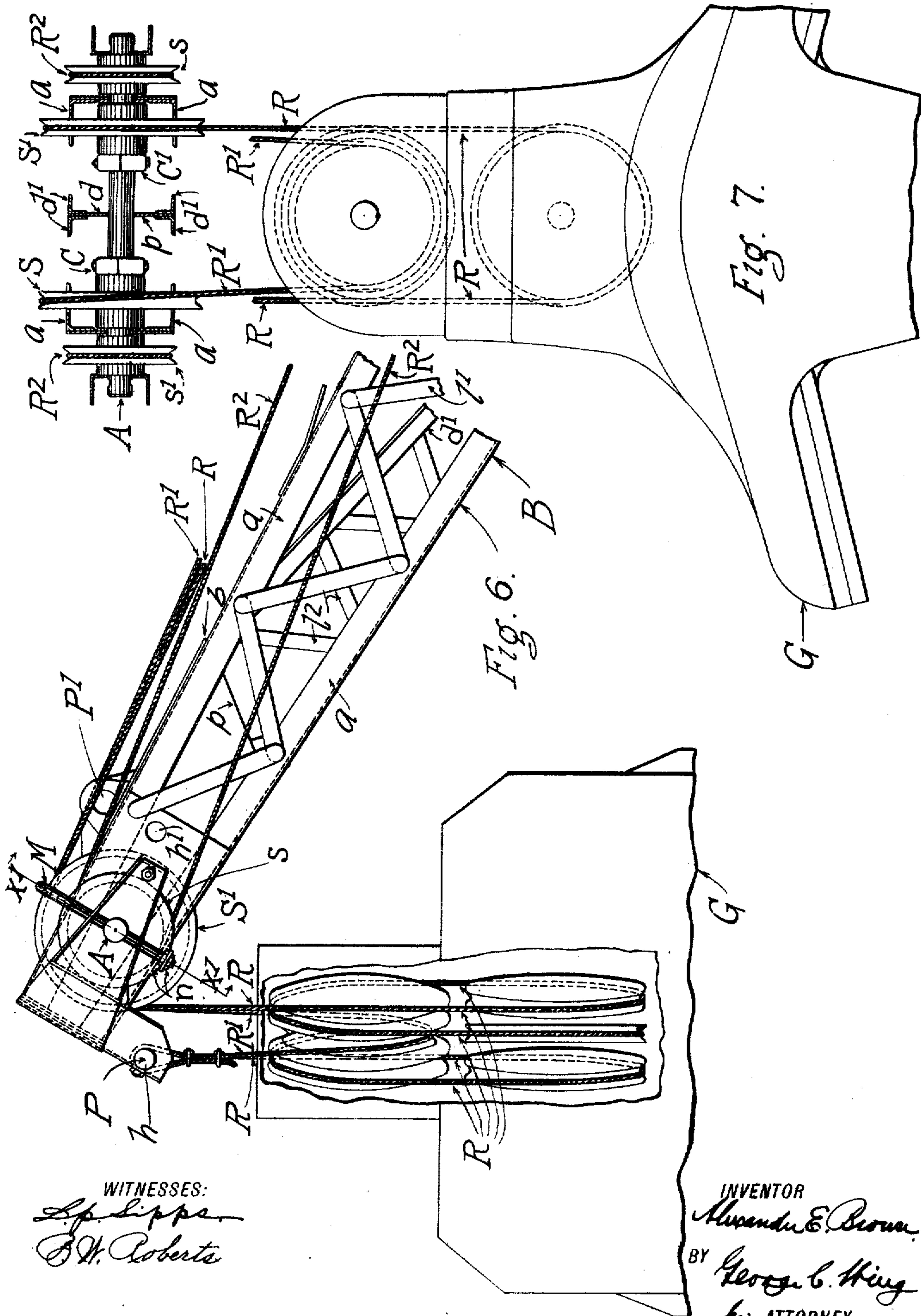
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6 SHEETS—SHEET 3.

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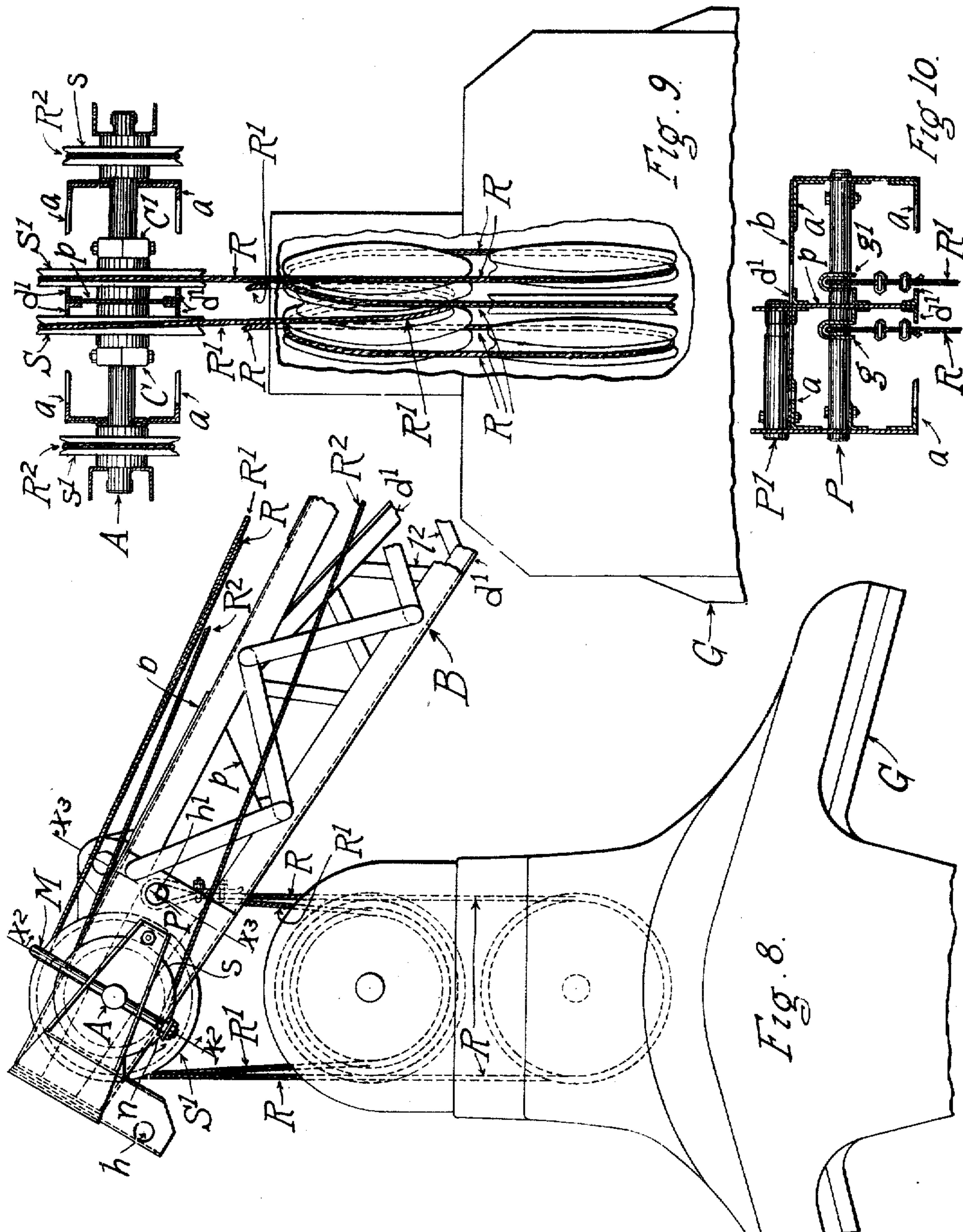
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6 SHEETS—SHEET 4.



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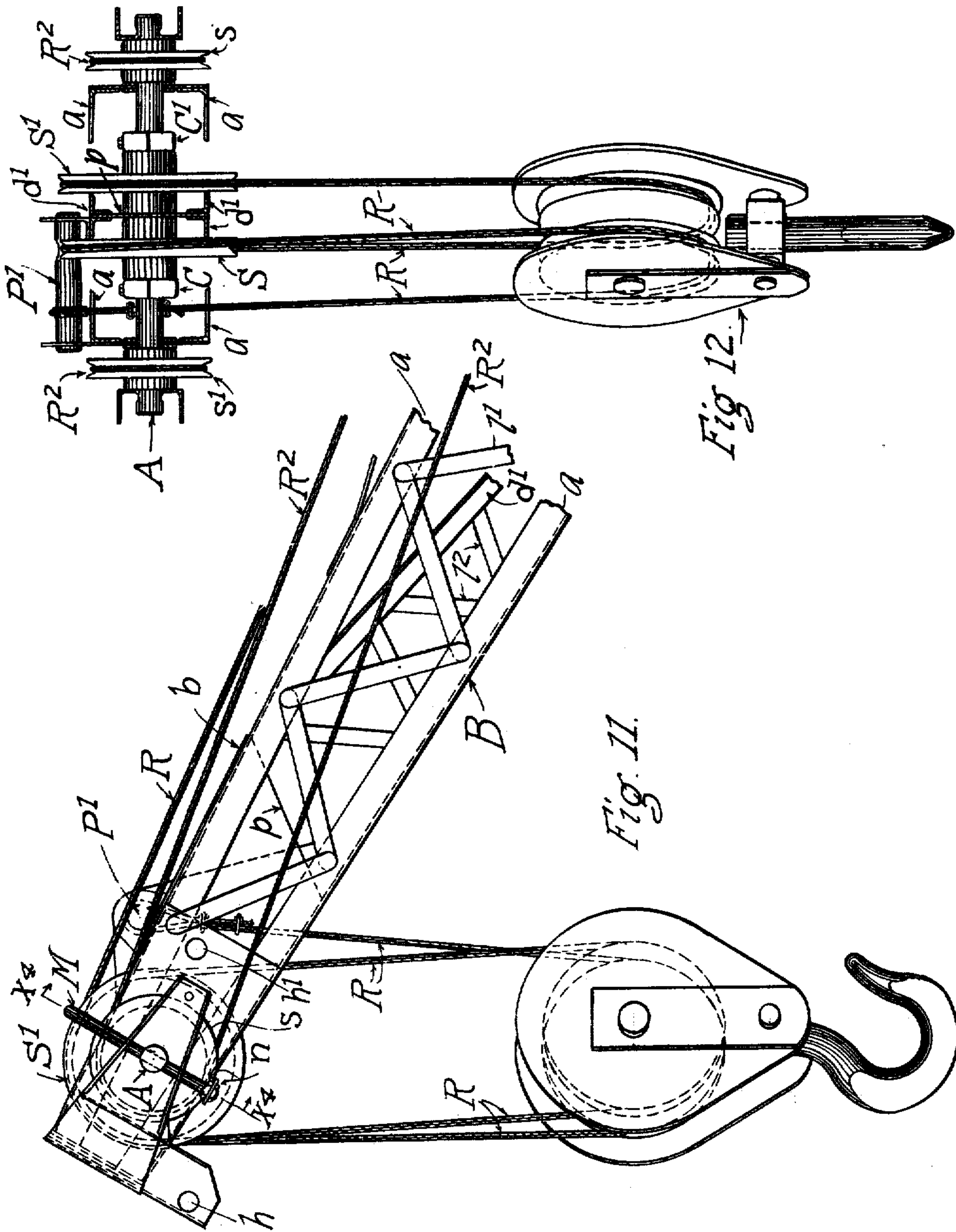
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6 SHEETS—SHEET 5.



WITNESSES:

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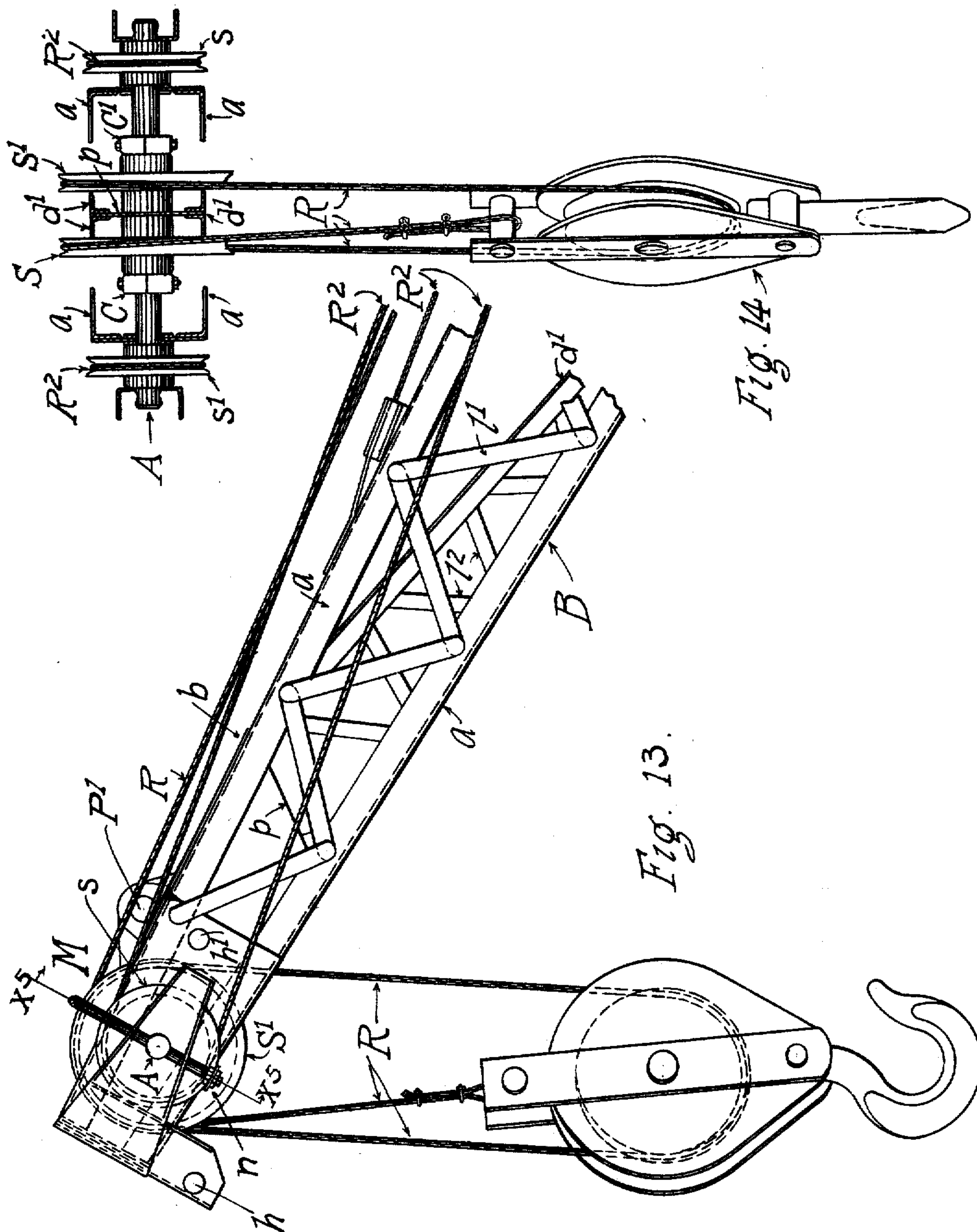
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6 SHEETS—SHEET 6.



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UNITED STATES PATENT OFFICE.

ALEXANDER E. BROWN, OF CLEVELAND, OHIO.

CRANE-BOOM.

No. 899,005.

Specification of Letters Patent.

Patented Sept. 15, 1908.

Application filed April 1, 1908. Serial No. 424,657.

To all whom it may concern:

Be it known that I, ALEXANDER E. BROWN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Crane-Booms, as to which I hereby declare the following to be a full, clear, and exact description, due reference being had and intended to the several drawings, accompanying and making a part of this specification, wherein throughout the same similar reference-letters are used on similar parts.

My said invention is intended for use in connection with, or as more particularly applicable to the booms of derricks or cranes which are to be worked to hoist and lower, and to properly operate, so-called grab-buckets, of the single or two-rope type, a block and tackle, or like attachment, when a suspension, lowering, raising, opening or closing, and like operation is thereby to be accomplished. The prevailing forms of booms, of this description, so far as I am informed, by reason of their characteristic limitations are, more or less, confined, in their functions, to an engagement with and operation of but one form of object, which form as well as its relative angle with the boom is predetermined in each case. That is to say, save in exceptional cases, and then only to a restricted extent, a boom that is designed for use with a grab-bucket must have its sheaves occupy one position when the bucket is to be operated at right angles to the boom, another when parallel therewith, and a third position still when a block and tackle is to be used. As heretofore constructed said sheaves have had no flexibility of adjustment in the boom head but have always been firmly fixed in the position required for the particular above uses for which the boom, in each case, is intended, and hence a boom originally adapted for one use cannot readily be re-adapted to or used for another. A boom, for instance for use with a block and tackle cannot be converted for a use with grab-buckets except by providing it with extra sheaves for the purpose which necessarily increase its leverage upon the derrick and must remain wholly idle when the block and tackle is in use.

My present invention is to provide a form of boom, in the connections referred to, that can be adapted, at will, to either a grab-bucket, or a block and tackle service, and

without limitation, by reason of the angular relation these are to have with respect to the boom itself. In the special form of boom embodying said invention, shown in the drawings, it is to be observed that its design or peculiar method of construction at the same time greatly minimizes the weight of the boom, and its forward attachments, and their consequent leverage, or over-turning moment with respect to the derrick itself.

In said drawings. Figure 1 is a side elevation of a boom, and its operating drums on a derrick, when in engagement with a grab-bucket. Fig. 2 is a side elevation of the forward portions of a boom arranged to suspend a grab-bucket transversely. Fig. 3 is a down plan view of what is shown in Fig. 2. Fig. 4 is an end elevation of the part shown in Fig. 2. Fig. 5 is a sectional view, on the lines $x x$, of that which is shown in Fig. 2. Fig. 6 is a side elevation of the end portion of a boom when, according to my said invention, a grab-bucket is suspended transversely of the same. Fig. 7 is a sectional view, in the direction of the arrow, on the lines $x' x'$ in Fig. 6, with the forward portion of the boom and rope-guard removed. Fig. 8 is a similar view to Fig. 6, but when the bucket is parallel with the boom, Fig. 9 is a sectional view of what is shown in Fig. 8 on the lines $x^2 x^2$ therein, with the forward portion of the boom and rope-guard removed. Fig. 10, is a similar view on the lines $x^3 x^3$, Fig. 11, is a side elevation of the end of a boom with a four-part block and tackle suspended therefrom, Fig. 12 is a sectional view of what is shown in Fig. 11 on the lines $x^4 x^4$ therein, with the forward portion of the boom and rope-guard removed. Fig. 13 is a side elevation of the end of a boom with a three-part block and tackle suspended therefrom, and Fig. 14 is a sectional view of what is shown in Fig. 13 on the lines $x^5 x^5$ therein, with the forward portions removed as in previous figures.

In said figures, B, is the boom proper, which may be made up and connected with its derrick or crane, in any suitable manner. In the present case B is composed of a framework of four angles a , held together by lacings $l l'$ and batten plates b and b' . Centrally of said framework is a diaphragm d , made up of the four angles d' united by means of vertical plates p and p' and the subordinate lacings l^2 . Said diaphragm extends to the outer end of the boom B and is penetrated by and serves to support the axle A.

D, D' and D² represent the operating drums on the derrick, and R and R', the operating ropes which, in this case, are needed in connection with and for actuating a so-

5 called two-rope grab-bucket G.

R² is the boom operating rope whereby (as appears in Figs. 2 and 3) the boom is raised and lowered in the customary manner to spot the load.

10 In the figures the rope R² is fastened at its one end, to the drum D², and is then reeved around a system of equalizing sheaves E and E' in which the other end of the rope is returned and secured by suitable connections

15 to said drum D², or its frame-work, as indicated in Fig. 1.

The grab-bucket G which I have selected to illustrate my invention is of the type of two-rope bucket shown and described in

20 United States Letters Patent Number 723133 granted to me March 17, 1903. The invention, however is equally applicable to a single-rope type of bucket or other hoistable object. It will be observed that, so far as the several

25 functions involved are concerned, the sheaves referred to must always be in proper alinement with those in the vertically moving bucket or block and tackle below, and, that when more than one sheave is required in the

30 boom or bucket, such alinement can only be secured by a horizontal or longitudinal adjustment of the boom sheaves along their pin-bearings. In view of these requirements, and to secure a form of boom that

35 shall adaptably meet the same, I provide, at the forward or outermost end of the boom B, a pair of primary sheaves S and S', that are slidably mounted on the cross-axle A. The latter extends transversely of the boom for

40 this purpose, and, as shown in Fig. 7 and subsequent figures, is carried beyond the boom on each side so as to overhang the same and receive a secondary pair of sheaves s and s' for the boom operating rope R².

45 A special arrangement or guard M to prevent the escape of said ropes from their respective sheaves, is shown (see particularly Fig. 4) which operates to retain the axle A in its normal position. Said guard M consists

50 of any suitable part, preferably, a rod that passes across the boom, above and in close proximity to the ropes, when reeved within their sheaves, with its ends passing through the ends of the axle A, like cotter-bolts, and

55 secured against displacement by the nuts *n n*. Adjustably fitted to said axle, on whichever side of the sheaves S and S', occasion requires, are split-collars C and C' for the purpose hereinafter described. At predetermined points on the boom-frame, to the front

60 and rear of the sheaves S and S' are the holes *h* and *h'* to interchangeably receive a pin P to which the dead ends of the ropes R and R' may be fastened, according as the bucket is

65 to be operated transversely of, or parallel

with the boom. P' indicates a like pin, in a suitable aperture at the rear of the sheaves to which the dead end of a four, or any even part rope of a block and tackle may be fastened. Of course in either of the above ar-

70 rangements any other suitable means of securing said ends may equally be employed, although its relative location with respect to the sheaves must be substantially as pointed out in which sense the feature now described

75 is an element of a specific claim herein.

Fig. 10 shows the dead ends of the ropes R and R' of a two-rope grab bucket in their above described fastenings to the pin P, the bucket being parallel to the boom, and, as a

80 convenient means of securing such fastenings in their places, U-shaped guard-pieces *g* and *g'*, through which the pin passes, surmount the same, on either side and are bolted to the respective sides of the diaphragm *d*.

85

Fig. 4 shows the same detail when the bucket is transverse of the boom; the guard-pieces, in this figure, are near the ends of the pin P, as indicated in the dotted lines.

Having thus described my said invention

90 its manner of use will readily appear.

When a two-rope grab-bucket is to be operated, its two ropes, one to hoist and the other to close the jaws, must each have its own sheave in the boom-head which must be

95 in substantial alinement with a corresponding sheave in the bucket. When the latter is to be worked transversely of the boom as in Fig. 7 (that is, when the movement of the jaws is to be in a direction at right angles to

100 the boom's length) the sheaves S and S' must be wider apart on the axle A than when either the bucket is to be worked parallel with the boom, as in Fig. 9, (that is, when the move-

105 ment of the jaws is to be in the same direction as the boom's length) or, than when a block and tackle is used with a three or four-part rope, as shown in Figs. 11 to 14. When a block and tackle or a single-rope grab

110 bucket is used it is evident that one of the ropes R or R', may be dispensed with and wound up from the boom and lashed upon its winding drum; its sheave may then be utilized for reeving the hoisting rope in every case except, as will be understood, when a

115 one or two-part rope is used.

It being desired to adjust my said form of boom to a 2-rope grab bucket transversely thereof, as in Figs. 6 and 7, the sheaves S and S' will be slid along their axle until their

120 scores are in alinement with the take-off point of the scores of the sheaves in the bucket below that they respectively serve. Thereupon the split-collars C and C' will be moved up and fastened against their respec-

125 tive sheaves and the boom will be in proper adjustment for the special service assumed. A similar process will be undergone when the grab bucket is to be used parallel, or at an

130 angle other than a right angle with the boom,

or, when a three or more part block and tackle are to be employed, the sheaves being simply slid along the axle A until they occupy the correct place thereon with relation to their subordinate sheaves, and then secured, in such place, by their respective split-collars.

It is manifest that a readaptation of the boom to a new use other than those hereinbefore referred to may be readily made at any time and without causing any appreciable interruption to the working of the derrick, by simply reversing the above described process.

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

1. In a boom for cranes, and like constructions, the combination of sheaves in its outer end, movable transversely of the same, and, suitable means of securing said sheaves at different points of their said movement, substantially as shown and described.

2. In a boom for cranes, and like constructions, the combination, at its outer end, of a transverse axle, sheaves slidably mounted thereon, and suitable means of securing said sheaves at different points on said axle, substantially as shown and described.

3. In combination with a boom for cranes, and like constructions, a transverse axle

through its outer end which projects laterally therefrom, sheaves slidably mounted on said axle within said boom, sheaves mounted on said lateral projections of the same, together with suitable means of securing said sheaves, within the boom, at different points on said axle, substantially as shown and described.

4. In a boom for cranes and like constructions, the combination, at its outer end, of a transverse axle that projects laterally therefrom, sheaves on said axle within and without the boom, and a guard-piece extending across the same, above said sheaves, the extremities of which guard-piece pass through said laterally projecting portion of said axle, substantially as shown and described.

5. In a boom for cranes, and like constructions, the combination of sheaves in its outer end movable transversely of the same, suitable means of securing said sheaves at different points of their said movement, and suitable means for interchangeably securing the actuating ropes to said end of the boom, in order to conform said ropes to different angular positions of the vertically moving sheaves with respect to said boom, substantially as shown and described.

ALEXANDER E. BROWN.

In presence of—

L. P. SEPPS,

CHARLES T. PRATT.