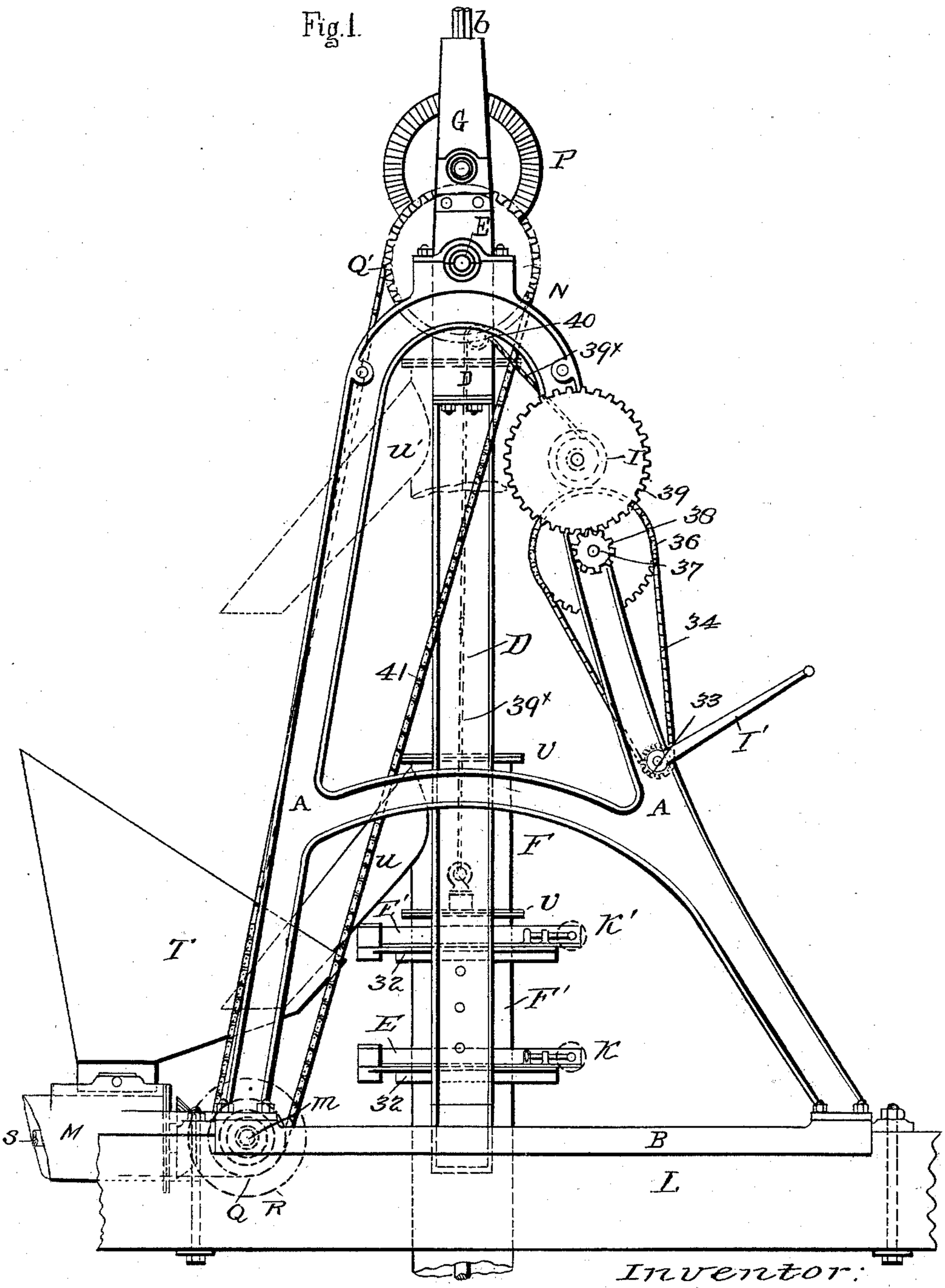
(No Model.) 4 Sheets—Sheet 1.

A. MARANGOS.

GRAIN ELEVATOR.

No. 483,566. Patented Oct. 4, 1892.

Fig. 1.



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By Richards & Co
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A. MARANGOS.

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Fig. 2

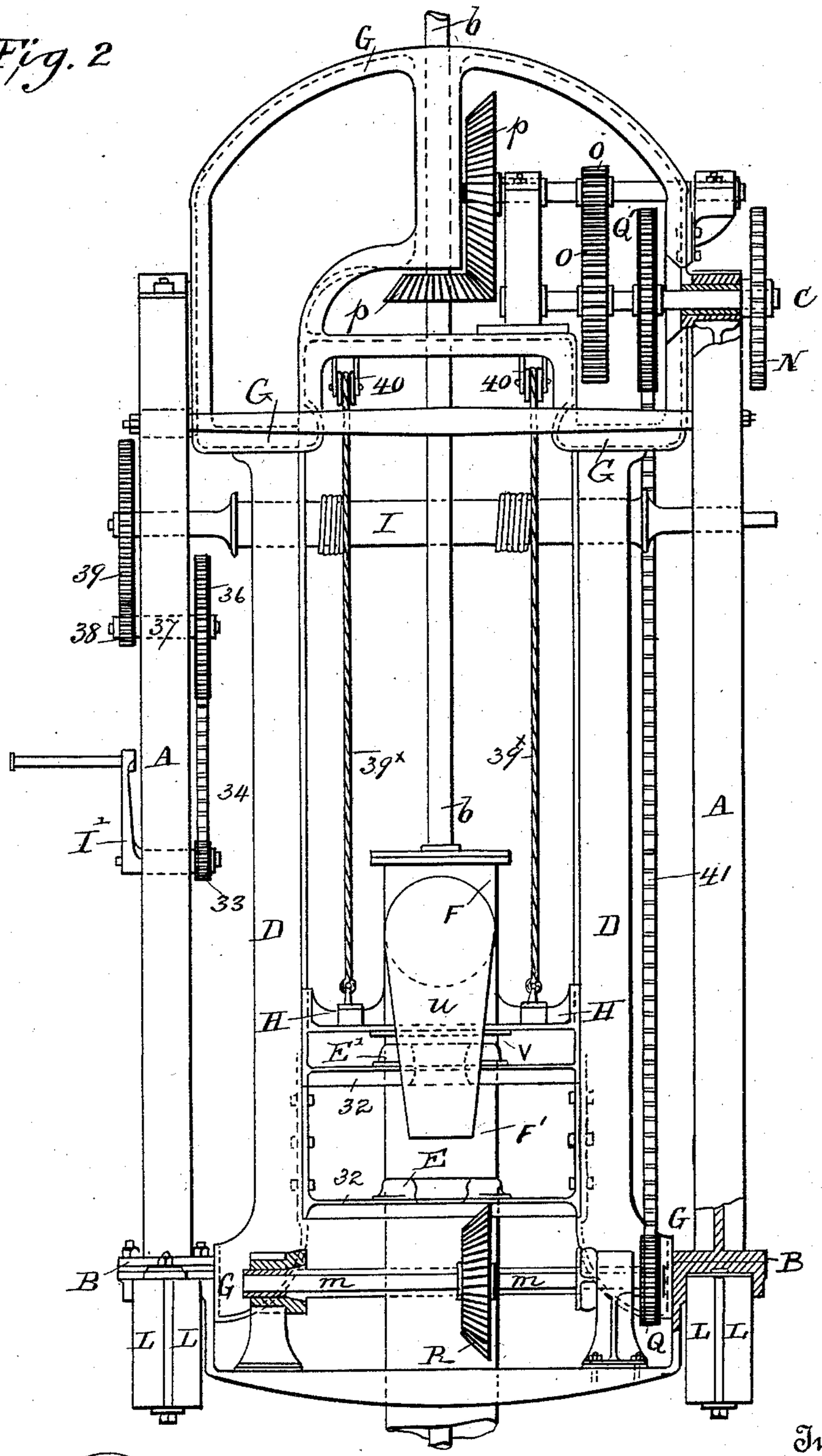

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Fig. 3.

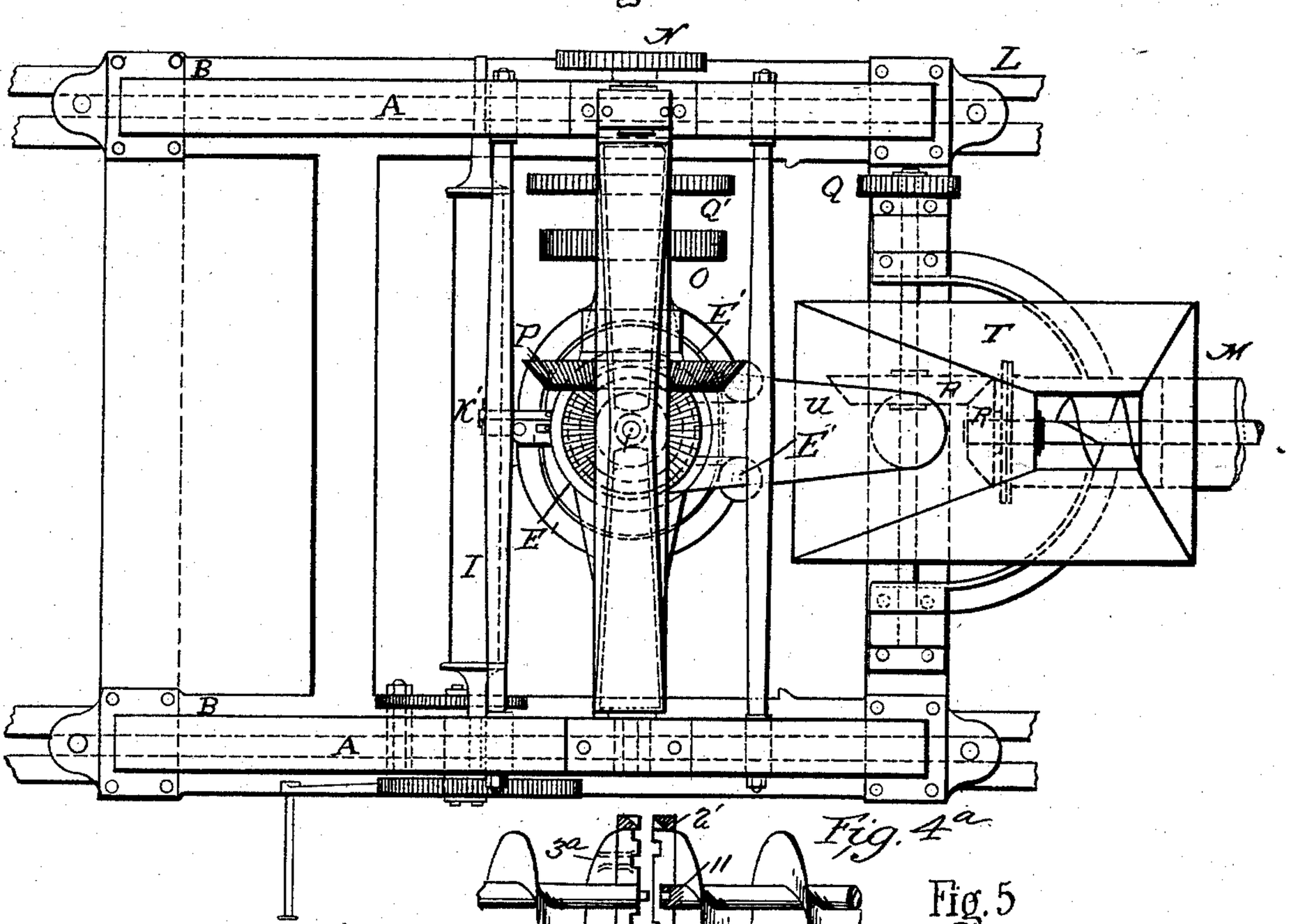

Fig. 4.

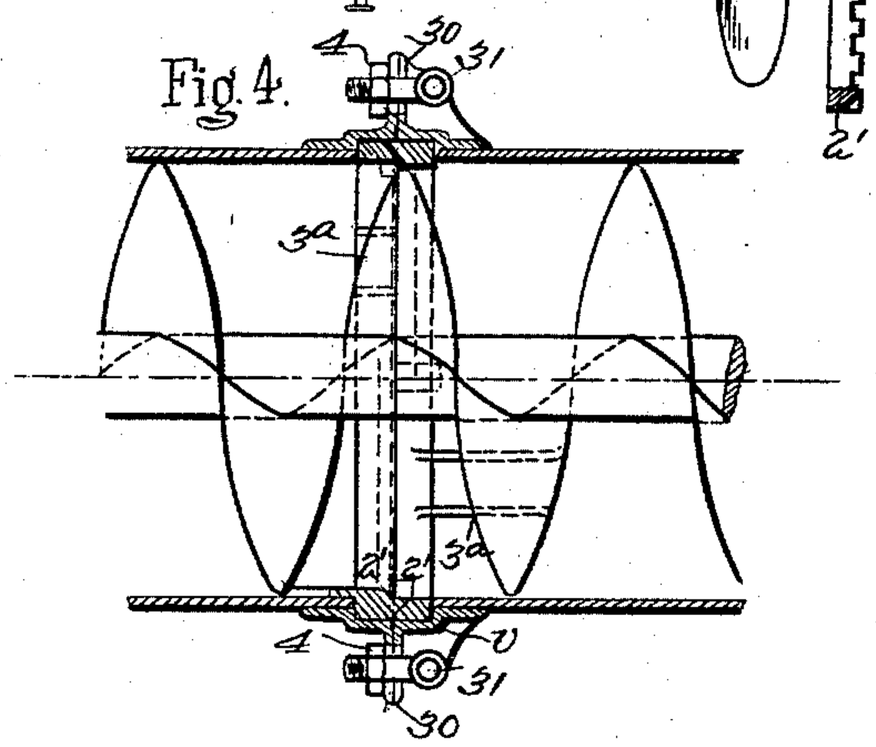

Fig. 4a.

Fig. 5.

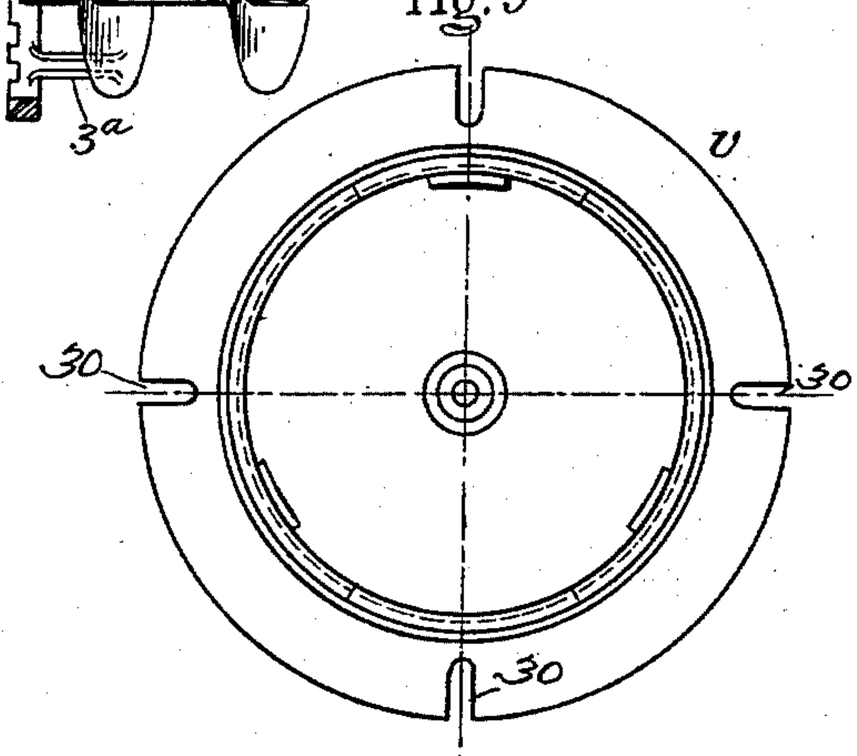

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Fig. 6.

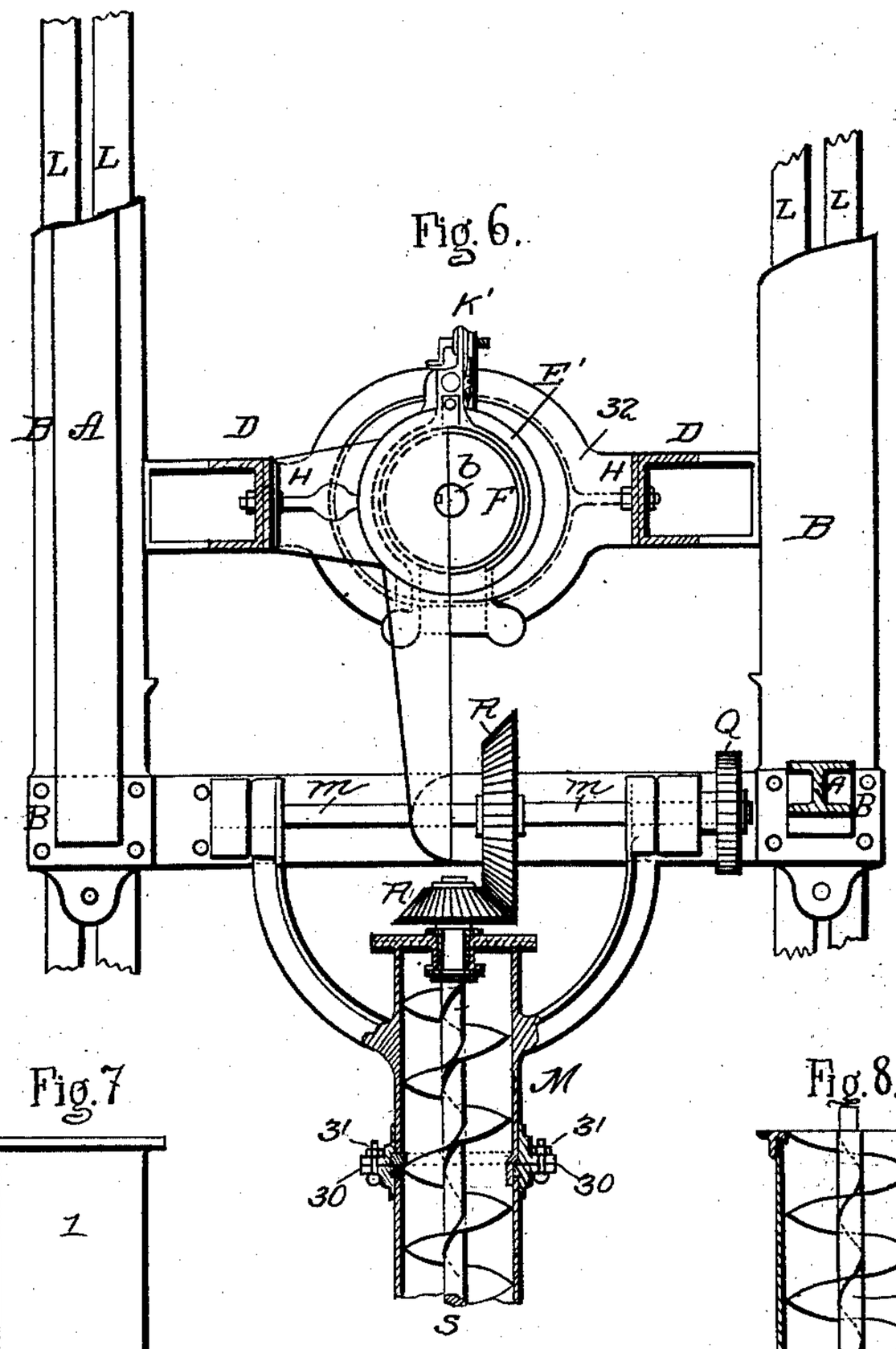


Fig. 7

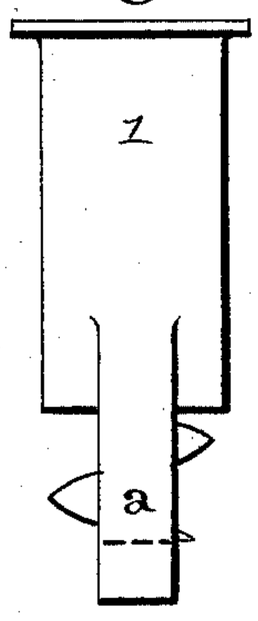
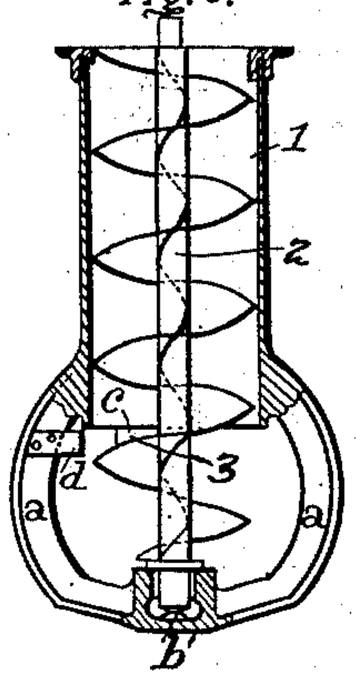


Fig. 8.



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UNITED STATES PATENT OFFICE.

APOSTOLOS MARANGOS, OF MARSEILLES, FRANCE.

GRAIN-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 483,566, dated October 4, 1892.

Application filed April 14, 1892. Serial No. 429,227. (No model.) Patented in France February 20, 1890, No. 203,819; in Belgium August 22, 1890, No. 91,732; in England August 25, 1890, No. 13,349; in Italy September 11, 1890, No. 145; in Spain April 6, 1891, No. 11,772, and in Austria-Hungary December 15, 1891, No. 38,664 and No. 63,358.

To all whom it may concern:

Be it known that I, APOSTOLOS MARANGOS, a citizen of the Republic of France, residing at Marseilles, France, have invented an Improved Grain-Elevator, of which the following is a specification.

The invention has been patented in France, No. 203,819, dated February 20, 1890; in Belgium, No. 91,732, dated August 22, 1890; in Great Britain, No. 13,349, dated August 25, 1890; in Italy, No. 145, dated September 11, 1890; in Austria-Hungary, No. 38,664 and No. 63,358, dated December 15, 1891, and in Spain, No. 11,772, dated April 6, 1891.

My invention relates to an apparatus for vertically raising grain and pulverized material, and is especially designed for use in loading and unloading ships, for the delivery of grain to storage-elevators, and in handling the material stated on docks and in storage-houses generally.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of sufficient of a grain apparatus as is necessary to show my invention, the raised position of the vertical conveyer-tube, with its chute, being shown in dotted lines. Fig. 2 is a front view of the same, with a part of the frame broken away. Fig. 3 is a plan view of the same. Figs. 4 and 5 are detail longitudinal and transverse sections of the inclosing case and conveyer. Fig. 4ª is a view of the sections of the screw conveyer partly in section. Fig. 6 is a horizontal sectional plan view taken in the plane of the lateral discharge-conveyer. Figs. 7 and 8 are a detail side and vertical sectional view, respectively, of the lower part of the conveyer-tube and conveyer.

As illustrated, my improved apparatus will be generally distinguished, involving the following features: first, of the elevator, which raises the material from the hold of the vessel; second, of a laterally-extending discharge-conveyer, which delivers the material at the desired place; third, of the frame for supporting the elevator, and, fourth, of the actuating devices.

The elevator proper is composed of a series of juxtaposed elements connected together as hereinafter described. Each one of these said elements comprises a tubular section containing a section of spiral conveyer which moves with but slight friction. These sections are all alike, with the exception of the first and lowermost one, which constitutes the feeder. This said lowermost section consists of a tube 1, (see Figs. 7 and 8,) open at its lower end, at which point it is provided with a yoke-bracket *a a*, provided centrally with a bearing-step *b'* in a line with the spiral conveyer and adapted to receive the end of the axis 2 in the same.

By referring to Fig. 8 it will be seen that the pitch of the blade of the spiral conveyer beneath the end edge of the section 1 would form a contracted portion in which sections of metal, nails, wire, and other foreign matter might become jammed and seriously interfere with the easy movement of the apparatus. To provide against this, I provide the axis of the spiral conveyer adjacent to the lower edge of section 1 with a block 3. A spring projection *d*, located on one side of the bracket adjacent to the lower edge of the section 1, is adapted to intercept strings, cord, and other like elements in the material. The tubular sections of the conveyer proper are provided at their adjacent ends with lateral flanges *v*, which are correspondingly notched, as indicated at 30, Figs. 4 and 5, so that hinged bolts 31, secured on one of the sections, may be swung to bear within each pair of notches and clamp the flanges rigidly together through the medium of the nuts 4. These clamping portions conjointly form a recess to receive the abutting ring portions 2' and 2' on the end of each spiral conveyer-section, the adjacent faces being gear-dressed, so that the two rings will mesh with each other and communicate the motion of one section to the other. Such an arrangement enables the strain to be taken off the central spindle, which is also sectional in its character, having socket-and-pin connections 11 between them, as shown in Fig. 4ª. The webs 3ª illustrate how the conveyer-blades are connected to the rings. The upper tubular sections F F' of the elevator proper have their lateral

flanges *v* so disposed that a clamp-section E′, held by hand-screw K′, serves to hold said sections rigidly in position. Now by opening the upper E′ and slightly loosening the lower E the latter will serve as a guide to permit the descent of all of the sections, except the top one, thus admitting of the introduction of an additional section within the conveyer to lengthen the same. The section which is to be held is supported by its lateral flange resting upon the clamp-ring E′. These clamp-rings are pivoted to the cross-braces 32, extending between and secured to the depending pivoted hanger-arms D, said braces having central openings through which the conveyer-tubes pass.

The top section F is provided with a discharge-spout *u*, adapted to deliver the material elevated into a hopper T, supplying the material to a lateral tube M, containing a spiral conveyer-shaft S, made up of sections, as previously described, with reference to the main conveyer. Bracket-arms extend integrally from the casing and pivotally engage a shaft *m* to admit of the vertical adjustment of the lateral conveyer M in an arc of the circle. The relation of the bevel-gearing R R is such that the lower belt-wheel Q when operated through its belt 41 and upper belt-wheel Q′ can actuate the conveyer-shaft S, notwithstanding the pivotal position of the lateral conveyer. The shaft *b* of the main conveyer is driven through the medium of the bevel gear-wheels P P, pinion *o*, larger gear-wheel O, upper gear-wheel Q′, and exterior gear-wheel N.

The winch I is operated by a hand-crank to wind or feed a cable secured to an ear or bracket on the main conveyer to elevate or lower the same. The connection from the hand-crank I′ to the winch is made through the sprocket-pinion 33, the chain or belt 34, the belt-wheel 36, its shaft 37, pinion 38, and gear 39. The cables $39^{\times}$ pass from the winch up over the sheaves 40, journaled in the main frame, and thence down to the cross-bar H, connected to the upper section F of the conveyer, the said bar moving on ways formed on the hanger-arms D, Fig. 2. The elevated position of the conveyer is shown in dotted lines, Fig. 1.

The upper part G of the framework supporting the main conveyer is mounted in the side standards A of the main frame through the medium of trunnions and enables the inner frame, including the bars D D, to swing the main conveyer when it is desirable, either for the purpose of adjusting the position of the same or to provide against longitudinal rolling or pitching of the boat. By having the base-rails B engaging the longitudinal guide-rails L the longitudinal movement before referred to is assisted.

The material may be fed to the lower end of the main conveyer by any suitable means or supplemental conveyer or the material may be shoveled to the main conveyer by attendants provided for the purpose. The hangers form a supplemental frame, on which is located the bearing for the upper end of the conveyer-shaft. The transverse shaft, which communicates motion to the conveyer-shaft, extends through the pivotal bearing of the hanger.

I claim—

1. In a spiral conveyer, the combination, with a tube formed of a series of sections having clamping-flanges internally recessed, of a conveyer-blade made up of a series of independent sections provided at their adjacent ends with engaging rings bearing and turning in said recesses, substantially as set forth.

2. In combination, the frame, the vertical conveyer made up of detachable sections, the adjustable clamp on the frame adapted to embrace the sectional conveyer, and the means for raising and lowering the conveyer through the said clamp, substantially as described.

3. In combination, the main frame, the vertical screw conveyer supported thereby and having a spout at its upper end, the horizontally-arranged conveyer pivotally connected to the frame, the hopper carried by said conveyer and arranged below the spout of the vertical conveyer, the means for raising and lowering the vertical conveyer, and the means for adjusting the horizontal conveyer on its pivot, substantially as described.

4. In combination, the main frame, the hanger-arms D D, pivotally secured thereto, the vertical conveyer, the means for moving the same vertically, and the guiding means in connection with said conveyer, said guiding means extending between the hanger-arms D D, substantially as described.

5. The combination of the incasing tube and spiral conveyer within the same, the latter projecting beyond the lower end of the same and provided with a block 3, arranged adjacent to said lower edge, substantially as set forth.

6. The combination of an inclosing casing and spiral conveyer within the same and latter projecting beyond the lower edge of the former, and a spring projection *d*, located adjacent to said lower edge, substantially as set forth.

7. The combination, in a grain-elevating apparatus, of the side standards A and an interior frame carrying the conveyer-tube, spiral conveyer, and gear-shaft, said interior frame being pivotally suspended in said standards A A, substantially as set forth.

8. In combination, in a conveying apparatus, the conveyer-tube formed in sections with means at their edges for securing the sections together, the screw conveyer within said tube also formed in sections, and the rings secured at the ends of the conveyer-sections, said rings interlocking with each other to communicate the movement of one section to the next and engaging the convey-

ing-tube and serving to hold the sections in position, substantially as described.

9. In combination, the main frame, the conveyer, the means for carrying the same, consisting of the supplemental frame, including the hangers journaled in the upper part of the main frame, the conveyer-shaft journaled in the said supplemental frame, and the means for driving the said conveyer-shaft, comprising the transverse driving-shaft extending through the pivotal bearings of the hangers, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

APOSTOLOS MARANGOS.

Witnesses:

A. DELPEY,

E. DUCASSON.