(No Model.) 4 Sheets—Sheet 1.

# C. ULRICH.

## GRAIN ELEVATOR.

No. 245,417. Patented Aug. 9, 1881.

FIG. 1.

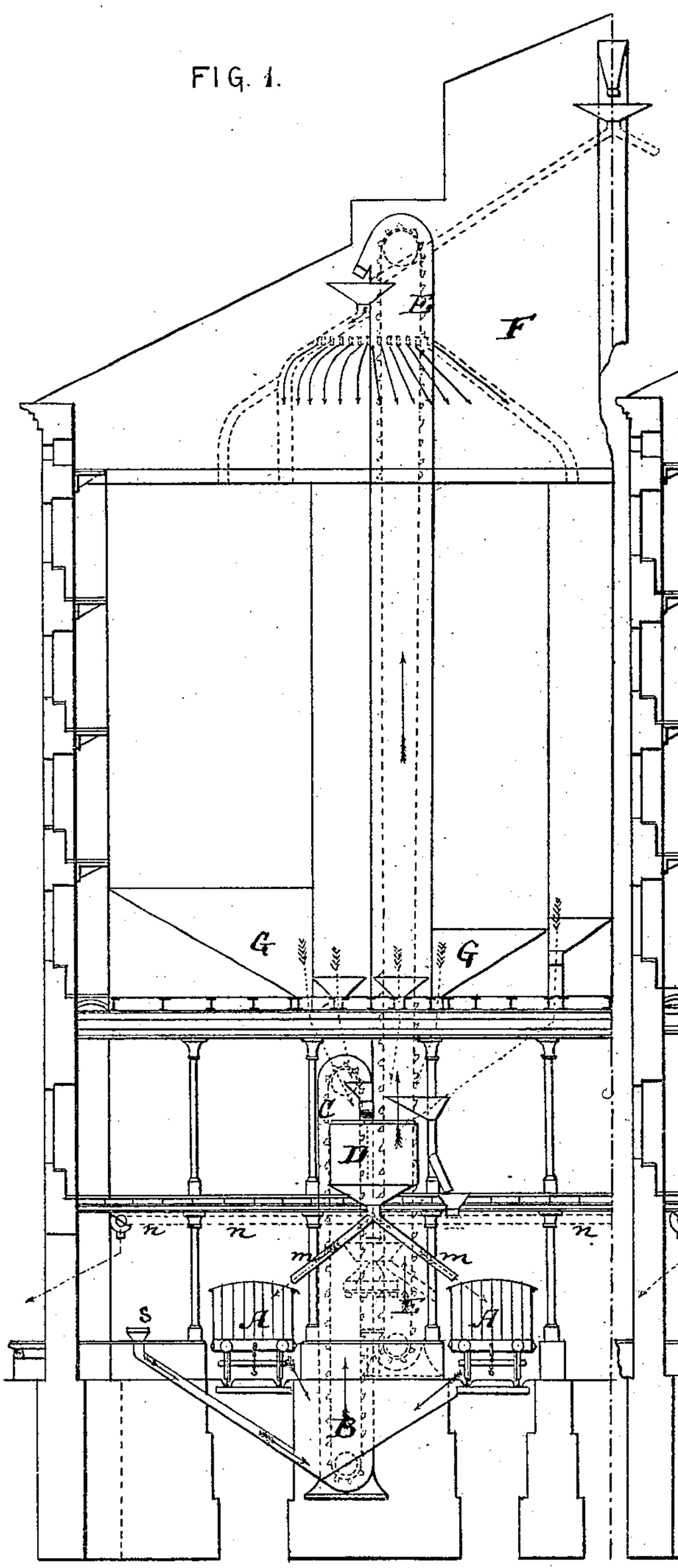
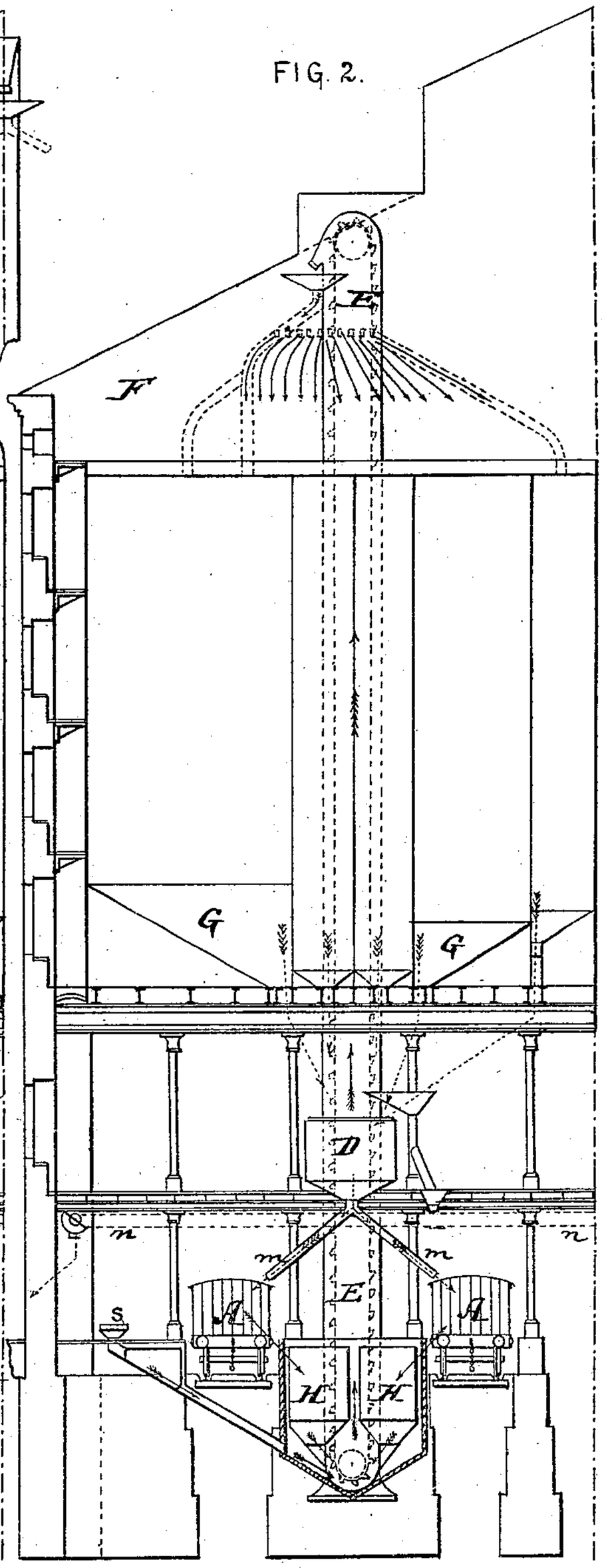



FIG. 2.




Witnesses
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Inventor:
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by his attorney
A. V. Briesen

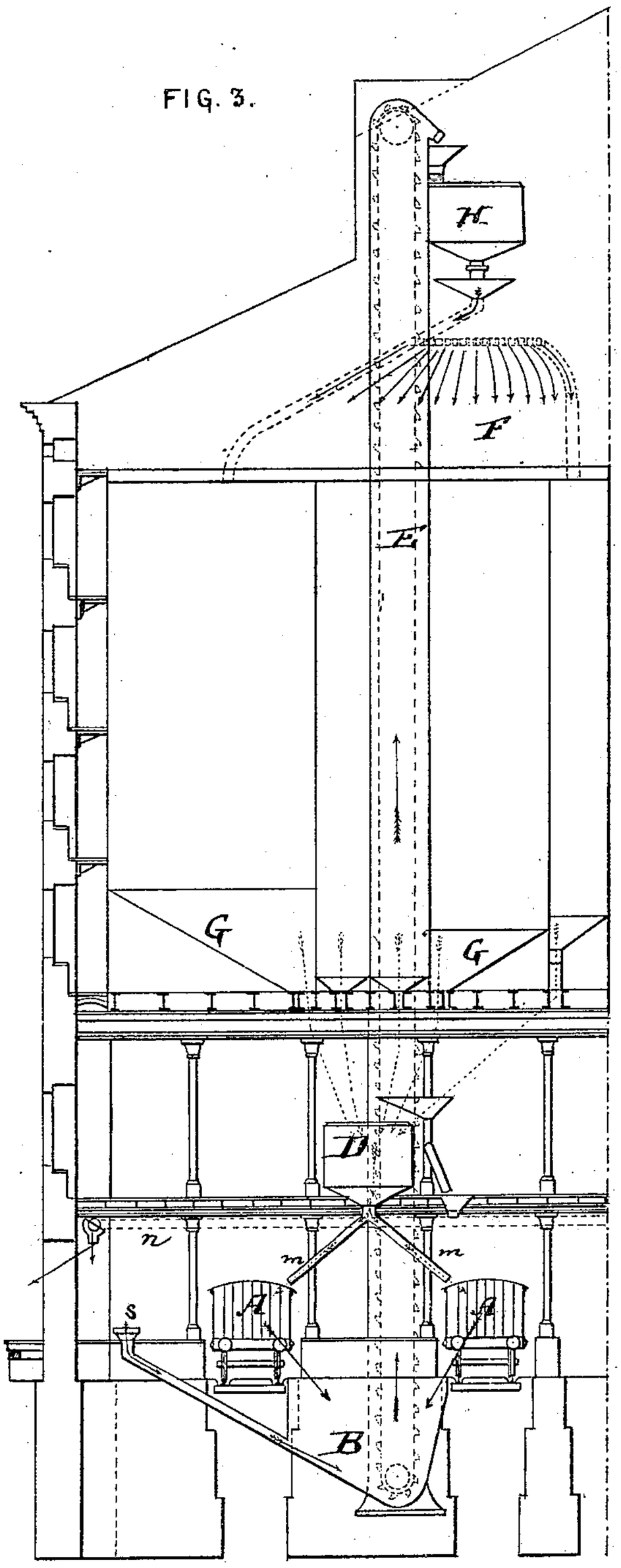
(No Model.) 4 Sheets—Sheet 2.

# C. ULRICH.

## GRAIN ELEVATOR.

No. 245,417. Patented Aug. 9, 1881.

FIG. 3.

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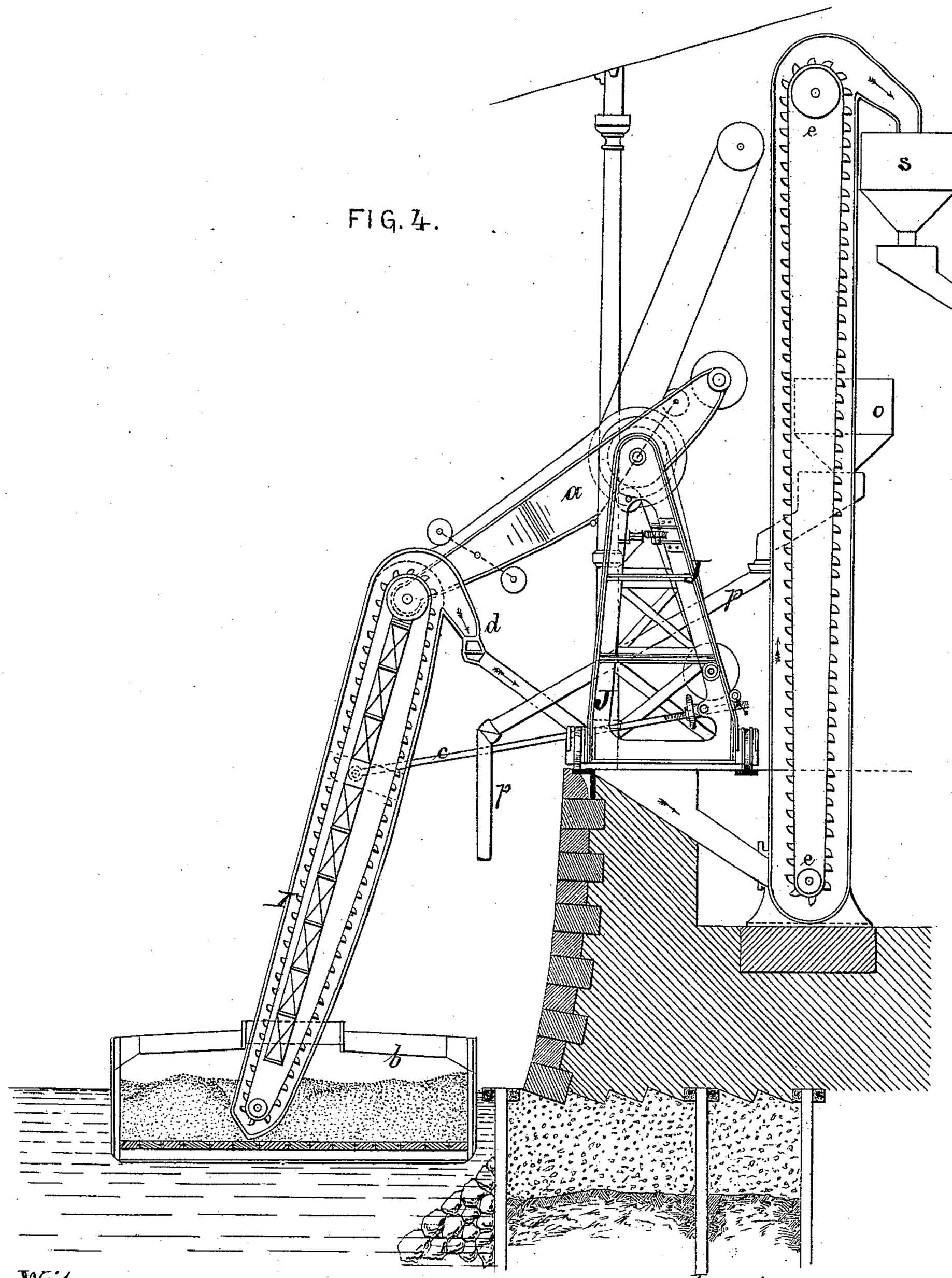
(No Model.) 4 Sheets—Sheet 3.

# C. ULRICH.

## GRAIN ELEVATOR.

No. 245,417. Patented Aug. 9, 1881.

FIG. 4.

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(No Model.)

4 Sheets—Sheet 4.

# C. ULRICH.

## GRAIN ELEVATOR.

No. 245,417. Patented Aug. 9, 1881.

FIG. 5.

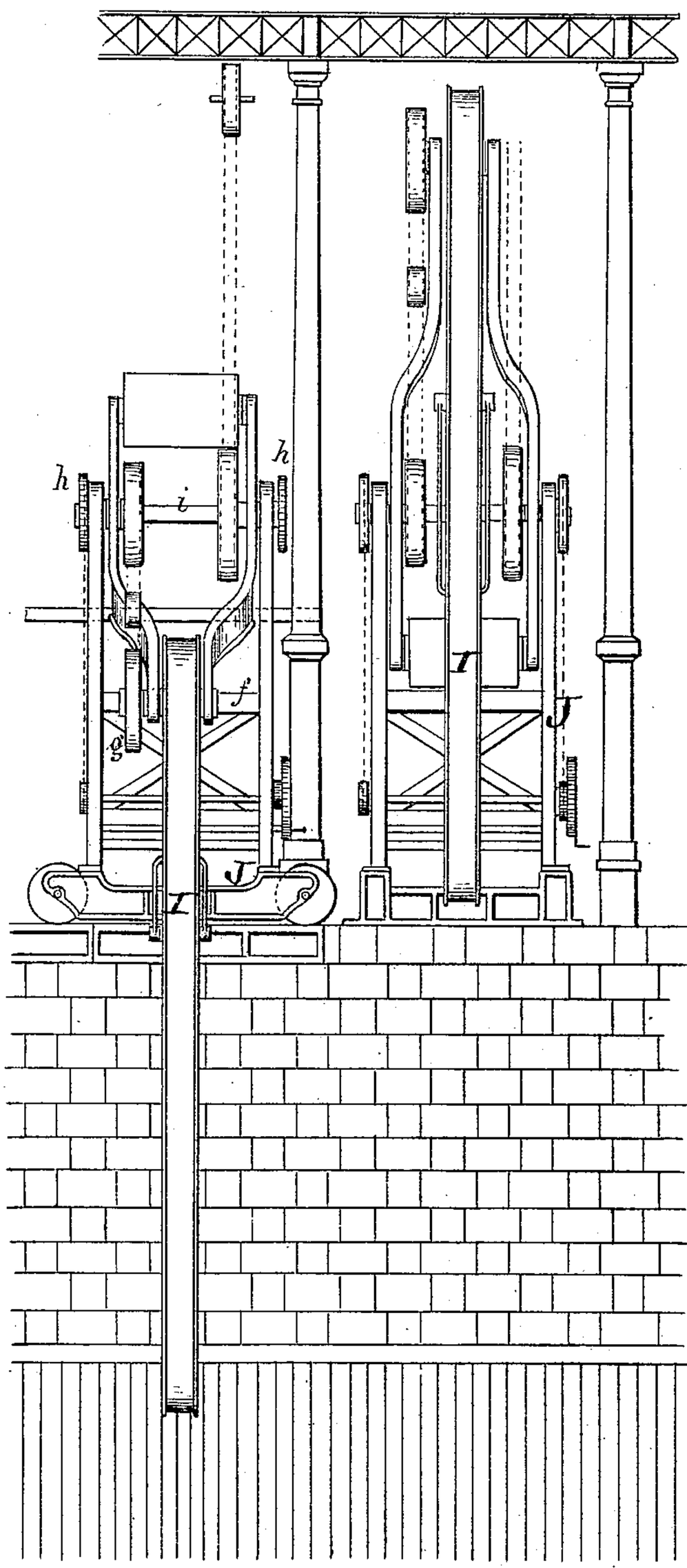
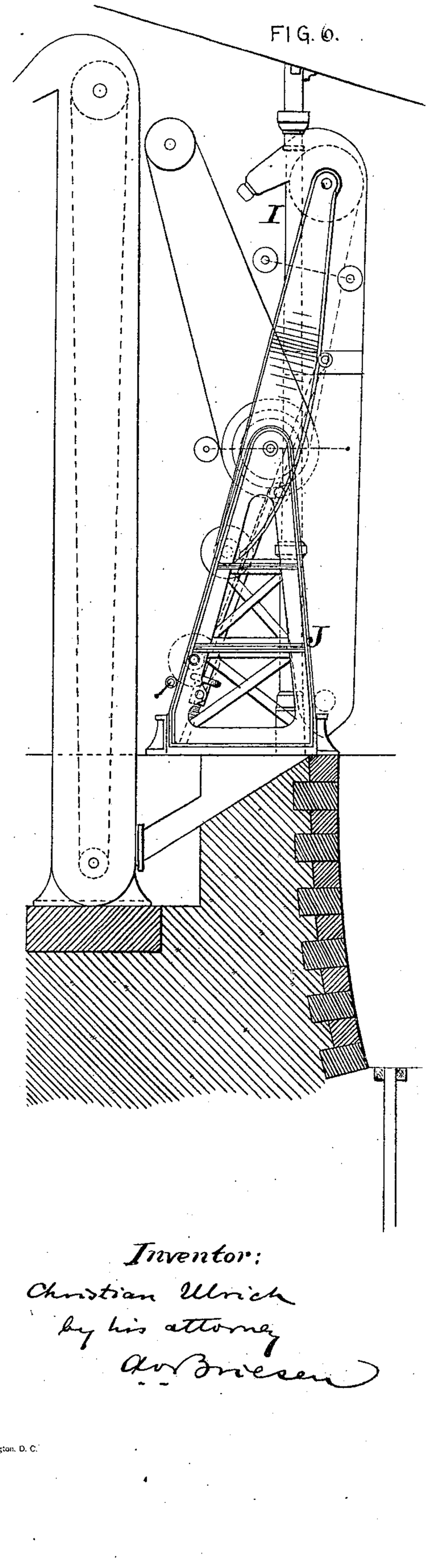



FIG. 6.

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# UNITED STATES PATENT OFFICE.

CHRISTIAN ULRICH, OF VIENNA, AUSTRIA.

## GRAIN-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 245,417, dated August 9, 1881.

Application filed April 20, 1881. (No model.) Patented in Austria July 28, 1880.

*To all whom it may concern:*

Be it known that I, CHRISTIAN ULRICH, residing at Vienna, in the Empire of Austria, and a subject of the Emperor of Austria, have invented Improvements in Grain-Elevators, (for which I have received Austrian Patent No. 8,171, for fifteen years from July 28, 1880,) of which the following is a specification.

This invention has for its object to improve the arrangement of elevators for taking grain and the like from boats or cars into store-rooms, and back from the latter into cars or boats, and weighing it during the act of delivery to the store-rooms or to the cars or boats.

As elevators are at present arranged they carry the grain to bins that are contained at a great height under the roof of the building, the grain passing through weighing-scales on its way up. In order to discharge the grain from the upper bins it is first lowered into the cellar, then again elevated to the roof, so that it may be weighed again, and is thereupon discharged into the cars or boats through suitable chutes. It is therefore as expensive to discharge and weigh as it is to receive and weigh the grain in the ordinary elevators.

Grain-elevators are a species of magazine or store-room. Whosoever uses them should have full opportunity to satisfy himself that the grain weighed for the discharge into cars or boats is correctly weighed, and, furthermore, that all the grain so weighed is virtually discharged into the cars or boats; but as at present constructed the purchaser is not able, by watching the weighing process, to know that he receives all the grain weighed for the discharge; nor is he able, if he watches the delivery into his boats or cars, to know that such grain has been correctly weighed.

Another objectionable feature of ordinary elevators is that they cannot be used to simultaneously receive and discharge grain.

It is the object of this invention to overcome the above-mentioned defects.

In the accompanying drawings, Figs. 1, 2, and 3 represent sectional elevations of buildings which are provided with my improved elevator, illustrating the latter in modified forms. Fig. 4 is an enlarged side view of that portion of the elevator that connects directly with a boat which is to be unloaded. Fig. 5 is a face view thereof. Fig. 6 is a side view thereof, showing it folded together.

The elevators shown in Figs. 1, 2, and 3 all contain my invention. They are shown in different modifications, which suggest themselves according to the different structures in which they are to be used; but I believe that the arrangement shown in Fig. 2 will be more uniformly acceptable. In all the figures the arrows drawn in full represent the course of the grain as it enters the elevator to be stored. The dotted arrows show the course of the grain that leaves the upper bins to be discharged into boats or cars.

The arrangement shown in Fig. 1 is preferable for elevators erected near the sea-shore or on the banks of rivers having ground-water.

The arrangement shown in Fig. 2 is useful in all cases where the elevator is erected on dry ground, and where the weighing apparatus below ground is not liable to be flooded.

The arrangement shown in Fig. 3 is particularly calculated for the use of elevators put up on sloping ground.

In Fig. 1, the letter A represents railway-cars or analogous conveyances calculated to carry the grain to and receive it from the elevator. These cars, if they arrive full of grain, discharge it into the lower hopper, B, whence a bucket-carrying belt, C, which is driven by suitable machinery, lifts the grain and carries it to the scales D. These are ordinary Fairbanks or other scales usually employed in such cases. The scales are preferably ranged in pairs, so that when one is loaded to a certain degree it will be self-discharging, leaving the other scale or scale-pan to receive the grain that follows. The grain having thus been weighed is from the scales D, by chutes, (indicated by dotted lines,) conveyed to the long belt E, which also has lifting-buckets, and raises the grain into the upper floor, F, whence it is distributed to the receiving-bins G.

To discharge the grain from the bins G the chutes in the bottoms of the bins are opened, allowing the grain to flow into the scales D, and thence, after it has been weighed, through chutes *m* into the cars, or by other chutes to aprons or belts *n*, which are shown by dotted lines in Fig. 1, to be by such belts conveyed to ships or wagons. The floor on which are the

scales is accessible to the public, so that the parties interested may supervise the weighing of the grain in loading as well as in unloading.

The arrangement which is shown in Fig. 2 does away with the short belt C, but has instead an additional pair of scales, H, which is in the lower floor. The grain from the cars A is thrown directly into the lower scales, H, and weighed. From these scales it is, by the long elevator E, carried to the top floor, F, and distributed among the bins G. When grain is to be conveyed from the bins G to cars or boats the bottoms of the bins are opened and their contents discharged into the upper scales, D, where the grain is weighed. From the scales D the grain flows either directly to the cars through chutes *m* or to the belts *n*, as hereinabove stated.

Inasmuch as the discharge of grain from the bins G and the weighing thereof are entirely automatic and solely effected by gravity, the expense of such discharge and of the loading of vessels or cars is as nothing compared with the very expensive ordinary process of relifting the grain to the roof after weighing it for the discharge and before discharging it into the cars or boats. The arrangement, moreover, is of such a character that loading and unloading of grain can proceed simultaneously.

The cars A on one of the tracks (shown in Fig. 2) can discharge grain into the scales H, and at the same time the cars A on the other track (shown in Fig. 2) can be loaded from the scales D.

It is evident that wherever cars are mentioned in this description boats, wagons, or other vehicles are included in the term as equivalent for the purposes of this specification. In fact, the arrangement shown in Fig. 2 is equally well adapted to all kinds of transports, be they railroads, ships, or wagons. Either can be used to discharge grain or other substance into and receive it from the elevator. The grain can be conveniently taken from cars, ships, or wagons, and discharged into ships, wagons, or cars; but whenever it enters the elevator and whenever it leaves the same it is first automatically weighed. The scales are always open to the public.

The discharging capacity of this elevator is double that of any elevator now in existence.

Suitable ventilators may be provided for the purpose of drying the grain or keeping it dry.

Only one belt, E, is shown in Fig. 2; but in a full-sized elevator many such belts will be used. Their upper parts should be in proximity to belts to admit of the convenient distribution of the grain on the upper floor, F.

For loading ships the belts *n* discharge into hoppers *o*, (shown in Fig. 4), whence suitable conduits *p* lead into the ships.

In Figs. 4, 5, and 6 is shown an attachment for unloading ships. This attachment is an elevator-belt, I, suspended from a movable frame, J.

For unloading canal-boats and river-boats it may be advisable to dip several belts into the holds of such vessels, especially when the latter are subdivided into compartments, and when unloading at one point only would be liable to injure the vessel or make it keel over. To this end the movability of the frame J is quite desirable.

The elevator leg and belt I is suspended from the longer arm of a balanced beam, *a*, which hangs in the frame J. The elevator leg and belt I is thoroughly balanced on the beam *a*, so that persons on board the ship *b* can readily move it to the necessary depth into the vessel's hold. If not in use, the elevator leg and belt I can be conveniently folded up, as in Fig. 6. A swivel-brace, *c*, will hold the elevator-leg I in any desired inclined position. The mouth *d* of the elevator-leg I is connected by universal joint with a pipe, the object of which is to conduct the grain into the inlet-opening of the elevator-belt *e*, the frame of which is erected on the river-bank. In order to enable the proper inclination of this pipe, even at low-water, it is essential that the frame of the belt *e* should be erected as near to the edge of the water as possible. The inner arm of the beam *a* is, to this end, shorter than the outer arm. The elevator-belt *e*, which may have the capacity of two or more of the belts I, lifts the grain into hoppers *s*, Fig. 2, or directly into the scales H.

The scales D all discharge into a funnel from which the pipes *m* project, as shown in Fig. 2. These pipes conduct the grain either into the cars A, or, if desired, into an elevator-belt, by means of which the grain can be conveyed to suitable store-rooms or store-houses.

In case the elevator-building is erected close to the water the intermediate elevator-belts, I and *e*, may be dispensed with, as the grain may be discharged directly from the vessel into the funnels *s*.

With reference to the elevating devices shown in Figs. 4, 5, and 6, it may be well to add that the beam *a* is balanced by a weight placed on its short arm. (See Fig. 5.) The driving-shaft *f* of the belt I hangs in the long arm of this beam and carries a pulley, *g*. The pivot *i* of the beam *a* carries chain-wheels *h*, which can be turned by windlasses near the foot of the frame J.

The construction shown in Fig. 3 is, as has already been said, particularly intended for structures placed on sloping ground, preferably near a railroad passing near the upper part of the building. In such case the grain received at the top could be dropped to the receiving-cars A from the bins G through the scales D; but grain received at the bottom would be lifted by the belt E into the scales H, which, in this case, are at the top of the building, and thence taken to the upper railway or stored in the bins. Grain received from the upper railway would be passed into the scales H, and thence deposited into the bins G.

I claim—

1. In a grain-elevator, the arrangement and

combination of the receiving-hopper *s*, leading to the scales H, in which the grain is weighed without manipulation before it is elevated with said scales H and with the lifting-belt E, taking the grain from the scales H, with bins G, and with the discharging-scales D, substantially as herein shown and described, to permit the simultaneous loading and unloading of the grain and the weighing of the grain as it enters and leaves the building, as specified.

2. In combination with a grain-elevator which is constructed substantially as stated, the traveling frame J, balanced beam *a*, swinging elevator-belt I, and elevator-belt *e*, substantially as herein shown and described.

In witness whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHRISTIAN ULRICH.

Witnesses:

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EDWD. C. DE RUTI.