No. 724,868. PATENTED APR. 7, 1903.

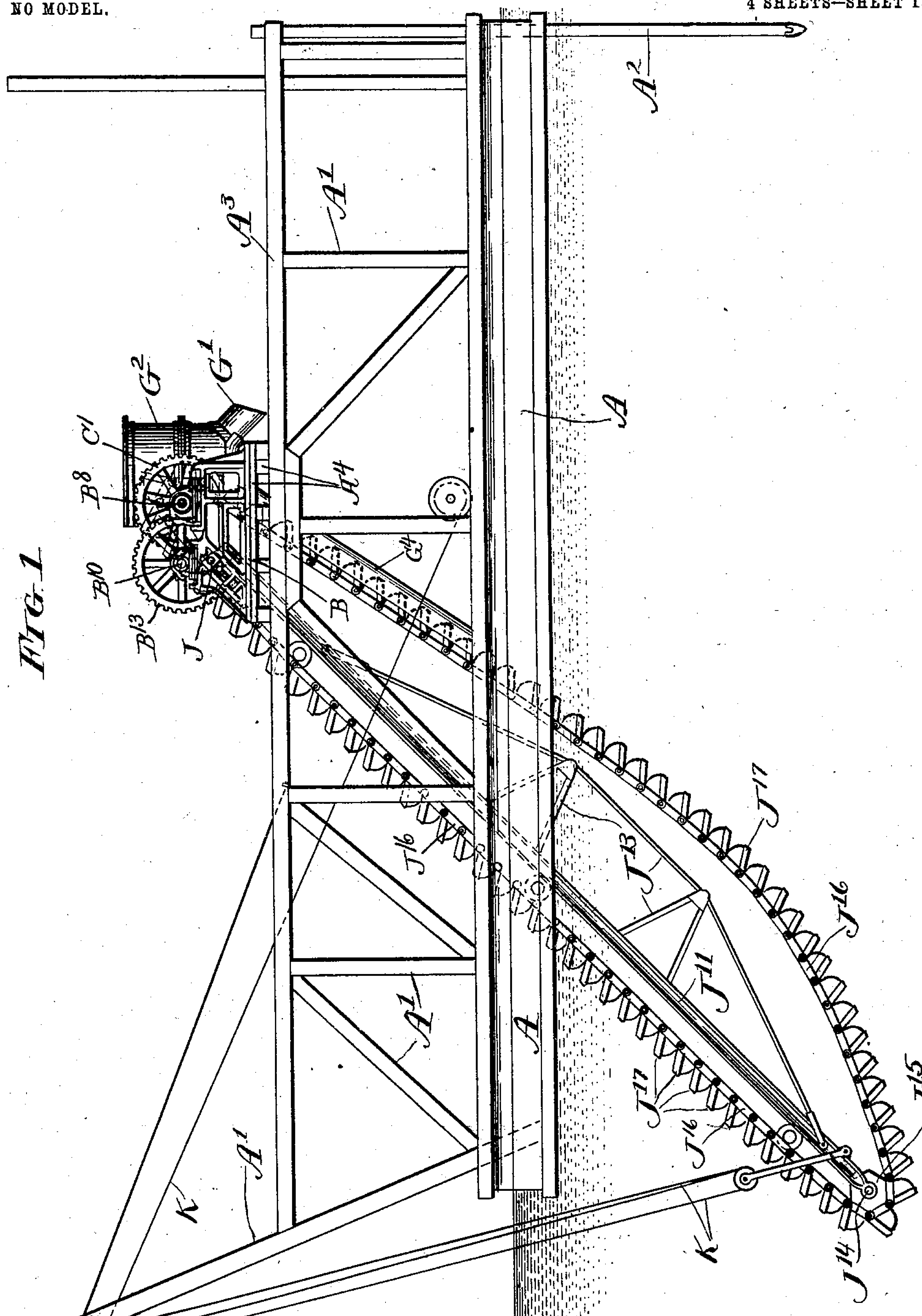
G. L. HOLMES.

SELF CONTAINED BACK GEARED HEAD STALL FOR ELEVATOR BUCKET DREDGES.

APPLICATION FILED MAR. 31, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

FIG. 1



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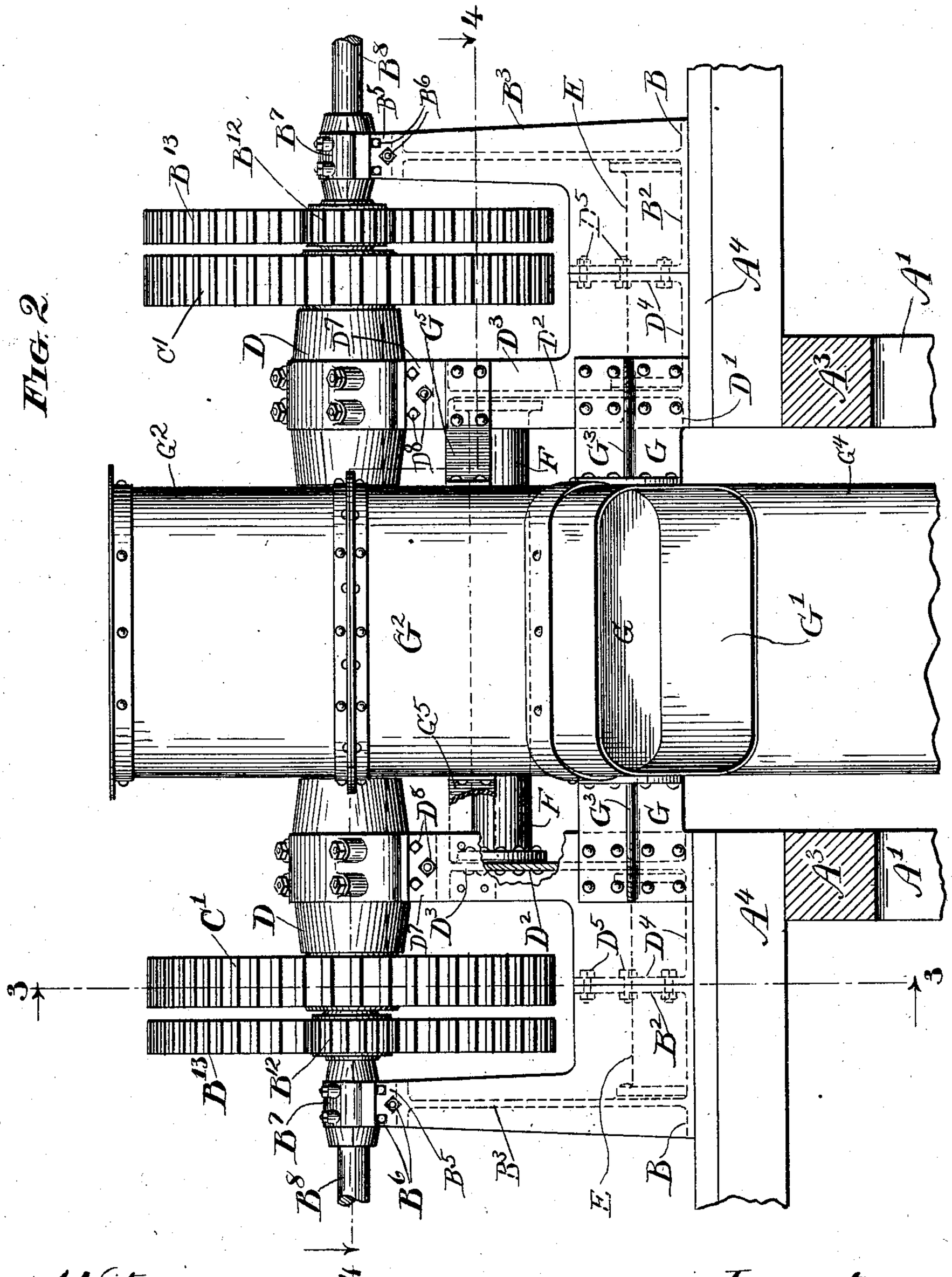
NO MODEL. 4 SHEETS—SHEET 2.

FIG. 2



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NO MODEL. 4 SHEETS—SHEET 3.

FIG. 3.

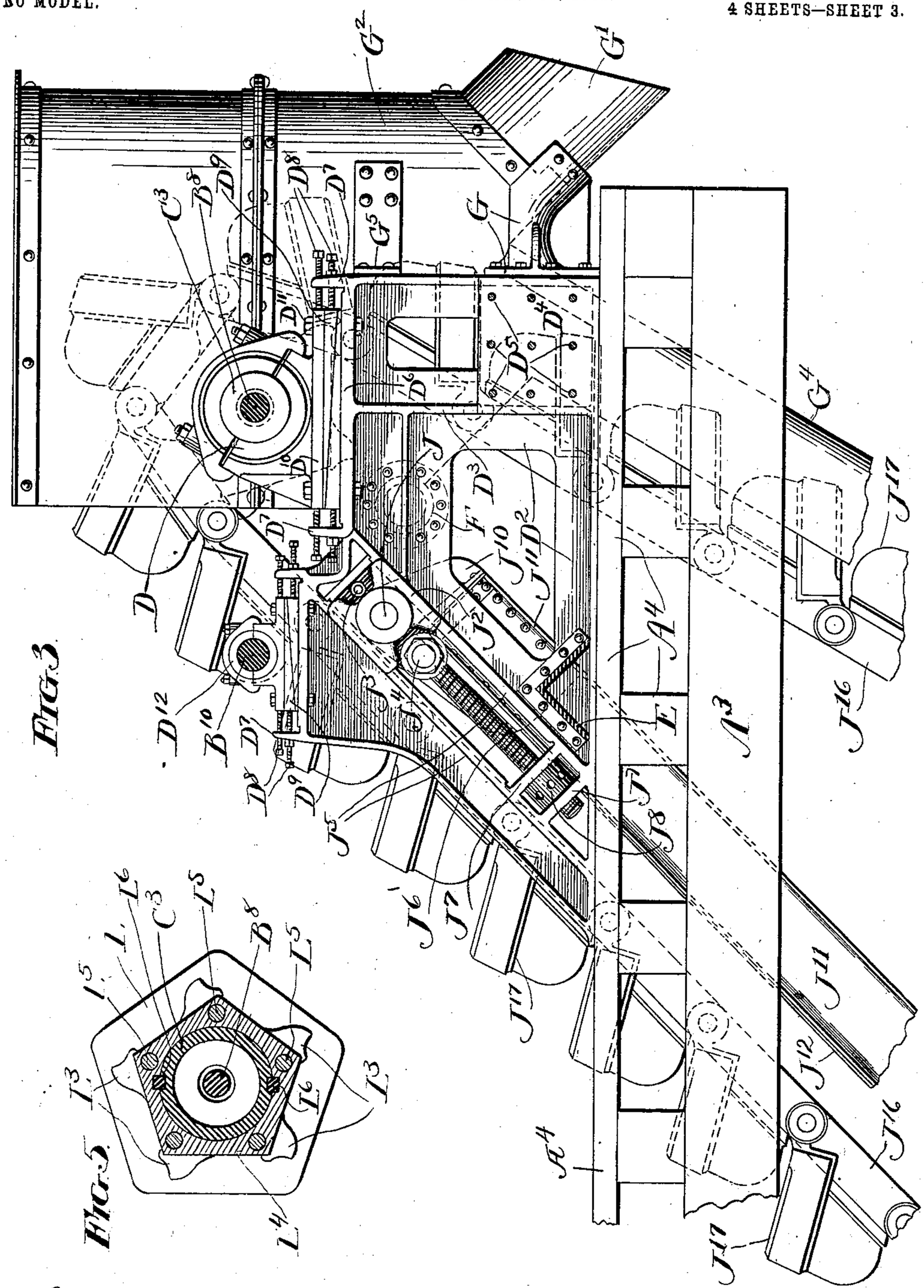

FIG. 5.

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NO MODEL. 4 SHEETS—SHEET 4.

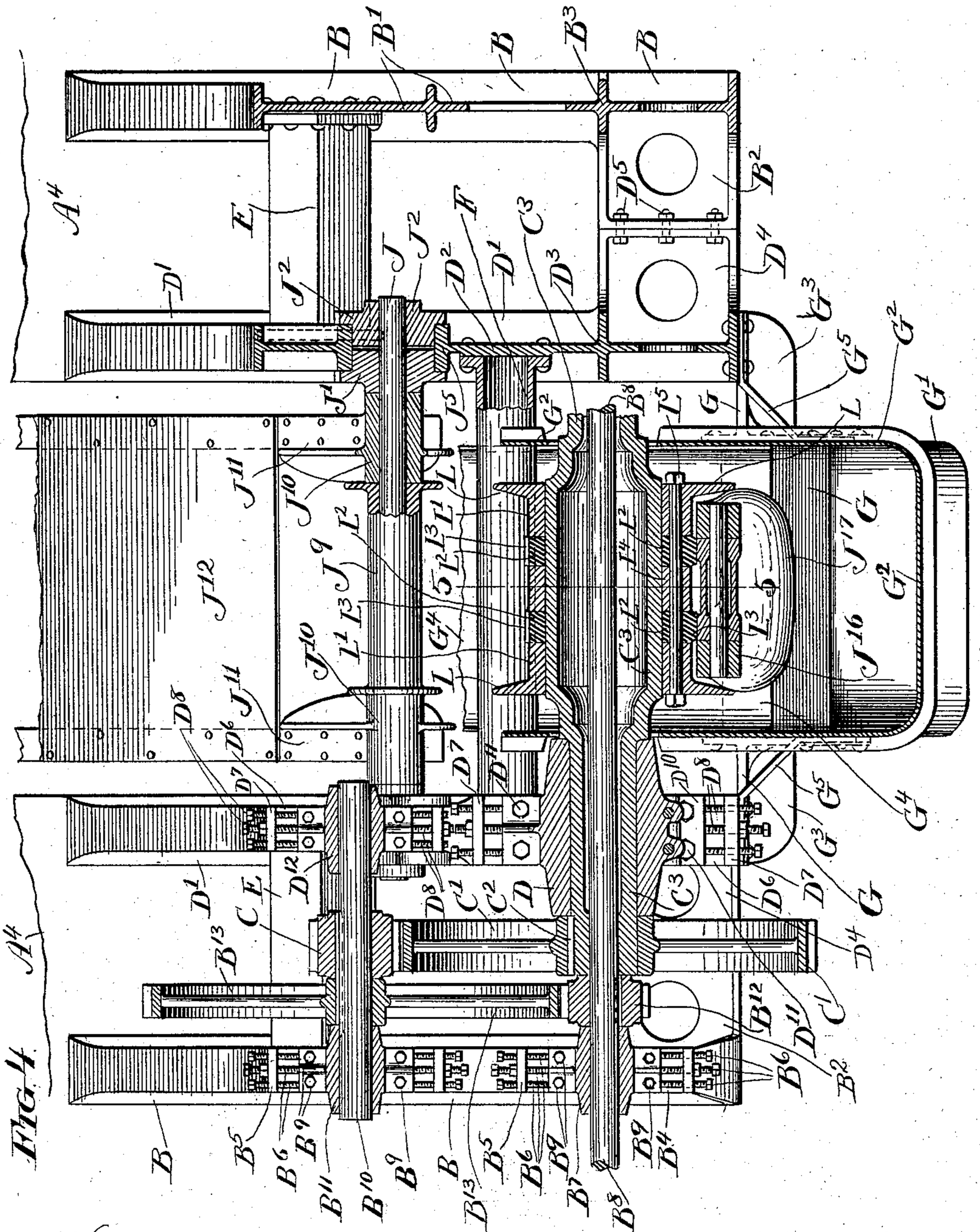

FIG. 4.

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UNITED STATES PATENT OFFICE.

GEORGE LEWIS HOLMES, OF CHICAGO, ILLINOIS.

SELF-CONTAINED BACK-GEARED HEADSTALL FOR ELEVATOR-BUCKET DREDGES.

SPECIFICATION forming part of Letters Patent No. 724,868, dated April 7, 1903.

Application filed March 31, 1902. Serial No. 100,685. (No model.)

To all whom it may concern:

Be it known that I, GEORGE LEWIS HOLMES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Self-Contained Back-Geared Headstalls for Elevator-Bucket Dredges, of which the following is a specification.

My invention relates to self-contained back-geared headstalls for elevator-bucket dredges.

Figure 1 is a side view of the dredge with my improvement in position. Fig. 2 is a rear view of the head portion. Fig. 3 is a section on the line 3 3, Fig. 2, with the gears omitted. Fig. 4 is a section on the line 4 4, Fig. 2. Fig. 5 is a detail section on the line 5 5, Fig. 4.

Like parts are indicated by the same letter in all the figures.

A is the body of a dredge-boat having the timbers A′ A′, the spud A^2, and the upper deck A^3, the parts arranged so as to form a slot through which the elevator mechanism is free to swing. Suitably supported on the decking A^3 is a platform A^4, on which is mounted the head mechanism.

B is the base of a casting having a web B′, a lateral inwardly-projecting portion B^2, an upwardly-projecting part B^3, suitably strengthened and provided above with the extended plate B^4, having the upward projections B^5 B^5 for the screw-bolts B^6 to longitudinally adjust the wedge-blocks and the lower journal-bearing B^7 for the driving-shaft B^8. The wedge-blocks and journal-bearing are fixed in position when once adjusted by the bolts B^9. At the other end of the base B of this casting rises a similar standard, carrying similar parts similarly lettered, for the counter-shaft B^{10}. The parts mounted on the base B are preferably all in one and the same casting. The bearing proper for the shaft B^{10} is B^{11}. The shaft B^8 carries at each end, near to the journal-box B^7, a small pinion B^{12}, which meshes with the gear B^{13} on the counter-shaft B^{10}. The counter-shaft also carries a small pinion C at each end close to the gear B^{13}, which in turn engages with the large gear C′, which is keyed at C^2 to the quill-shaft C^3, through which passes the driving-shaft B^8 and which is supported in the bearing D. Associated with each of these castings which have for their bases the plates B B is a somewhat similar casting having a base-plate D′, with an upwardly-extending web D^2, an upwardly-extending standard-like part D^3, and a laterally-projecting portion D^4 at one end. This laterally-projecting portion D^4 corresponds to the part B^2, and they are coupled together by the bolts D^5 D^5. This standard terminates above in an extended plate D^6, with the upward projections D^7 for the adjusting-bolts D^8 for the wedges D^9, which are adapted to raise and lower the bearing-plate D^{10}, on which the bearing D rests. The parts are ultimately secured in position by the bolts D^{11}, and thus is provided on this casting, which rises on the base D′, a suitable bearing for the quill-shaft C^3. At the forward end of this base-plate and forming part thereof is a somewhat similar standard carrying a somewhat similar arrangement of parts for suitably supporting the bearing D^{12} for the end of the shaft B^{10}. Thus it will be understood that there are two of these castings quite similar to each other on both sides of the slot through which the elevator mechanism operates, that a counter-shaft is journaled in adjustable bearings on each side of the slot, that a driving-shaft is journaled in adjustable bearings on the two outer "frame-pieces," as I call these castings, and that the quill-shaft is journaled on the two inner frame-pieces. These four frame-pieces, with their associated parts, are secured together by suitable stretchers or cross connections, so as to form a rigid frame capable of supporting in proper position the shafts and obviate the possibility of springing or binding from the yielding of the parts. For this purpose the two frame-pieces on each side are secured together first by the bolts D^5, as indicated and above explained. They are also secured together at their forward ends by the stretchers E, shaped like an inverted V in cross-section, placed, as indicated, in connection with the webs B′ and D^2, to which the ends of the stretchers are securely riveted. The two innermost frame-pieces are secured together by the tubular stretcher F, the ends of which are turned up and suitably riveted to the webs D^2 D^2. They are also secured together by the rear stretcher G, which is riveted to the laterally-projecting portions D^4 of the inner frame-pieces and extends from one to the other and is provided with flanges

by which it is secured, first, to the down-spout G′, and, second, to the head-chamber G^2. It is shaped like an inverted V inside and is provided with strengthening-flanges G^3 on its outer surface. As above indicated, the spout G′ passes downwardly from this plate on one side, and the trough G^4 extends downwardly from the apex of this V-shaped plate in the opposite direction in substantial parallelism with the descending buckets of the elevator. In the inner frame-pieces the part D^4 is extended upwardly at the rear, as indicated, and to it is secured one end of the angle-brace G^5, the other end of which is secured to the head-chamber to form an additional brace or stretcher connection for the parts at this point. Toward the forward ends of these inner frame-pieces is secured a bar J in the sliding box composed of the two parts J′ and J^2. These two parts of the sliding box are held together above by the cross-bolt J^3 and below by the bolt J^4, and they have extended sides, so as to engage the flanges J^5 J^5, which form a slideway for such box. Secured to said box by the cross-bolt J^4 is the screw-bolt J^6, which passes through the two transverse pieces J^7 J^7 and is provided with a turn-nut J^8, adapted when turned to move the bolt J^6 up and down, and thus draw with it the box and also the bar J. On the bar J is the spool J^9, over which the chain and buckets travel. Toward each end of the bar J is a casting J^{10}, shaped, for example, as shown, and provided with suitable flanges and parts to receive the ends of the I-beams J^{11} J^{11}, which I-beams extend downward toward the end of the elevator proper and are bridged or connected together by the cross-plate J^{12}. At their lower extremities they are suitably braced, if desired, by the truss construction J^{13}, and at their lower ends they carry the shaft J^{14} and sprocket-wheel J^{15}, on which rides the chain J^{16} with the buckets J^{17}. The lower end of this construction is supported by the adjustable mechanism K, which is not described in detail.

On the quill-shaft C^3, toward the middle thereof, is an enlarged portion, as indicated in Fig. 4, and on this is secured a chain-driving device, which consists of the following parts: first, the pentagonal flanges L L; next, the pentagonal extensions thereof L′ L′; next, a somewhat similarly shaped part L^2 L^2, with the sprocket-teeth L^3 L^3 thereon, and, next, the central filling-piece L^4. All these parts are held together by bolts L^5 L^5 and secured to the shaft by the keys L^6 L^6. This quill-shaft is, in effect, a head-shaft, and the sprocket-teeth L^3 referred to engage the chain, suitably shaped for that purpose, and drive it, with the conveyer-buckets.

I have not shown outside additional bearings for the driving-shaft; but it will be understood that such can be used if required. The shaft is shown broken off, and such bearings, if desirable, and in some cases they may be, would of course be simply the ordinary bearings for such a shaft.

The use and operation of my invention are perhaps sufficiently suggested by the foregoing description of the several parts. They may be further explained, however, as follows: The elevator mechanism, which passes down through the slot in the forward part of the boat, is capable of being adjusted to any desired position by means of the devices K or any other devices properly organized for that purpose. The extension-frame, which carries the sprocket-wheel about which the excavating-buckets travel, is capable of longitudinal adjustment to take up the slack in the chain by the proper manipulation of the screw-bolts J^6 J^6, which move the sliding-box and with it, of course, the rod J^{10}, on which is secured, as explained, the I-beams of the extension-frame, and thus this extension-frame may be adjusted as to length. The head-shaft is driven, as indicated, by the back-geared connection, the driving-shaft and head-shaft having the same axis of rotation and the connection being made through the counter-shaft and the associated gears and sprockets, and thus the high speed of the driving-shaft is reduced to a low speed in the quill-shaft or head-shaft. The high-speed shaft may be driven at either or both ends. By having the head-shaft or quill and the driving-shaft in close proximity to each other or, as in this case, concentric with each other I avoid the necessity of carrying the driving-shaft either forward or rearward to get out of the way of the chain, and therefore avoid the necessity of widespread or separated bearings and secure a solid self-contained bearing for the entire head-shaft mechanism. There is no chain or other such transmission device between the driving-shaft and the driven shaft, and by having the solid self-contained frame for the entire head construction I avoid the danger of having the parts pulled out of line which is incurred where there are separate supports on the sides of the slot and where the driving-shaft is separate from the driven shaft. Moreover, in the case of the use of driving-chains large sprocket-wheels are necessary in connection with the driven shaft or head-shaft, and in some cases they are as much as thirteen feet in diameter. This involves raising the head-wheel very high and throwing the receiving parts, toward which the material is discharged, too far toward the rear. All the bearings of all the parts on both sides are brought into such rigid relation that they can be easily lined up and can be kept in line. With regard to the cross-braces or stretchers it will be observed that while the frame-pieces are securely attached together by such cross-braces they are positioned so as not to interfere with the several parts. One of the cross-braces which bridges the slot is between the two chains in close proximity to the head-shaft

and the other is outside of the line of travel of the chain, but very near the extreme lower line of travel of such chain. This permits the extension-frame, with the chains and buckets, to be raised and lowered from almost a vertical to almost a horizontal position without interfering with either of these braces. In the ordinary operation of the device the material is brought up by the buckets and discharged into the head-chamber and thence into the spout G′, and whatever drip takes place is carried by the trough G^4 back into the slot, so as not to interfere with the machinery or fall upon the deck.

The sprocket-wheel construction for driving the chain and buckets is fully illustrated in Figs. 4 and 5 and is a device of great strength and well adapted for the particular purpose. Its parts are very securely attached together and mounted on the enlargement of the quill-shaft, and they are also made very strong and solid, so as to perform the severe labor for which they are intended. I have not detailed the particular construction of the chain; but it will be understood to be a species of link belt adapted to work on the sprocket-wheel shown in Fig. 5. In Fig. 4 a section of this chain is shown and in Fig. 1 a side view of the same. The spool J^9 on the bar J is intended to cause the chain to pass easily over the bar J, and the bar J serves to rigidly connect the two upper ends of the I-beams.

I claim—

1. In a self-contained back-geared headstall for elevator-bucket dredges, the combination of a high-speed driving-shaft with a low-speed driven shaft in close proximity thereto, and between the two sections of the chain and near the upper end or bend thereof gears and pinions connecting one with the other and reducing the speed, and a dredge chain and buckets driven by such driven shaft.

2. In a self-contained back-geared headstall for elevator-bucket dredges, the combination of a high-speed driving-shaft with a low-speed driven shaft or quill concentric therewith, gears and pinions connecting one with the other and reducing the speed, and a dredge chain and buckets driven by such driven shaft.

3. In a self-contained back-geared headstall for elevator-bucket dredges, the combination of a high-speed driving-shaft with a low-speed driven shaft or quill concentric therewith, gears and pinions connecting one with the other and reducing the speed, a dredge chain and buckets driven by such driven shaft, two outer frame-pieces in which the driving-shaft is journaled and two inner frame-pieces in which the driven shaft is journaled, and stretchers which rigidly connect the outer and inner frame-pieces in pairs.

4. In a self-contained back-geared headstall for elevator-bucket dredges, the combination of a high-speed driving-shaft with a low-speed driven shaft or quill concentric therewith, gears and pinions connecting one with the other and reducing the speed, a dredge chain and buckets driven by such driven shaft, two outer frame-pieces in which the driving-shaft is journaled and two inner frame-pieces in which the driven shaft is journaled, and stretchers which rigidly connect the two inner frame-pieces together.

5. In a self-contained back-geared headstall for elevator-bucket dredges, the combination of a high-speed driving-shaft with a low-speed driven shaft or quill concentric therewith, gears and pinions connecting one with the other and reducing the speed, a dredge chain and buckets driven by such driven shaft, two outer frame-pieces in which the driving-shaft is journaled and two inner frame-pieces in which the driven shaft is journaled, and stretchers which connect the inner and outer frame-pieces rigidly together in pairs, and other stretchers which connect the two inner frame-pieces rigidly together.

7. A self-contained headstall for elevator-bucket dredges, comprising a rigid continuous support for carrying all the headstall mechanism, such support consisting of four frames, two on each side of the slot, the two of each pair rigidly connected together, and the two pairs rigidly connected by stretchers which bridge the slot.

8. A self-contained headstall for elevator-bucket dredges, comprising a rigid continuous support for carrying all the headstall mechanism, such support consisting of four frames, two on each side of the slot, the two of each pair rigidly connected together and the two pairs rigidly connected by stretchers which bridge the slot, said stretchers located one between the chains and the other below the chains, so as to permit the chains to swing through a wide arc without interfering with such stretchers.

9. A self-contained headstall for elevator-bucket dredges, comprising a rigid continuous support for carrying all the headstall mechanism, such support consisting of four frames, two on each side of the slot, the two of each pair rigidly connected together and the two pairs rigidly connected by stretchers which bridge the slot, one stretcher in the upper forward part of the support, the other stretcher in the lower rearward part of the support, and both placed so as to permit the chains to swing through a wide arc without interfering with such stretchers.

10. In a self-contained back-geared head-

stall for elevator-bucket dredges, the combination of a support, consisting of a series of frame-pieces coupled together in pairs on the two sides of the slot and connected together across the slot, so as to form a substantially continuous and rigid support, counter-shafts, one on each side of the slot, a driven shaft, and a driving-shaft concentric therewith, all of such shafts mounted upon said support.

11. In a self-contained back-geared headstall for elevator-bucket dredges, the combination of a support, consisting of a series of frame-pieces coupled together in pairs on the two sides of the slot and connected together across the slot, so as to form a substantially continuous and rigid support, counter-shafts, one on each side of the slot, a driven shaft, a driving-shaft concentric therewith, all of such shafts mounted upon said support, and adjustable bearings on the support so that said shafts may be brought into alinement and held there by the rigidity of their common support.

12. In a self-contained headstall for elevator-bucket dredges, the combination of suitable supporting frame-pieces on opposite sides of the slot, with a head-chamber attached thereto and forming a brace or bridge across the slot, and other bridges or braces across said slot to bring the frame-pieces into rigid relation.

13. In a self-contained headstall for elevator-bucket dredges, the combination of suitable supporting frame-pieces on opposite sides of the slot, with a head-chamber attached thereto and forming a brace or bridge across the slot, other bridges or braces across said slot to bring the frame-pieces into rigid relation, and suitable spouts depending from said head-chamber to carry away the material discharged therein.

14. In a headstall for elevator-bucket dredges, the combination of an extension-frame to carry the outer sprocket for the chain, with a transverse rod, such device containing such transverse rod, a supporting-frame on which the driving-shaft for the chain is carried, and adjustments for such transverse rod, whereby it may be moved to extend or contract the extension-frame.

15. In a headstall for elevator-bucket dredges, the combination of an extension-frame to carry the outer sprocket for the chain, with a transverse rod on which it is pivoted, a supporting-frame on which the driving-shaft for the chain is carried, and adjustments for such transverse rod, whereby it may be moved to extend or contract the extension-frame, said adjustments consisting of screw-bolts and movable boxes controlled thereby.

16. In a self-contained headstall for elevator-bucket dredges, the combination of a suitable support with a driving-shaft mounted thereon, an extension connection mounted thereon independent of the driving-shaft, and an extension-frame attached to such connection, so that the extension-frame and the driving-shaft are retained in permanent relation to each other while such connection is movable.

17. In a self-contained back-geared headstall for elevator-bucket dredges, the combination of a supporting part, consisting of frame-pieces rigidly secured together, with a driving-shaft, a driven shaft, counter-shafts for the transmission of power from one to the other mounted on said support, and an extension connection for the extension-frame mounted on said support.

18. In a headstall for elevator-bucket dredges, the combination of a support on which the driving and driven parts of the headstall are supported, with an extension-frame, a rod bridging the slot connected with the two sides of said extension-frame, and a spool on said rod over which the chain travels.

19. In a headstall for elevator-bucket dredges, the combination of a support on which the driving and driven parts of the headstall are supported, with an extension-frame, a rod bridging the slot connected with the two sides of said extension-frame, a spool on said rod over which the chain travels, and an adjusting device, whereby said rod and spool may be raised or lowered on the support with reference to the position of the driving-shaft, to extend or retract the extension-frame.

20. In a headstall for elevator-bucket dredges, the combination of a driven shaft with a sprocket-wheel thereon, consisting of side flanges, intermediate sprocket-carrying parts, means for keying the device to the shaft, and means for securing the several parts together in the form of a spool.

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