

No. 792,273.

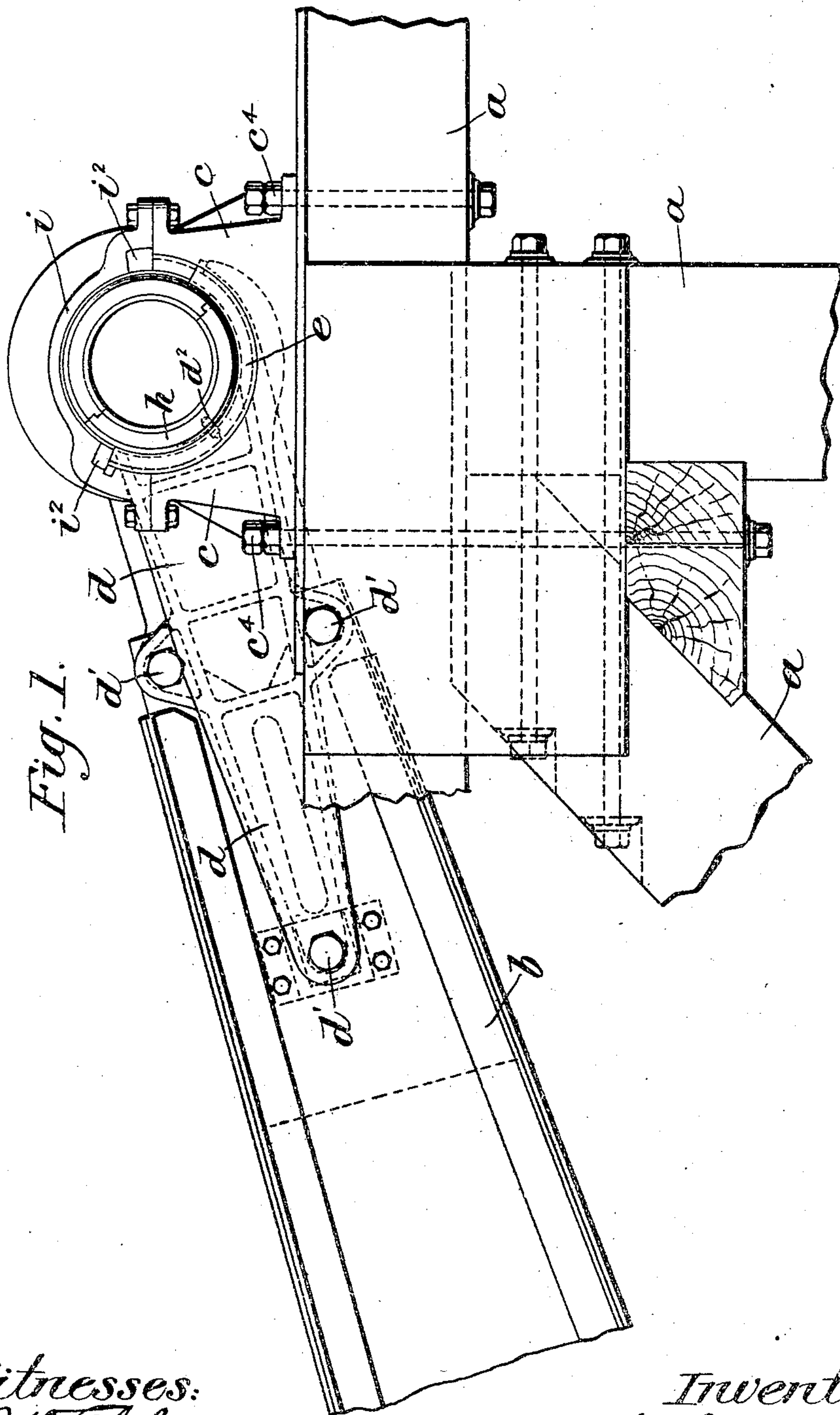
PATENTED JUNE 13, 1905.

S. L. G. KNOX.

LADDER AND TUMBLER BEARING FOR ELEVATOR DREDGES.

APPLICATION FILED OCT. 24, 1904.

4 SHEETS—SHEET 1.



Witnesses:

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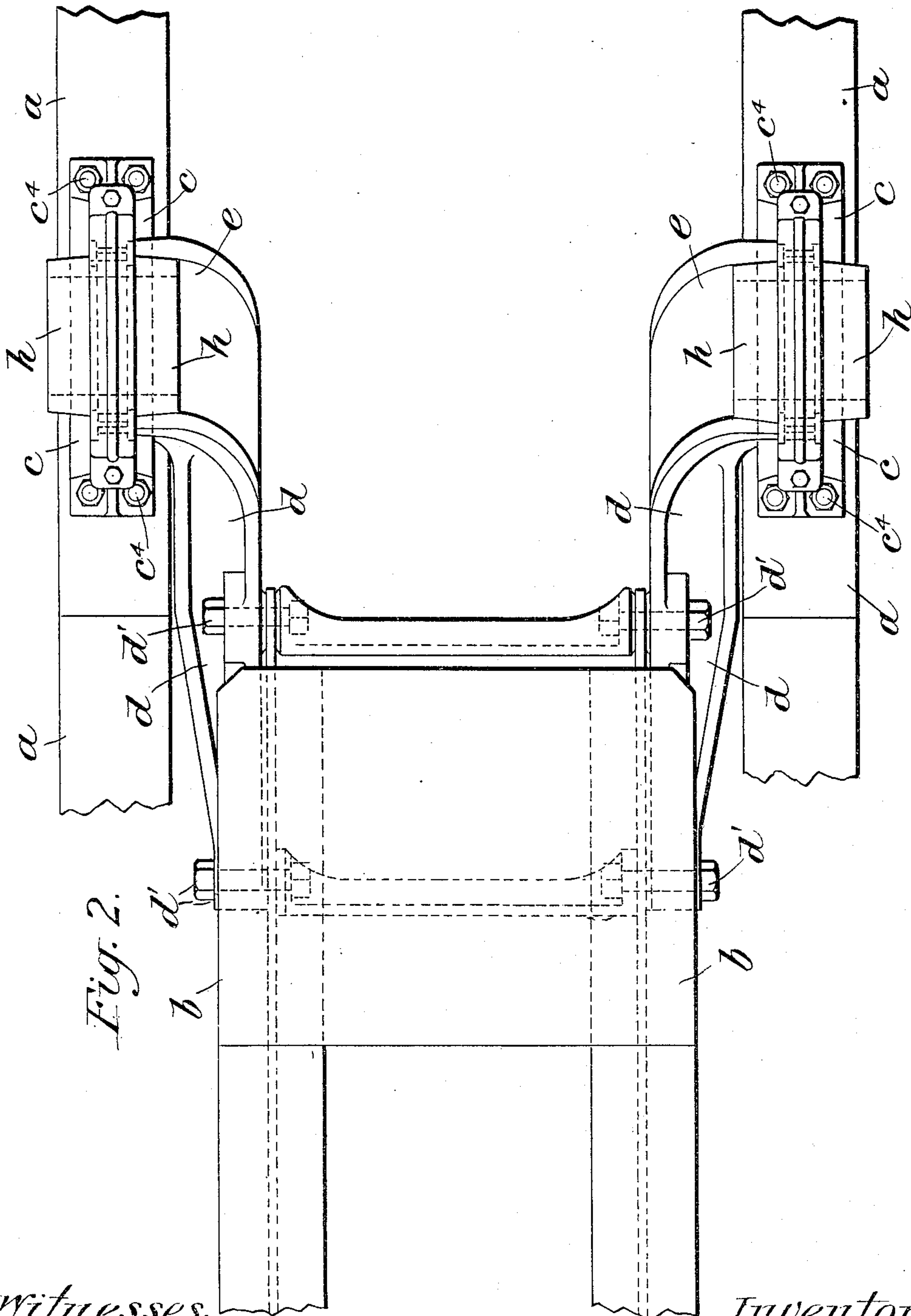


Fig. 2.

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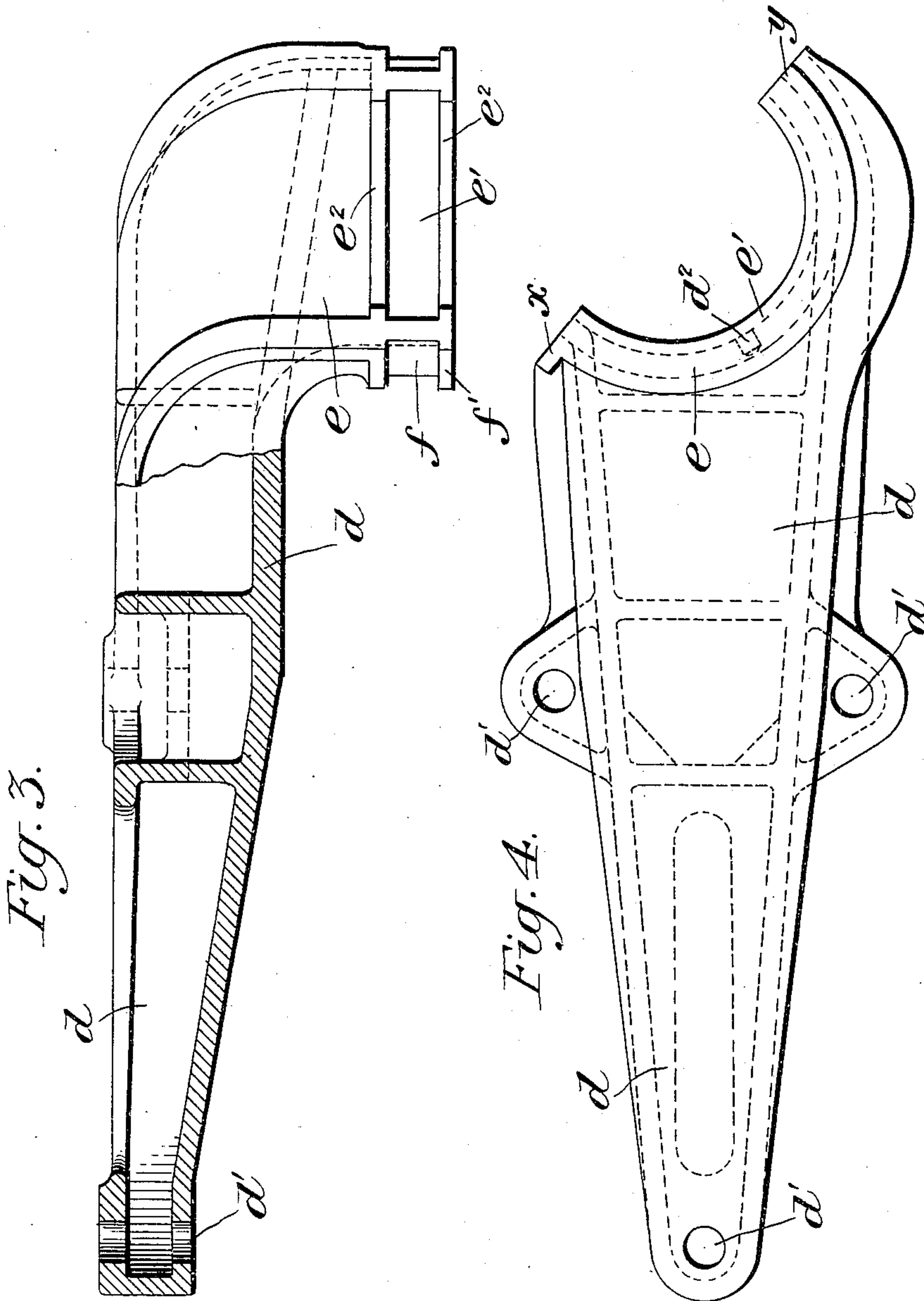
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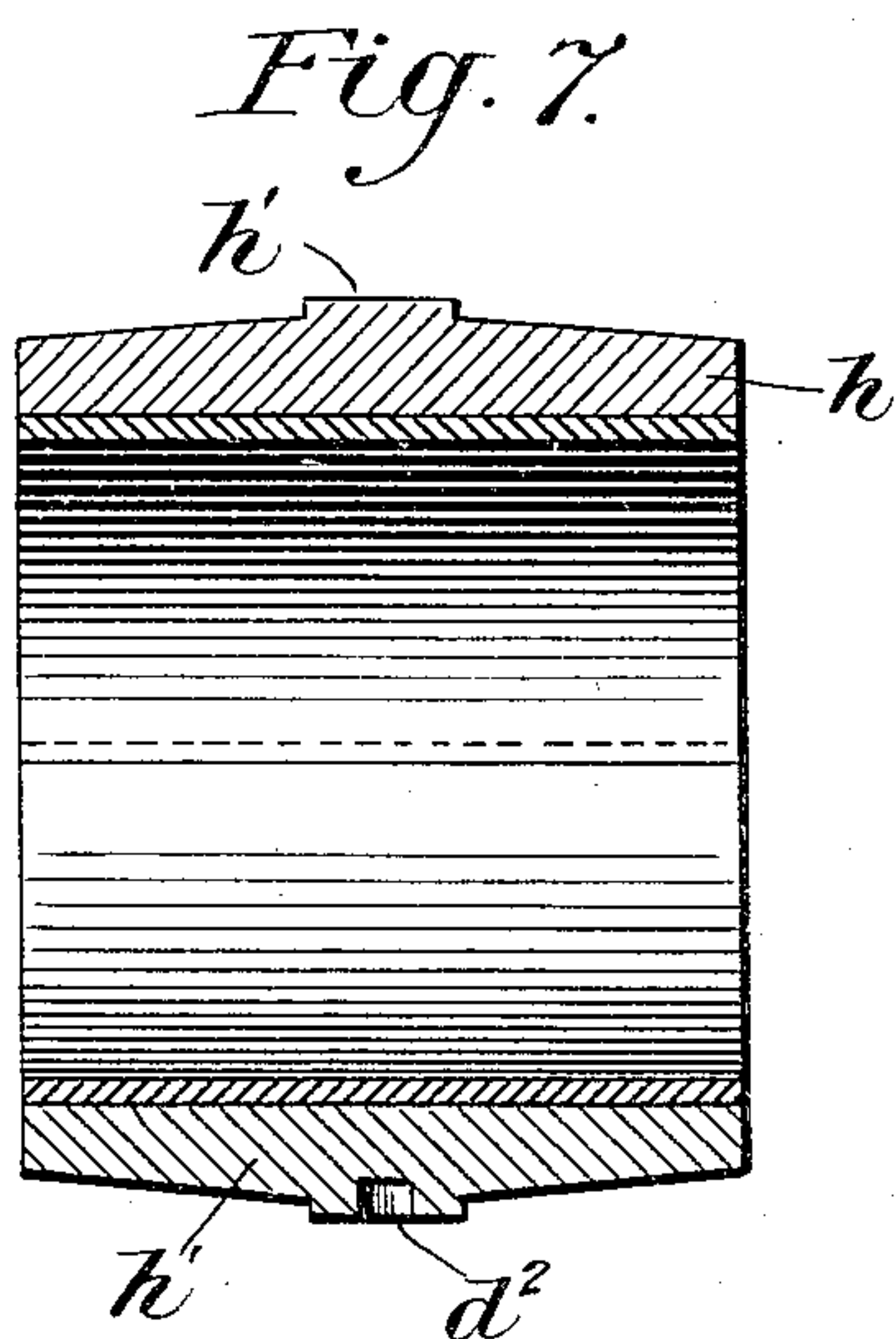
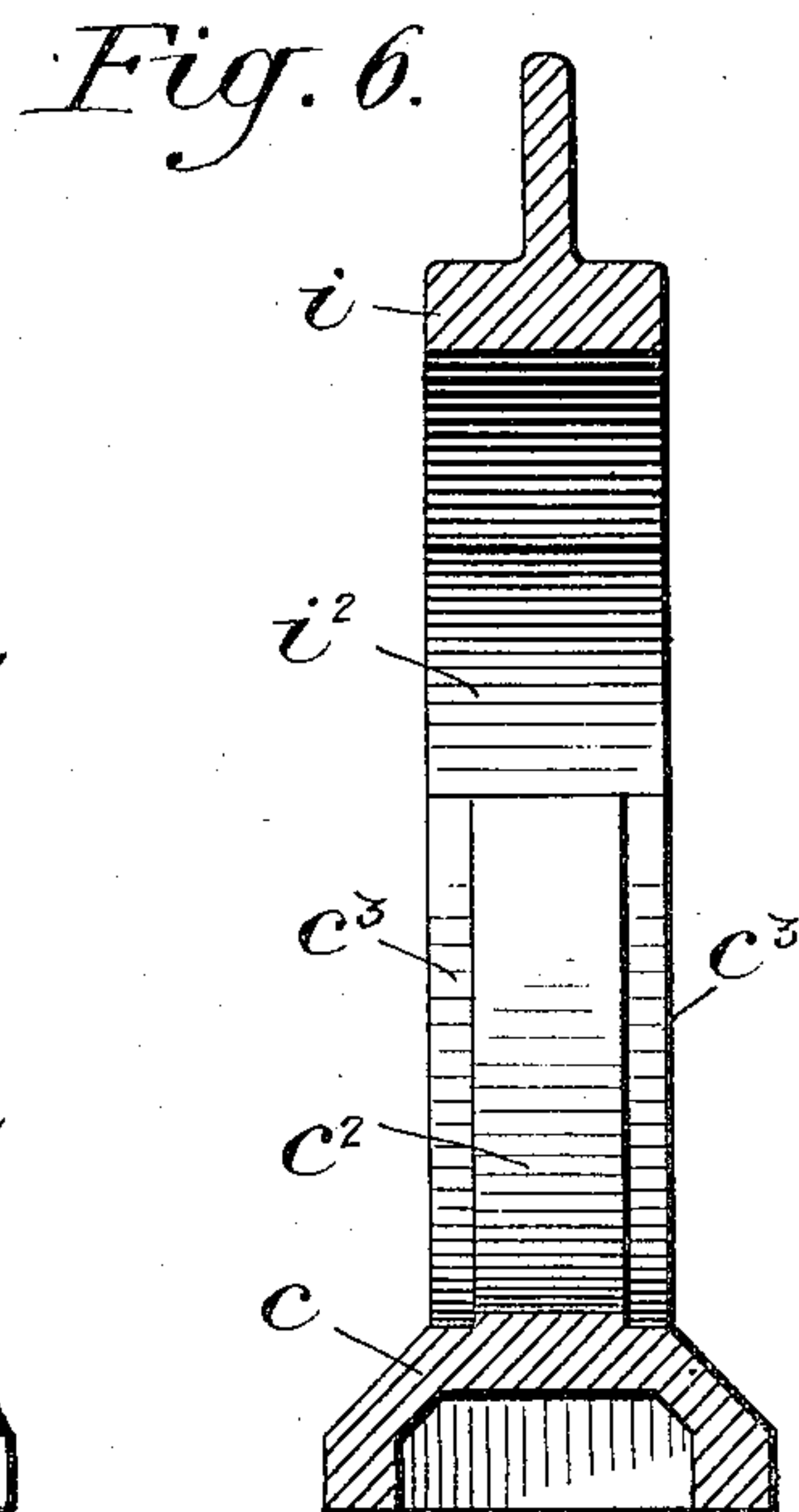
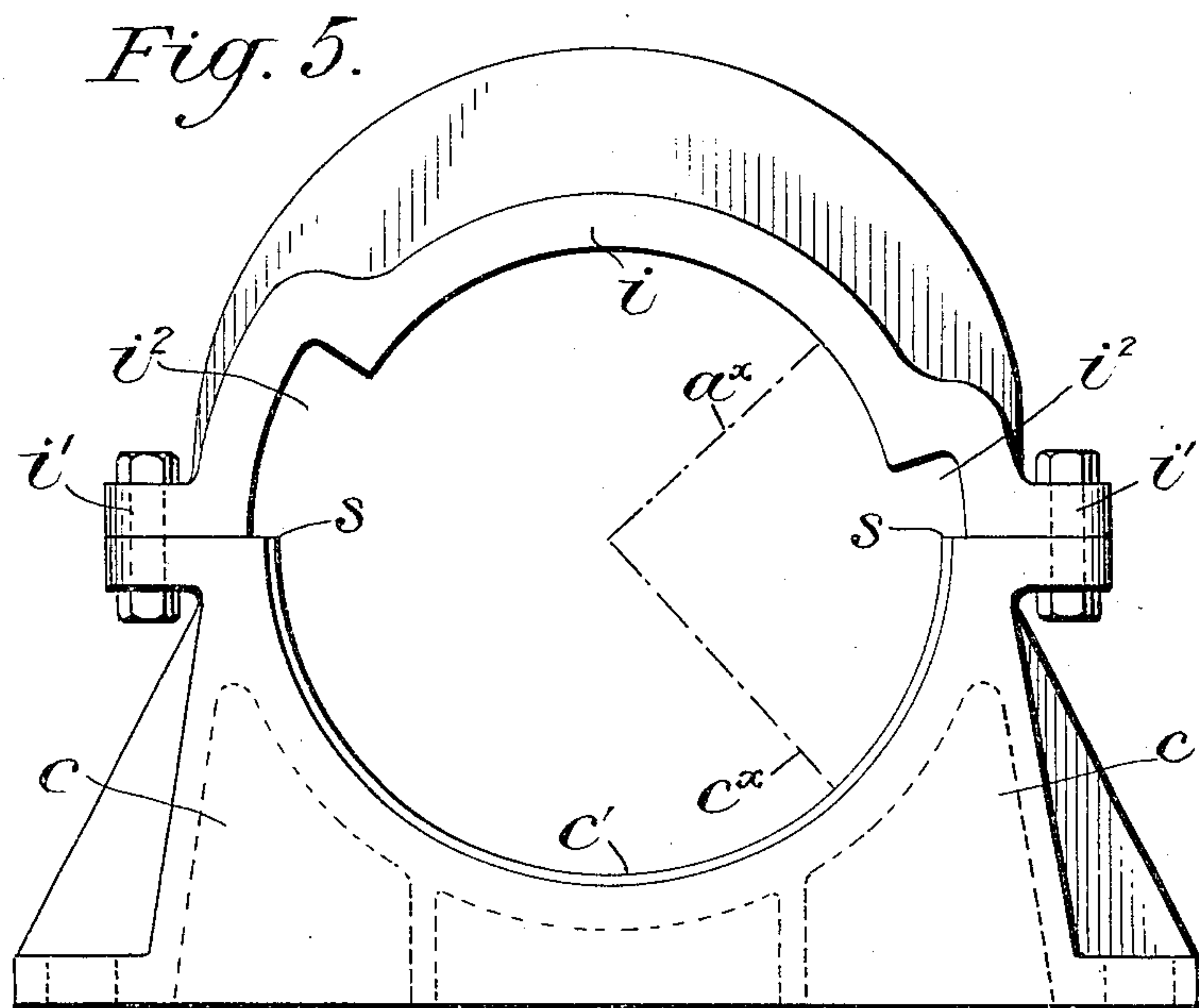
1894 live atty
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UNITED STATES PATENT OFFICE.

SAMUEL LIPPINCOTT GRISWOLD KNOX, OF MILWAUKEE, WISCONSIN,
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LADDER AND TUMBLER BEARING FOR ELEVATOR-DREDGES.

SPECIFICATION forming part of Letters Patent No. 792,273, dated June 13, 1905.

Application filed October 24, 1904. Serial No. 229,833.

To all whom it may concern:

Be it known that I, SAMUEL LIPPINCOTT GRISWOLD KNOX, a citizen of the United States, residing in the city and county of Milwaukee, State of Wisconsin, have invented certain new and useful Improvements in Ladder and Tumbler Bearings for Elevator-Dredges; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to elevator-dredges of the endless-bucket-chain type, where one tumbler is carried at the upper and outer end of a ladder that is connected to the upper end of a tower-like framework and has a limited rocking movement in relation thereto.

The main object in view is to lighten the structure as much as possible without sacrificing its strength and efficiency, and to this end it is characteristic of the improved construction that the strains due to digging, weight of ladder, &c., are centralized at the longitudinal central line of the ladder-bearings and all eccentric loading on the bearings is obviated.

The improvement is illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation of the upper end of the tower and the corresponding end of the ladder of an elevator-dredge having my invention. Fig. 2 is a top plan view of the same parts. Figs. 3 and 4 are detail views of the trunnion-like projections from the sides of the upper end of the ladder. Figs. 5 and 6 are detail views of the bearings that are mounted on the upper end of the tower and which support and carry the ladder projections, and Fig. 7 is a detail of the tumbler-shaft sleeve-bearing.

Referring to the views, *a a* denote the side pieces at the upper end of the tower, and *b b* indicate the side pieces of the ladder at the corresponding end. Except in the construction and arrangement of the bearing-pieces by which these parts are connected together there is nothing new in the construction of the tower or the ladder.

c c indicate pedestals that are rigidly secured, by bolts *c'* or otherwise, to the upper end of the tower and have semicircular bearings *c' c'*, and *d d* denote brackets that are securely bolted at *d' d'* to the side pieces of the ladder and have trunnion-like projections *e e* extending laterally from them. The projections *e e* fit in the bearings *c' c'*, and the brackets *c c* thus support the weight of the upper end of the ladder, the upper tumbler, and the adjacent parts. The projections *e e* are semicircular in form, as shown in Fig. 4, and have their exterior surfaces machined, as shown at *f* in Fig. 3, to accurately fit the bearing-surfaces of the brackets, which preferably are provided with raised centers *c''*, on which the plain part of the projections run, and grooved or chamfered edges *c'''*, as plainly shown in Fig. 6, in which fit the flanges *f'* on the trunnion projections.

The pedestals *c c* may be shaped and constructed in any suitable way, provided they have the semicircular open-topped bearings *c'*. The brackets *d d* may also be variously shaped and constructed, provided they have the projections *e e* extending laterally from their upper ends, so as to form trunnion-like supports for the ladder. These projections have semicircular recesses *e' e'* on their inner sides, and the recesses form the bearings for the bearing-sleeves *h h* of the upper tumbler-shaft, that are preferably constructed, as shown in Fig. 7, with a central exterior circumferential rib *h'*, that is inclosed by flanges *e'' e''* on recesses *e' e'*. The tumbler-shaft is not shown; but it will be readily understood that it is journaled in an ordinary manner in the bearing-sleeves *h h*, and these sleeves are secured in their bearings *e' e'* by dowels *d''*, so as to cause them to turn with the trunnion projections *e e* of the ladder end. The bearings in the tower-pedestals are thus concentric with the axis of the upper tumbler-shaft, and as the shaft-sleeves are concentric with and rest in the semicircular bearings of the trunnion projections the center of application of the weight of and load on the ladder coincides with the longitudinal center line of

the bearings which support them, thereby doing away with any eccentric loading on the bearings or the structure carrying them and permitting of a lighter construction without
5 weakening the machine or impairing the efficiency of its operation.

The bearing-sleeves and trunnion-bearings are held in the bearings $c' c'$ of the tower-pedestals by removable caps $i i$, that are bolted
10 or otherwise secured to the pedestals at $i' i'$, and in order to permit of the limited rocking or swinging of the ladder that is necessary in use these caps are notched, recessed, or cut away at $i'' i''$ at diametrically opposite points,
15 so as to permit the ends of the trunnion projections $e e$ to pass above the ends of the semicircular bearings $c' c'$ in the tower-pedestals. This will be clearly understood when it is considered that the radius a^x of the cap cor-
20 responds only with the exterior surface of the bearing-sleeve, while the radius c^x of the semicircular bearing-surface c' in the pedestals corresponds with the outer surface c' of the trunnion projection. It is therefore nec-
25 essary to cut away the cap at the points indicated, so as to permit the ends $x y$, Fig. 4, of the trunnion projections to pass above the edges $s s$, Fig. 5, of the pedestal-bearing sur-
face.

30 Having thus described my invention, what I claim is—

1. In a dredge, the combination of the tower having semicircular bearings at its upper end, a ladder having trunnion-like projections at
35 the corresponding end journaled in said bearings, tumbler-shaft bearing-sleeves secured in semicircular recesses in said ladder projections, and semicircular caps secured to the tower-bearings and inclosing the ladder pro-
40 jections and the tumbler-shaft sleeves.

2. In a dredge, the combination of the tower having semicircular bearings at its upper end, a ladder having trunnion-like projections at
45 the corresponding end journaled in said bearings, and tumbler-shaft bearing-sleeves se-

cured in semicircular recesses in the ladder projections, the center of application of the load transmitted by the ladder projections coinciding with the longitudinal center line
50 of the tower-bearings in which they rest.

3. In a dredge, the combination of the tower having semicircular bearings at its upper end, a ladder having lateral trunnion-like projec-
55 tions at the corresponding end journaled in said bearings, tumbler-shaft bearing-sleeves secured in semicircular recesses in the ladder projections, and semicircular caps secured to the tower-bearings and cut away to permit the ladder projections to have a limited rock-
60 ing movement in the tower-bearings.

4. In a dredge, the combination of the tower having semicircular bearings at its upper end, a ladder having lateral trunnion-like projec-
65 tions at the corresponding end journaled in said bearings, tumbler-shaft bearing-sleeves secured in semicircular recesses in the ladder projections, and semicircular caps secured to the tower-bearings and inclosing the ladder
70 projections and the tumbler-shaft sleeves, said caps being cut away at and to permit the lad- der projections to have a limited rocking movement in the tower-bearings.

5. In a dredge, the combination of the tower having semicircular bearings at its upper end, a ladder having lateral trunnion-like projec-
75 tions at the corresponding end journaled in said bearings, tumbler-shaft bearing-sleeves secured in semicircular recesses in the ladder projections, and semicircular caps secured to the tower-bearings and inclosing the ladder
80 projections and tumbler-shaft sleeves, said tower-bearings, ladder projections, shaft-sleeves and caps all having the same axial center.

In testimony whereof I affix my signature 85 in presence of two witnesses.

SAMUEL LIPPINCOTT GRISWOLD KNOX.

Witnesses:

HARRY B. HAYDEN,
PAUL C. BODE.