

(No Model.)

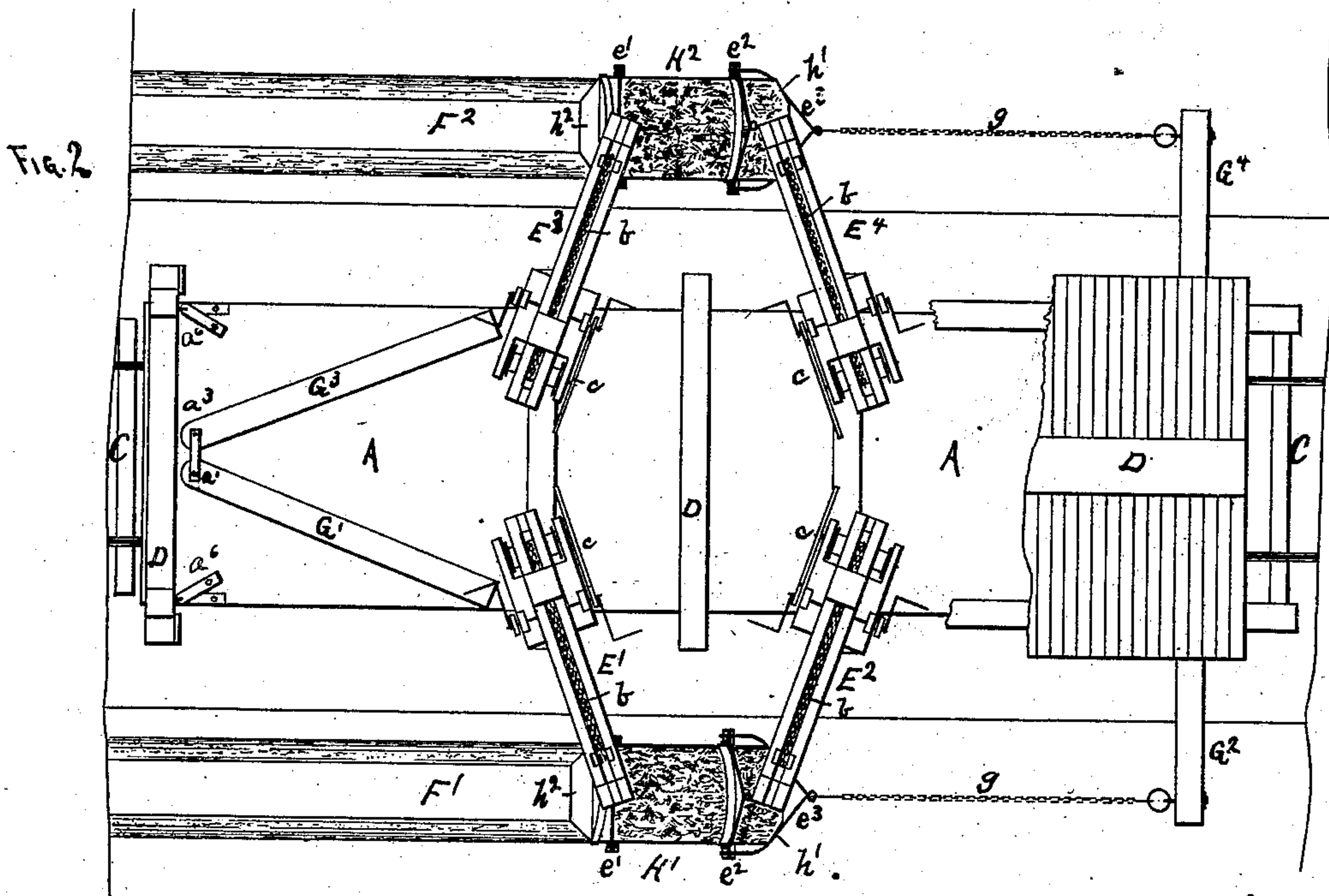
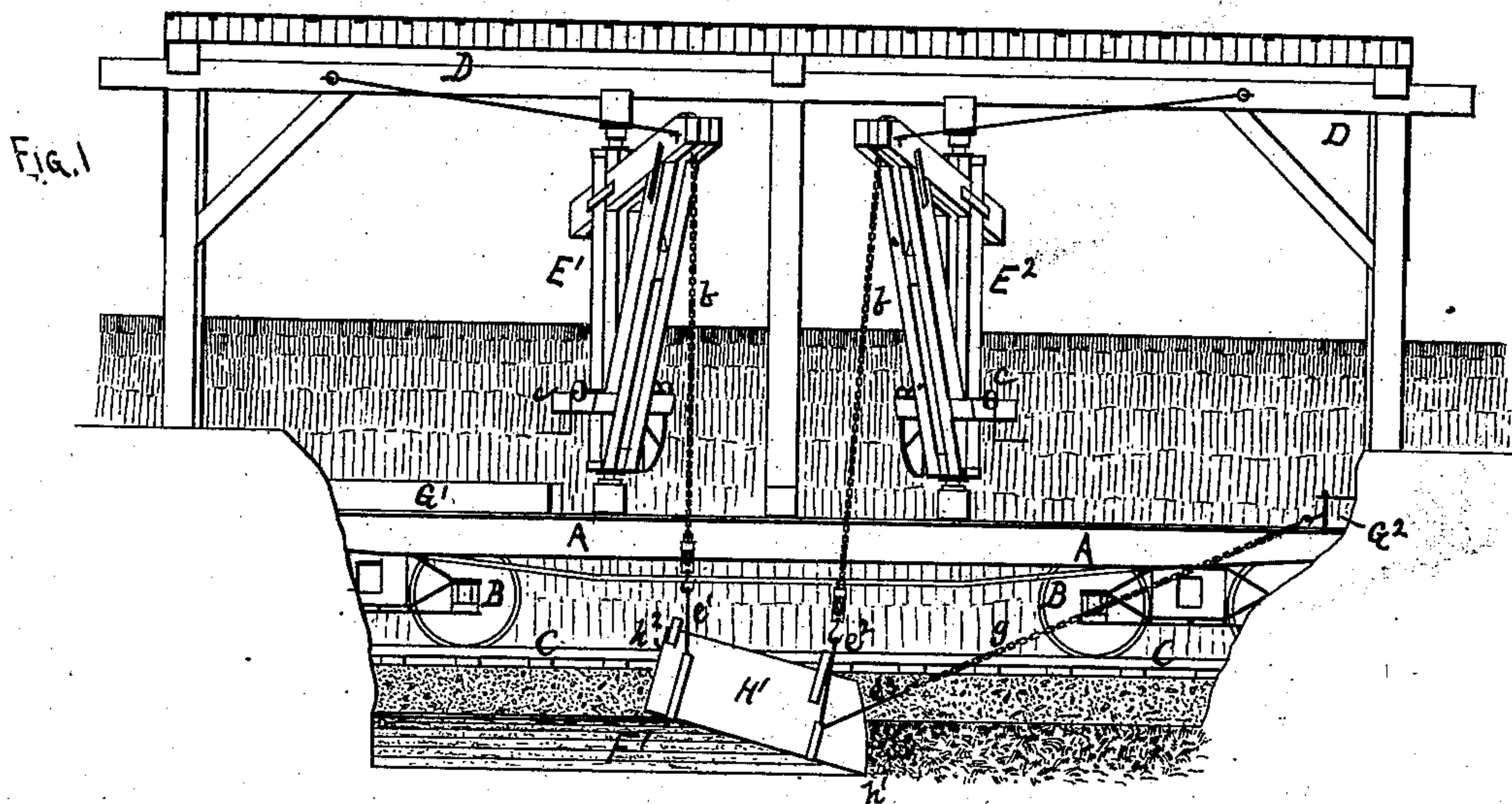
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C. W. CASE, J. O. PATTEE & A. M. LONG.

MACHINE FOR FORMING AND CLEANING DITCHES.

No. 272,412.

Patented Feb. 20, 1883.



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(No Model.)

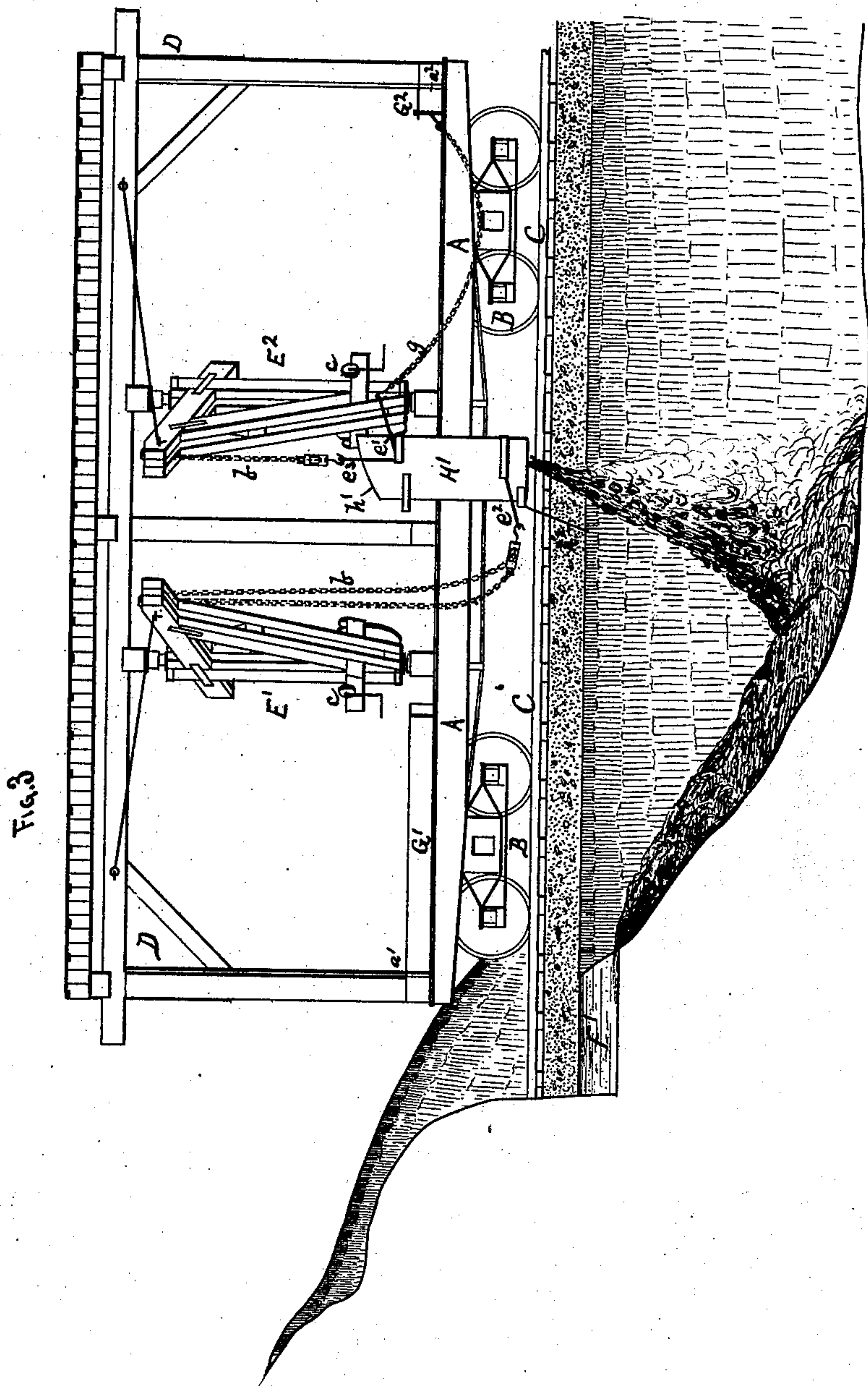
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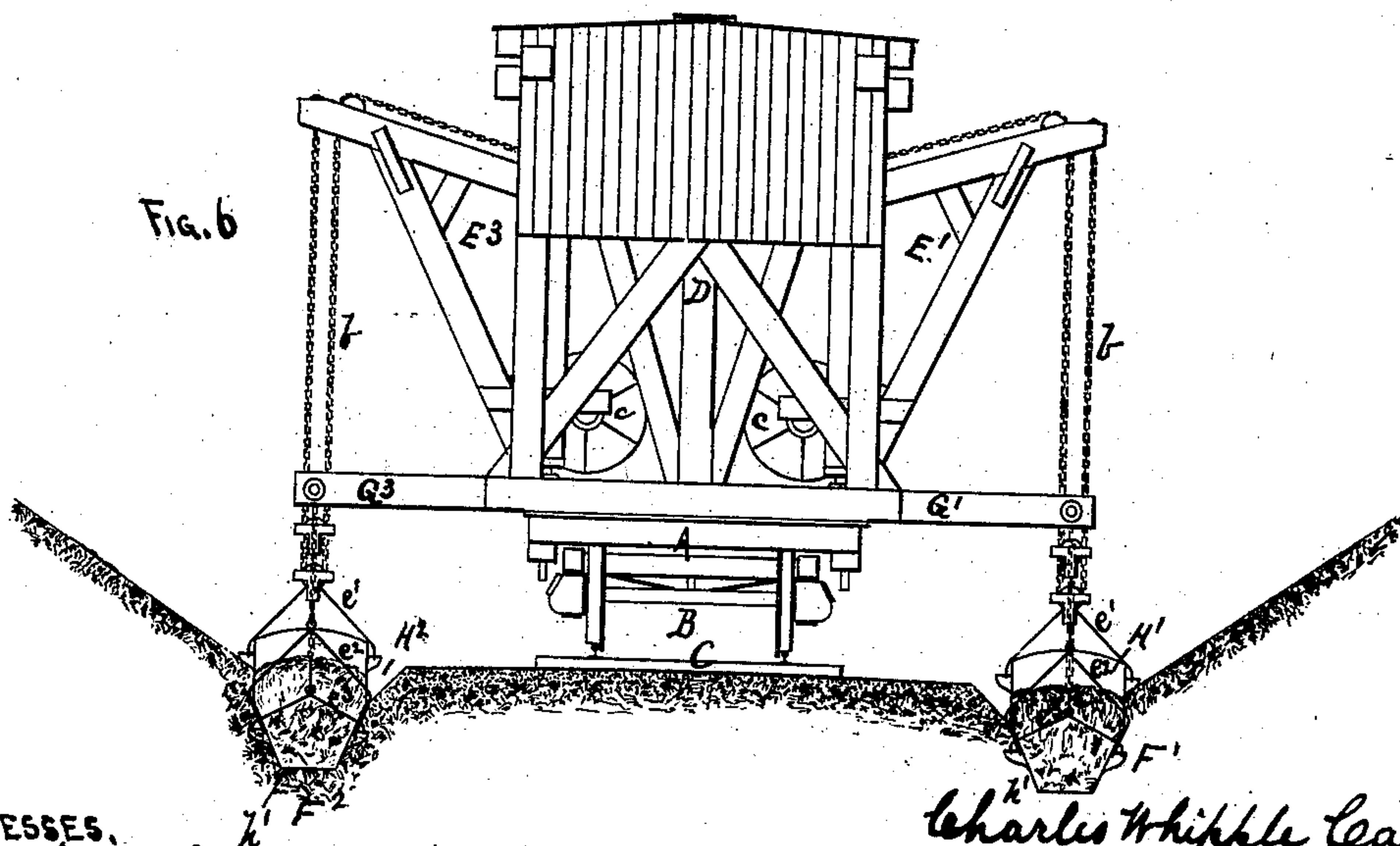
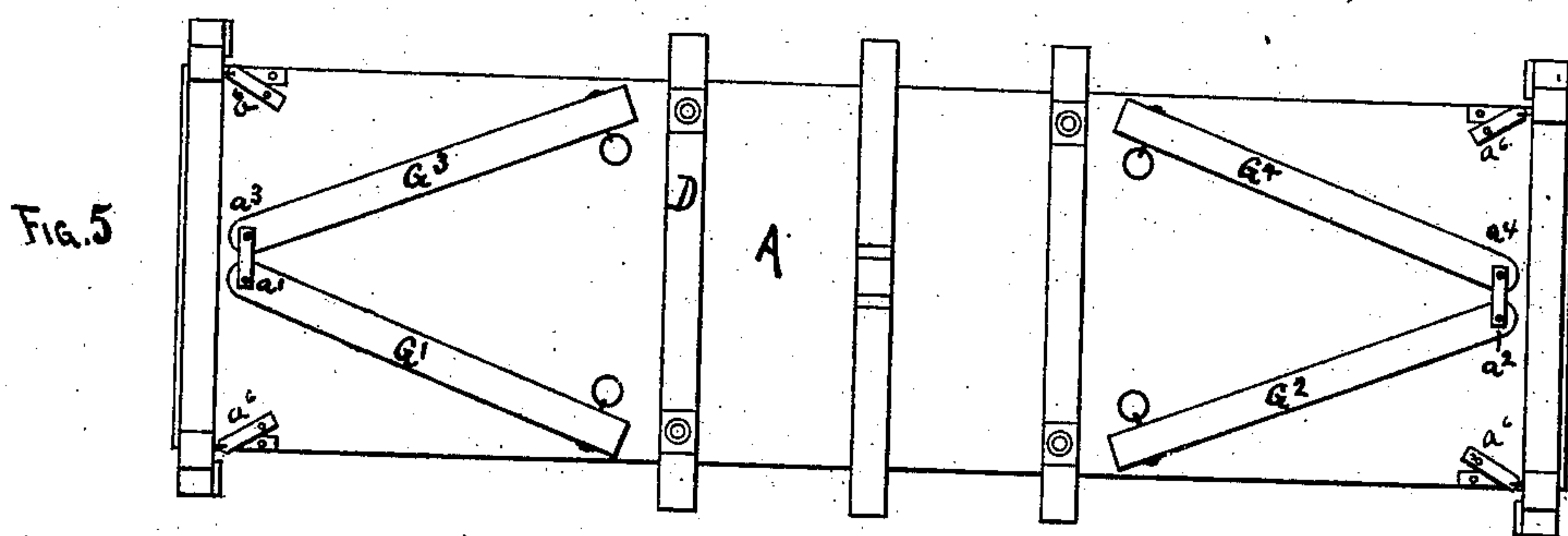
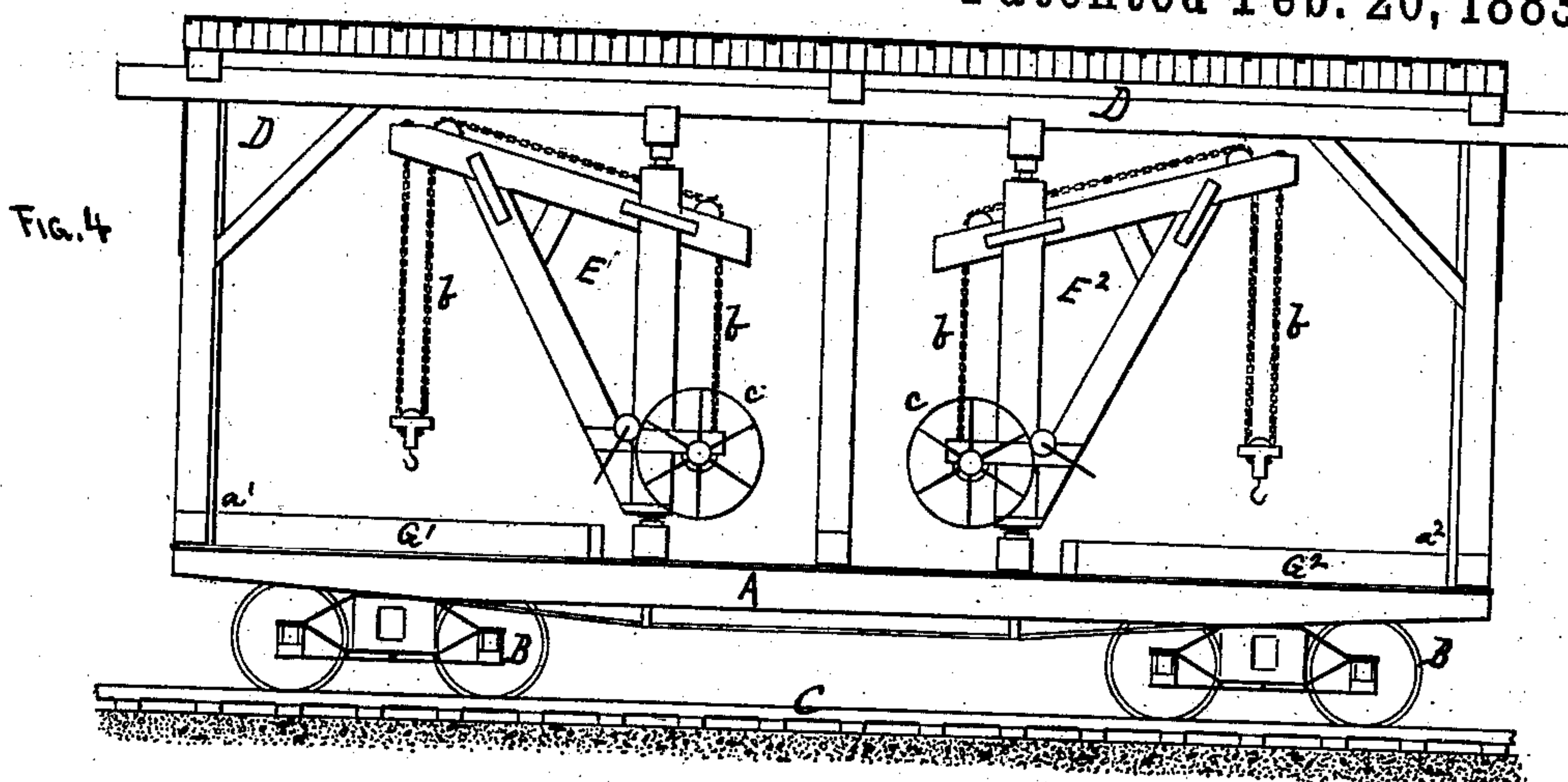
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(No Model.)

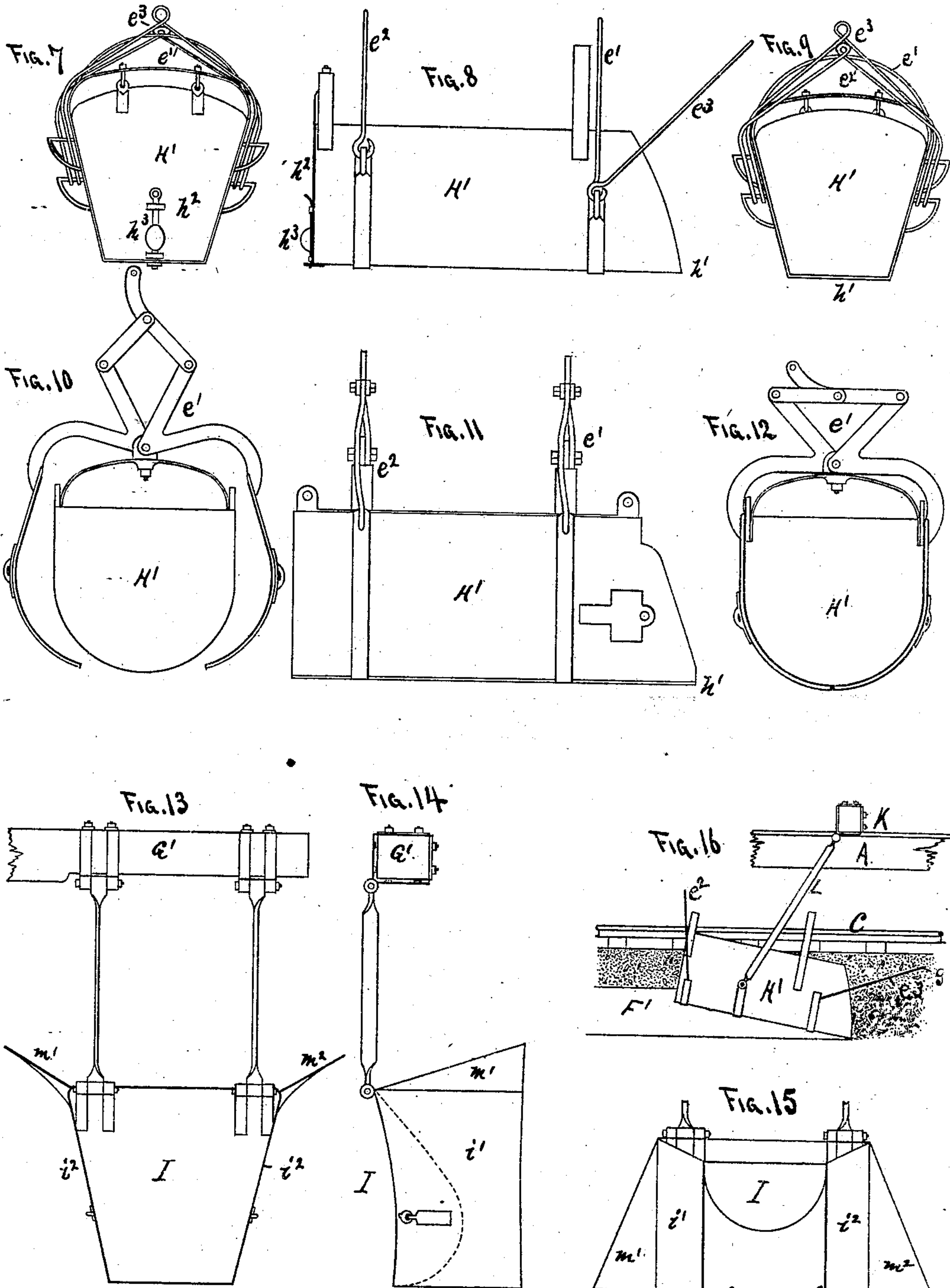
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(No Model.)

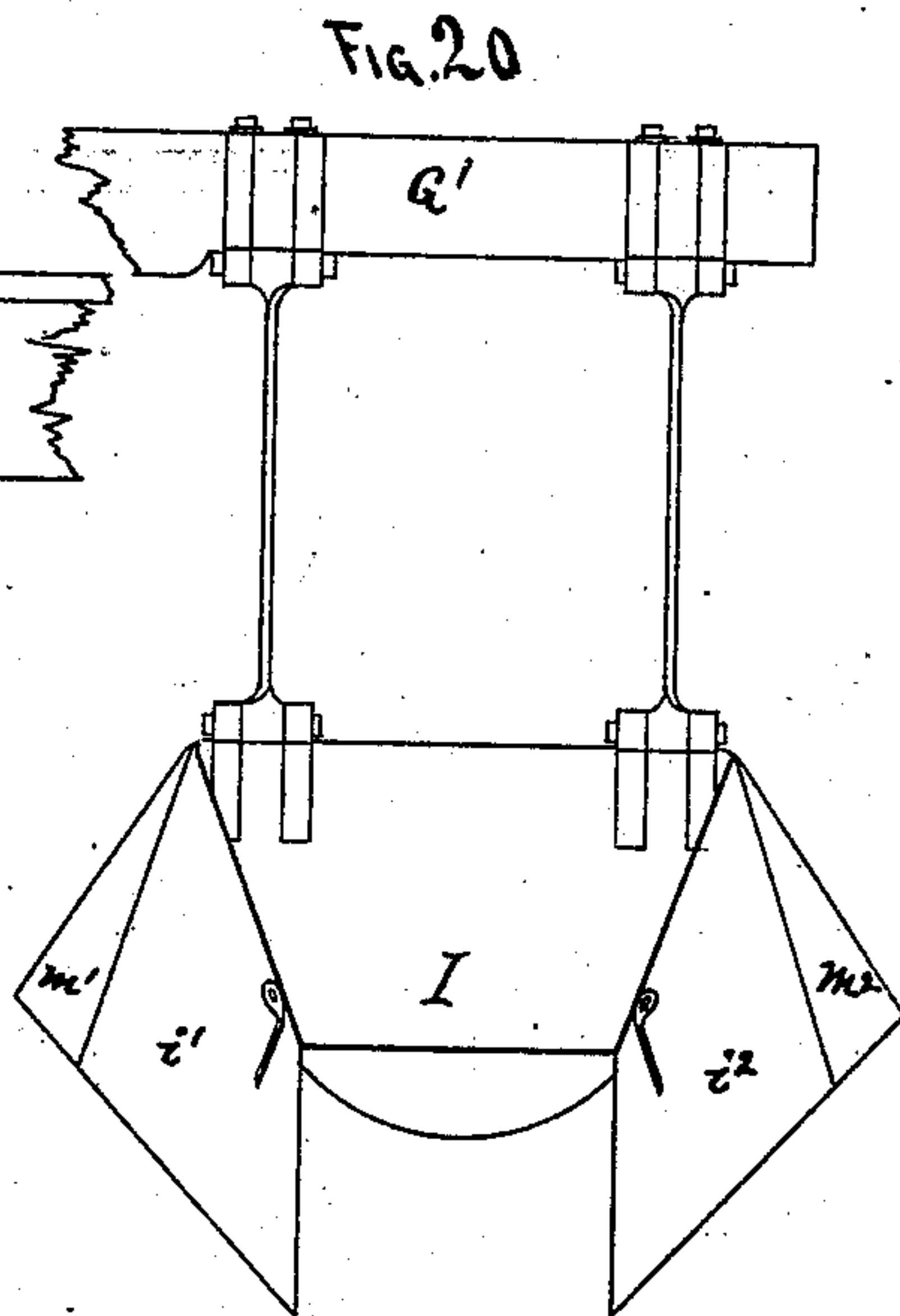
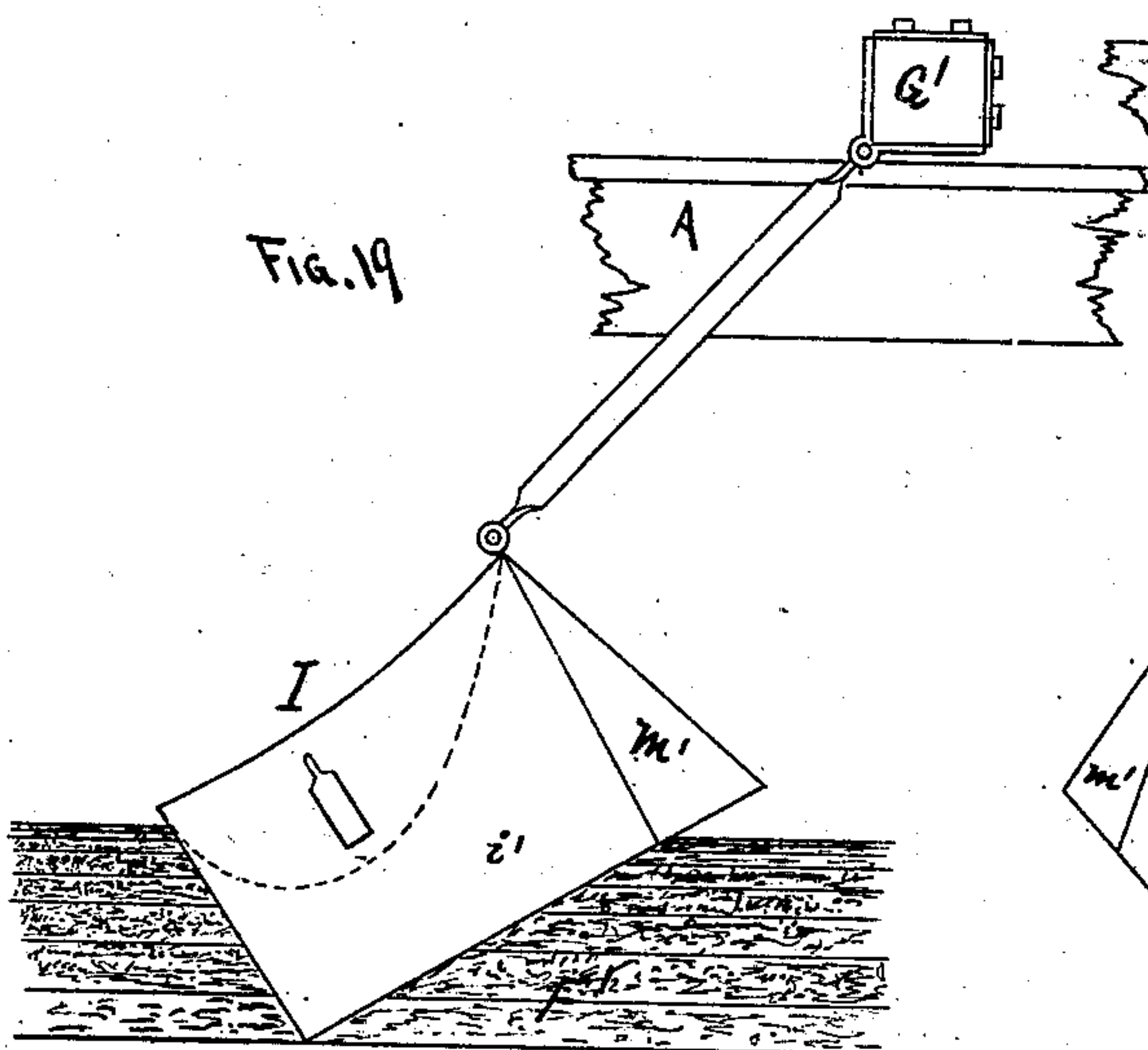
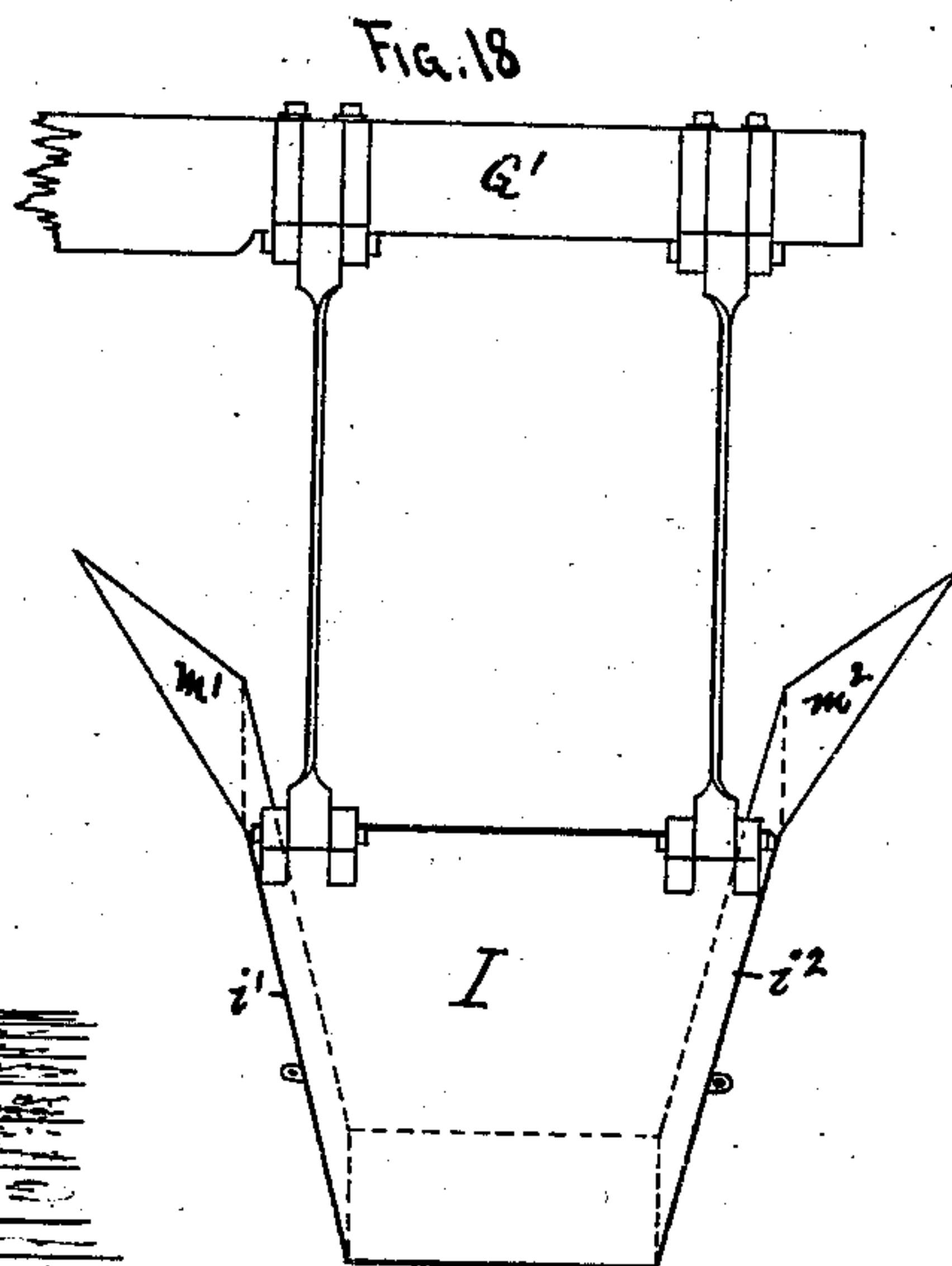
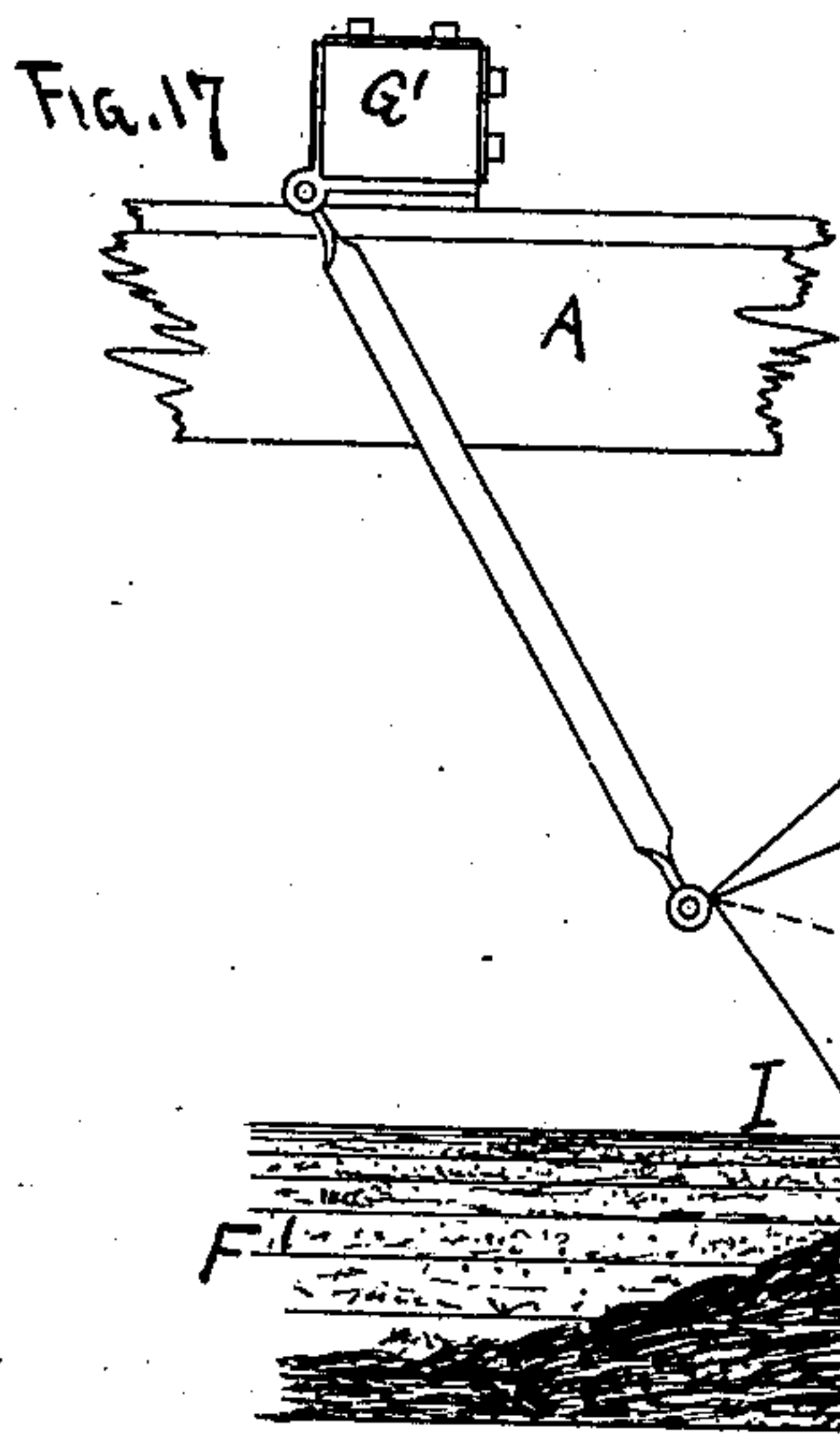
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UNITED STATES PATENT OFFICE.

CHARLES W. CASE, JOSEPH O. PATTEE, AND ARCHIBALD M. LONG, OF
MINNEAPOLIS, MINNESOTA.

MACHINE FOR FORMING AND CLEANING DITCHES.

SPECIFICATION forming part of Letters Patent No. 272,412, dated February 20, 1883.

Application filed July 21, 1882. (No model.)

To all whom it may concern:

Be it known that we, CHARLES WHIPPLE CASE, JOSEPH ORMOND PATTEE, and ARCHIBALD MOORE LONG, all citizens of the United States, and all residents of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Machines for Forming Ditches in Railroad-Cuttings, of which the following is a specification.

This invention relates to the construction and maintenance of the ditches alongside the tracks of railroads where they pass through cuttings; and it consists in the construction and combination of parts hereinafter particularly described, and then sought to be specifically defined by the claims.

In the drawings, Figure 1 is a side view, and Fig. 2 is a plan view, partially in section, of the ditch-forming machinery at work. Fig. 3 is a side view, showing one manner of dumping the buckets. Fig. 4 is a side view, and Fig. 5 is a plan view, showing the position of the derricks and draft-beams when arranged for transportation. Fig. 6 is an end view of the apparatus at work. Fig. 7 is a rear view, Fig. 8 is a side view, and Fig. 9 is a front view, of one form of dumping-bucket; and Figs. 10, 11, and 12 are similar views of another form of dumping-bucket. Fig. 13 is a front view, Fig. 14 is a side view, and Fig. 15 is a plan view, of another form of bucket, which will be used in forming or clearing ditches in muddy soil, or as an auxiliary to follow the other buckets. Fig. 16 is a side view illustrating a variation in the manner of operating the buckets. Figs. 17, 18, 19, and 20 are views of the "mud-bucket" shown in Figs. 13, 14, and 15, illustrating more fully its method of operation.

In operating railroads it is found necessary to form ditches alongside the railroad-tracks where they pass through cuttings, to carry off the surplus water that flows into the "cuts" during rain-storms or from melting snow and ice. Much difficulty is experienced in keeping these ditches clear from obstructions caused by the washing into them of mud and sand from the sides of the cuttings. After nearly every heavy rain-storm, and after the water caused by melting snow and ice has flowed

through these ditches, they are clogged with debris and require clearing to prevent the tracks being overflowed, and to quickly and easily clear these ditches of such obstructions, as well as to form the ditches originally, is the object of my invention.

The apparatus may also be used in forming deeper ditches for tile draining alongside railroad-tracks, to prevent the frost "heaving" the tracks.

In using the apparatus in ditches filled with soft mud, which is the usual condition of the obstructions, the earth and water for from two hundred (200) to three hundred (300) feet in front of the buckets is moved along ahead of them; hence that length of the ditches may be cleared at each operation, and then the apparatus moved backward and another stretch of two hundred or three hundred feet removed. This ability to move so large an amount of material by the expenditure of so small an amount of power is an important feature. The tracks in these cuts are usually on a grade, or if they are not the ditches are of course formed with a sufficient fall to carry off the water; hence the large body of mud removed by the buckets is assisted very materially in its movement by the "down-grade" of the ditch. The buckets will be formed in any suitable manner or of any suitable material, and will be arranged to conform to the ditch to be formed or cleared, different qualities of soil or different systems of road-beds requiring different forms or construction of ditches or buckets. For the purpose of illustration we have shown several forms of bucket and the usual form of apparatus for manipulating the buckets. This apparatus consists of a car, A, mounted upon trucks B, adapted to run upon the track C, and provided with a frame, D.

E' E² E³ E⁴ are derricks stepped upon suitable bases upon the car A, and supported at their tops in the frame D, and adapted to swing outward over the ditches F' F², alongside the track C, when in use, or be turned inward, as shown in Figs. 4 and 5, when not in use.

G' G² G³ G⁴ are four beams or "booms," pivoted at a' a² a³ a⁴ upon the car A, and adapted to swing outward, with their outer ends over the ditches F' F², as shown, when in use, or

turned inward upon the car-platform when not in use, as shown in Figs 4 and 5. When swung outward for use they may be retained by any suitable fastenings, as a stirrup and pin. (See 5 α^6 .)

H' H^2 are "buckets" or "shovels" adapted to fit the ditches F' F^2 , and connected to the derricks E' E^2 E^3 E^4 by chains b , said chains arranged to be raised and lowered by windlasses c upon the derricks. The buckets H' H^2 are provided with bails e' e^2 —one at each end—to which the chains b are attached, while a third bail, e^3 , at the front end of the bucket, forms an attachment for chains g , to connect 15 the buckets to the outer ends of the booms G' G^2 or G^3 G^4 , these latter chains thus forming "draft-chains" to draw the buckets forward, while the chains b support the buckets and regulate the depth of cut by being raised 20 or lowered by the windlasses. Ordinarily only one pair of the booms G' G^2 G^3 G^4 will be used at a time—viz., the pair that happens, for the time being, to be at the front end of the car or ahead of the buckets; but by providing 25 a set of the booms for each end of the car the buckets may be operated from either end or in either direction without turning the car around. The car will be drawn forward by a locomotive usually, or any other power may be used.

30 The buckets, as before stated, will be constructed in any suitable manner; but the form most generally used is that shown in Figs. 3, 7, 8, and 9, consisting of a body, H' or H^2 , conforming in their cross-section to the ditch being operated on, and having a sharpened front edge, h' , and hinged rear end, h^2 , held closed by a latch, h^3 , so that when filled with earth it may be easily dumped by "tilting" the bucket up 35 by the windlasses and chains c b , as shown in Fig. 3, and tripping the latch h^3 to permit the hinged back h^2 to open and allow the earth to run out. Damp clayey soil will only run out of the bucket in the same direction that it runs in; hence the necessity for dumping from the 40 rear; and to still further aid this dumping the buckets will be formed larger at the rear than at the front end when arranged to dump from the rear. Dry sandy soil, however, will dump as well from the front as from the rear; hence 45 the bucket for that kind of soil may be made, as shown in Figs. 1, 2, and 16, with a closed rear end, and tapering slightly from front to rear, the rear end being the narrowest, so as to dump easily. Then, again, some kinds of 50 soil require a bucket like that shown in Figs. 10, 11, and 12, divided through the center of the bottom and opening outward the whole length, as shown in Fig. 12, thus dropping the whole load at once.

60 In operating in dry sandy or clayey soil the car is run into the cut far enough beyond the end so that when the buckets are lowered down and set into the ground and drawn forward the buckets will be filled by the time they 65 reach the end of the cut. The front ends of the buckets are then raised upward until they are free from the ground and the car drawn

forward to the dumping-place, the load dumped, as shown in Fig. 3, and then run back into the cut and the operation repeated, the nature or 70 condition of the soil determining the distance back of the beginning of the previous cut the buckets shall be set for the beginning of the next cut. As before stated, when the ditch 75 is filled with soft mud the buckets will act upon two hundred or three hundred feet in the length of the ditch at once, while in most other conditions of soil not much more than the lengths of the bucket can be acted on at once.

Several sets of the buckets may be used at 80 once in some kinds of soil, either by attaching them to one car or by providing a car for each set of buckets.

In Figs. 13, 14, 15, 17, 18, 19, and 20 is shown still another form of bucket for use in 85 ditches filled with soft mud, consisting of a hollow dish-shaped shovel or scoop, I , having wings i' i^2 upon its sides and smaller wings m' m^2 upon the upper edges of the wings i' i^2 . When drawn forward this bucket assumes the 90 position shown in Fig. 17, the hollow part I scraping up the mud and piling it up in front of it, as shown, and, like the other forms of buckets, acting upon the mud for two hundred or three hundred feet in advance of it, while 95 the wings i' i^2 , acting upon the sides of the ditch, remove the mud therefrom, and preserve its symmetry. When mud and water only are to be removed from the ditches it is simply forced from the end of the cut and allowed to flow 100 down into the hollows beyond. Hence, when the end of the cut is reached, the bucket last mentioned simply dumps what soil or mud may have gathered in the dish-shaped part I , and is then drawn backward through the ditch 105 again, as shown in Fig. 19, until another section of mud is reached, and the operation repeated. When drawn forward some of the mud may be thrown up in ridges on the brinks 110 of the ditches, and when the buckets are drawn backward in the ditches, as shown in Fig. 19, the small wings m' m^2 will scrape these ridges of mud back into the ditch again, this being the office and object of the small wings.

The buckets I may also be attached to the 115 booms G' G^2 G^3 G^4 in the rear of the buckets H' H^2 , to remove from the ditches any mud or soil which the buckets H' H^2 may fail to act upon.

The derricks E' E^2 E^3 E^4 will not be used in 120 connection with the buckets I , except to hoist them upon the car when not in use or lower them down into place when they are to be used.

It frequently happens that the centers of deep cuts are also the summits of grades; hence 125 the ditches are operated upon from one end up to the center, and then the buckets turned around and connected to the booms upon the other end of the car and operated from the opposite end.

In Fig. 16 is shown a slight variation in the 130 manner of constructing and operating the bucket, consisting in a fixed beam, K , in place of one of the derricks, and a rigid arm, L , in

place of the forward supporting-chain *b*, connecting said beam *K* and the bucket. By this means the "nose" of the bucket is held firmly down into the ground, which will be required
5 in some kinds of work.

Steam, hand, or other power may be employed to operate the derricks and their windlasses.

What I claim as new is—

10 1. The combination of a car, *A*, the swinging derricks *E'* *E*² and their windlasses, a boom or beam, *G*², adapted to be projected from the car and moved back, and a bucket, *H'*, connected to the two derricks by chains *b* and to
15 the projecting beam by draft-chain *g*, whereby the several parts will operate as set forth.

2. The car *A*, derricks *E'* *E*² *E*³ *E*⁴, booms

G' *G*² *G*³ *G*⁴, and buckets *H'* *H*², in combination with the mud-drags *I*, substantially as and for the purpose set forth.

3. The mud-drag consisting of the hollow dish-shaped part *I*, wings *i'* *i*², and auxiliary wings *m'* *m*², substantially as and for the purpose set forth.

In testimony whereof we have hereunto set
our hands in the presence of two subscribing
witnesses.

CHARLES WHIPPLE CASE.
JOSEPH ORMOND PATTEE.
ARCHIBALD MOORE LONG.

Witnesses:

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