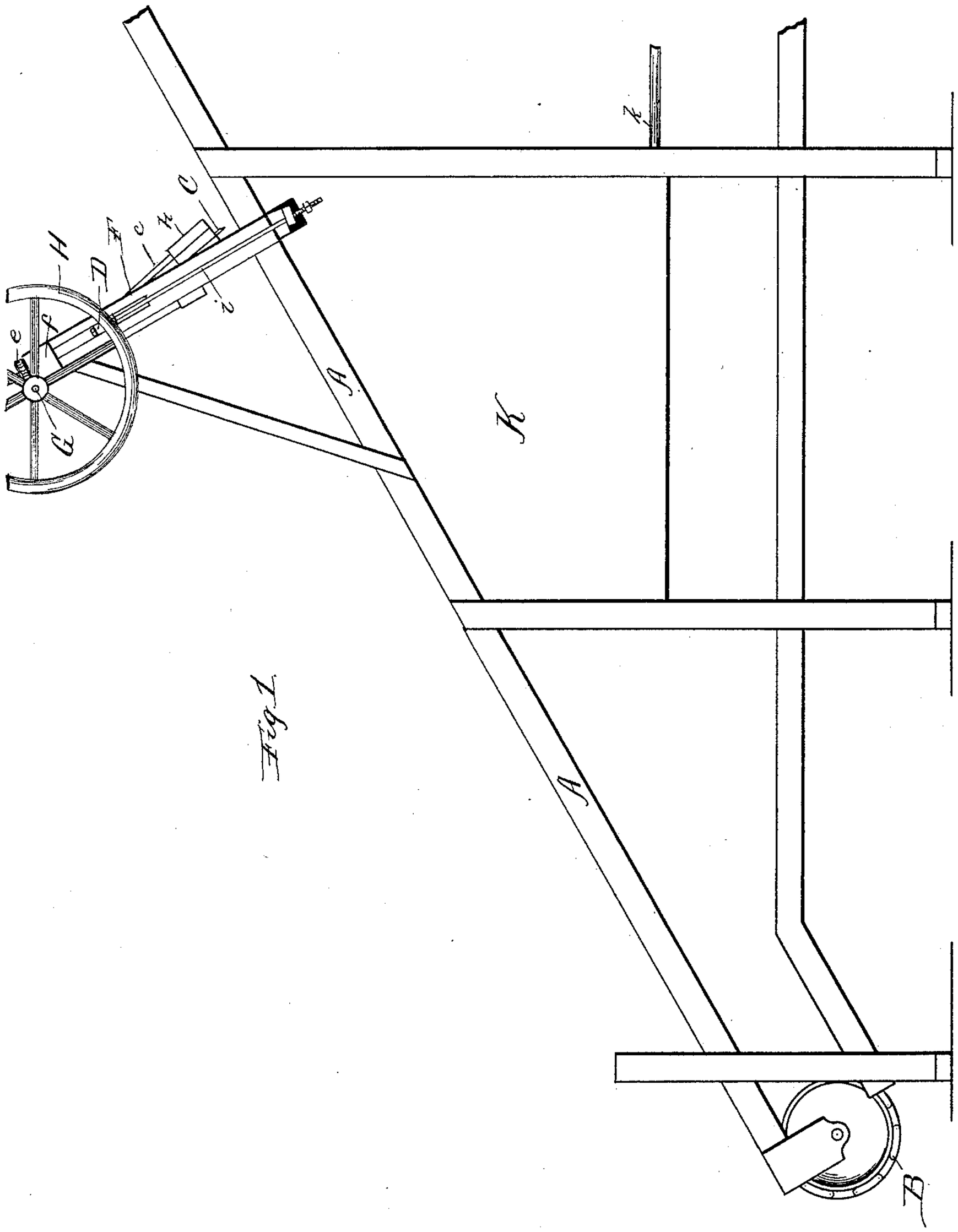
(No Model.) 3 Sheets—Sheet 1.

J. S. FIELD.

ICE ELEVATOR AND SNOW REMOVER.

No. 424,706. Patented Apr. 1, 1890.



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His Attorneys:

(No Model.) 3 Sheets—Sheet 2.

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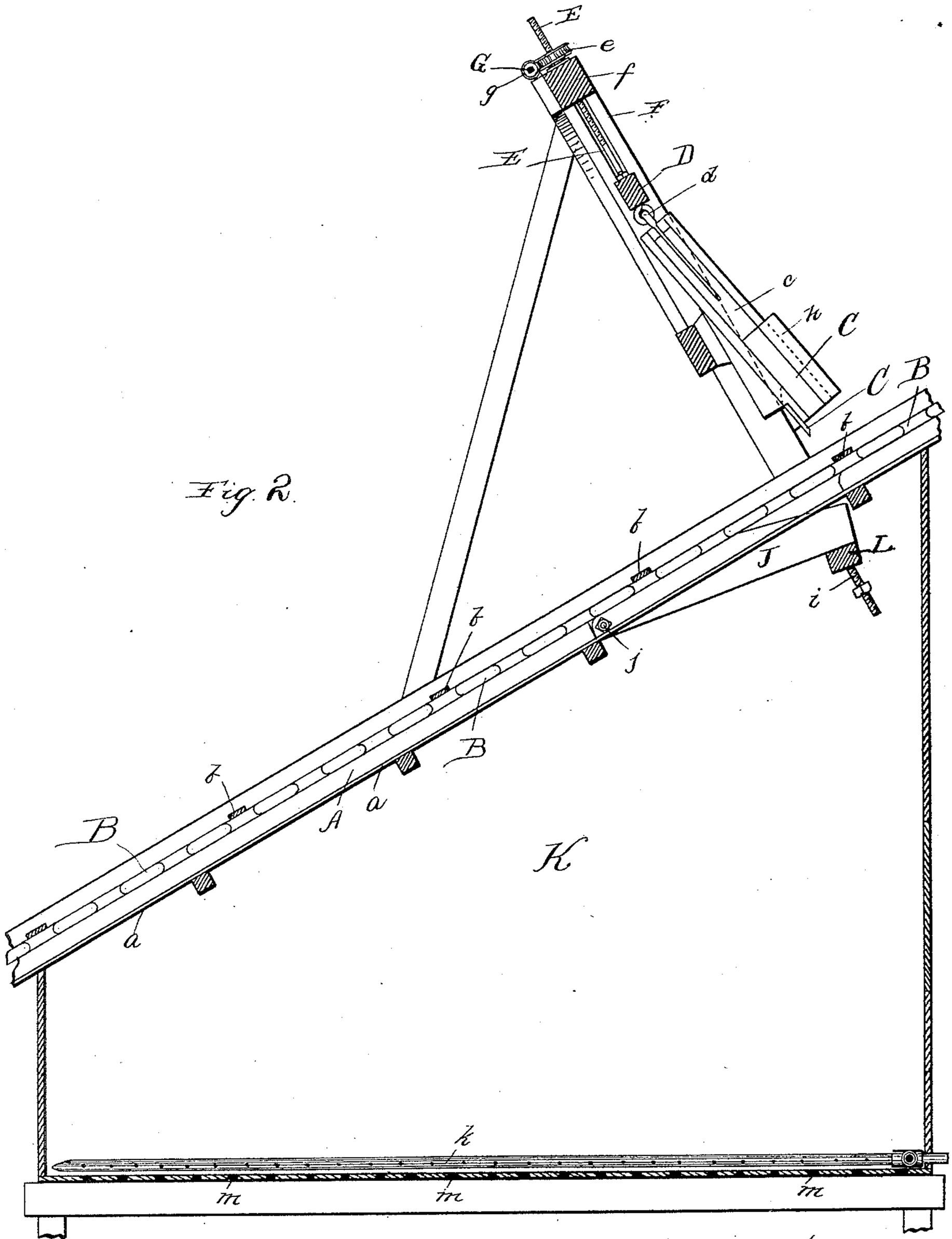
Fig. 2.



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ICE ELEVATOR AND SNOW REMOVER.

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Fig. 3.

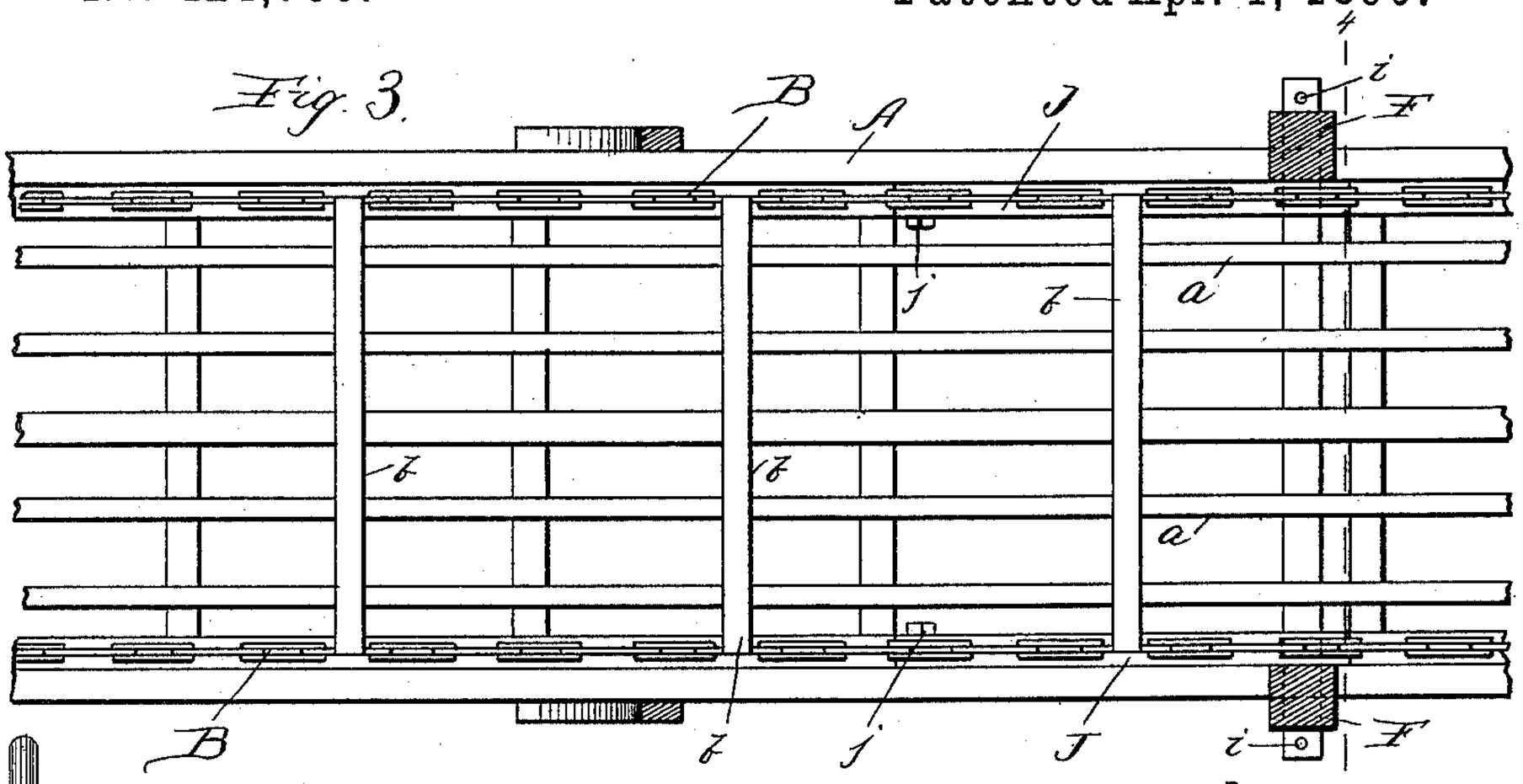


Fig. 4.

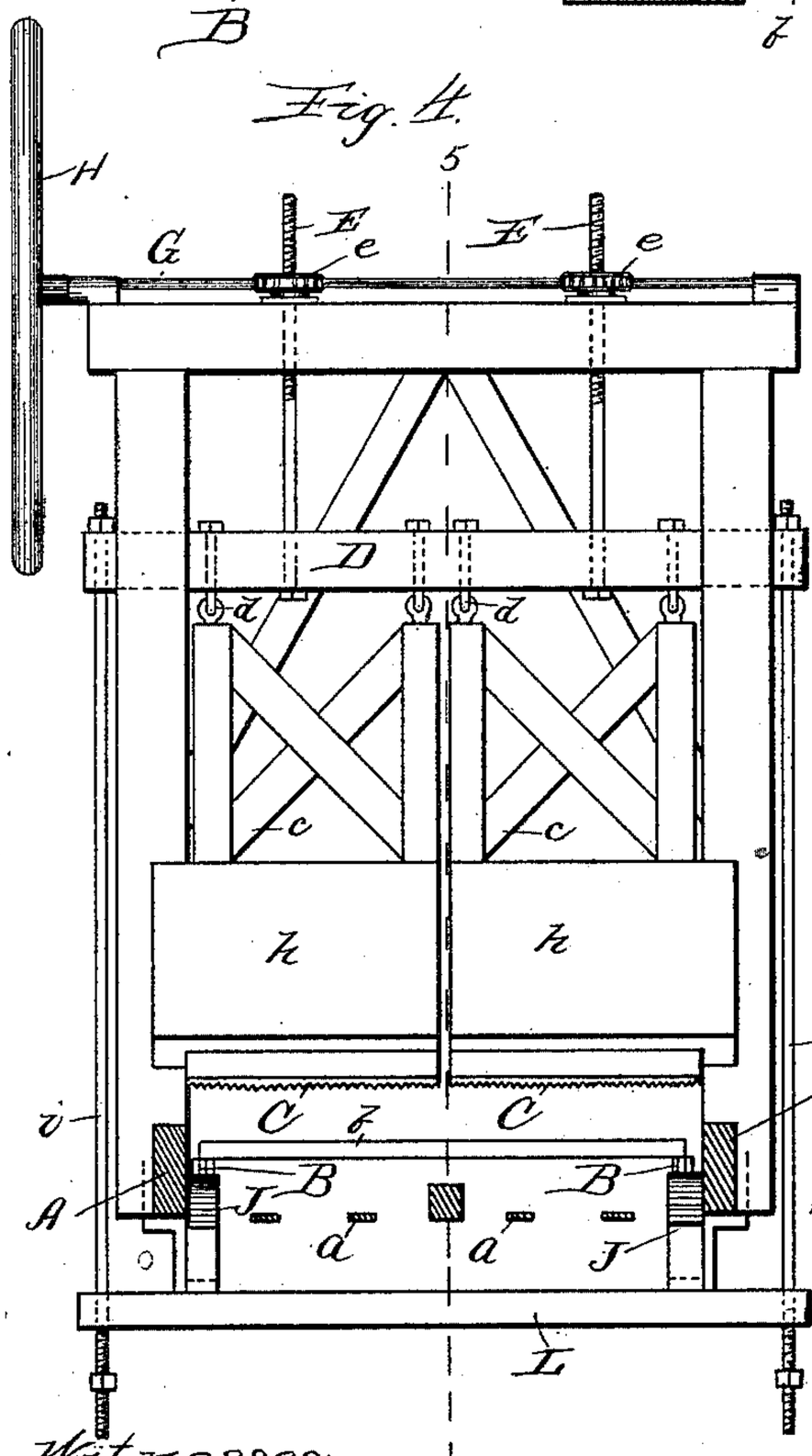
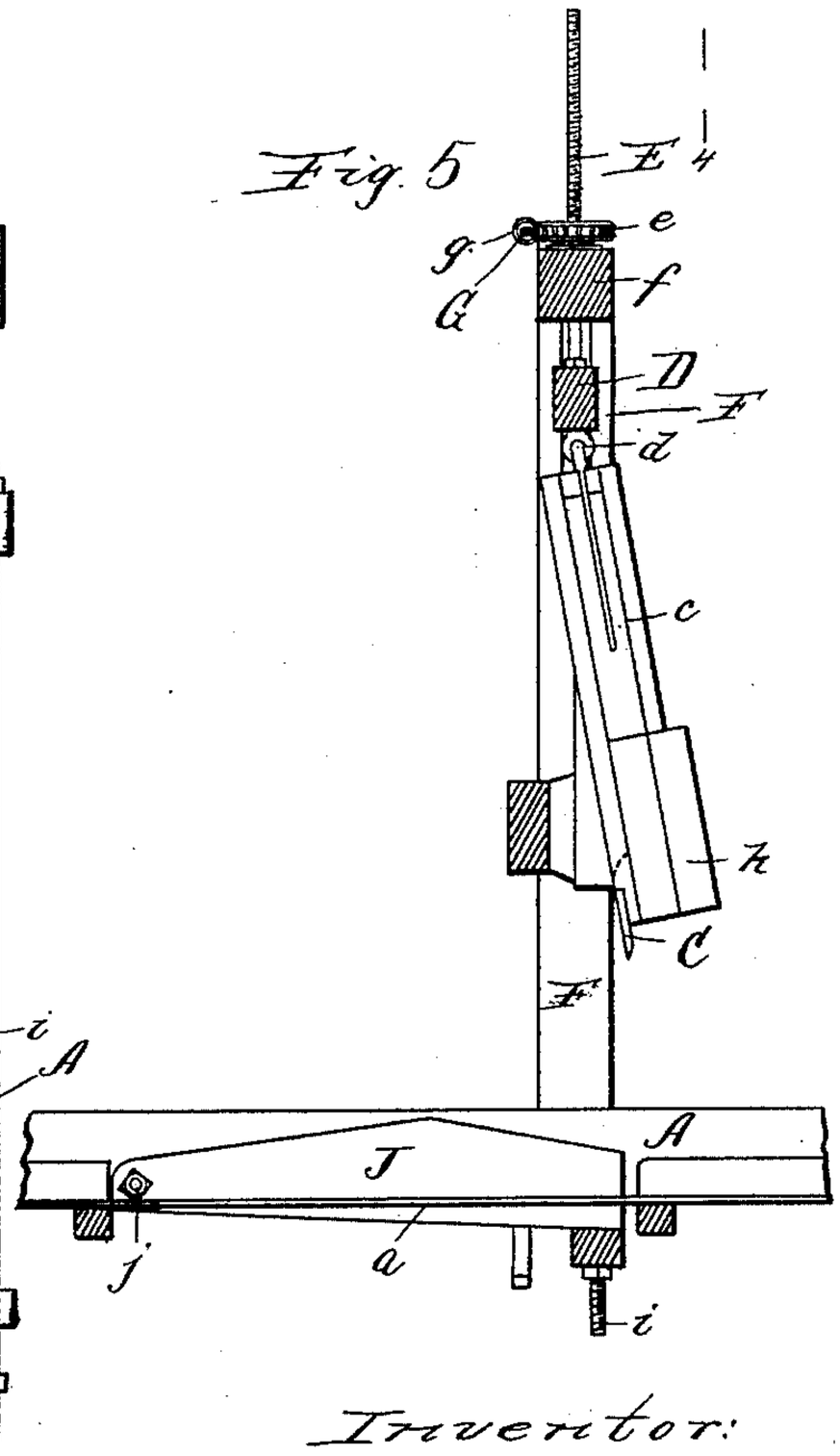


Fig. 5



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN S. FIELD, OF CHICAGO, ILLINOIS.

ICE-ELEVATOR AND SNOW-REMOVER.

SPECIFICATION forming part of Letters Patent No. 424,706, dated April 1, 1890.

Application filed January 7, 1889. Serial No. 295,627. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. FIELD, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Combined Ice-Elevator and Snow-Remover, of which the following is a specification.

It is now customary before harvesting ice to sweep or otherwise clear it of the accumulations of snow which may be upon it. This is at all times a laborious operation, and if the amount of snow is considerable the aid of horses and a large force of men is required to remove it.

My object in this invention is to provide the elevators of ice-houses with means whereby the ice as it is drawn up the elevators may be automatically cleaned of snow, slush, &c., and to make such means adaptable to the varying thicknesses of ice, so that the previous cleaning off of the snow is unnecessary.

To this end I mount upon the elevator at some convenient point a cleaning-scraper, which may be raised or lowered according to the thickness of the ice being housed and which is also preferably so supported or hung as to yield, if necessary, to accommodate the small differences in height which are presented in every run or field of ice. The yielding of the scraper is perhaps best obtained by securing the scraper to a swinging frame, pivotally supported at a point above the path of the ice, the scraper being free to swing in the direction in which the ice is moving. To prevent this yielding from being too free, whereby some of the snow, especially if caked or frozen, would be apt to escape removal, the swinging frame may be weighted or made heavy enough to secure efficient action by the scraper. As extra thick ice may be liable to be tipped over backward when it encounters the resistance of the cleaning device, by reason of the fact that such device commences its action at the upper advance corner of the cake, while the pushing-slat of the elevator acts against the lower rear corner, I obviate this tendency by providing risers for the elevator-chains, whereby the chains and pushing-slats may be raised to a higher plane relative to the cake and the slats bear against the same at such a point as will overcome the resistance of the cleaner without danger of the cake overturning. These risers may be adjustable, as the extent to which they should lift the chains will vary according to the thickness of the ice in hand.

In order to dispose of the snow removed by my cleaning attachment I locate the cleaning devices directly over a heated slush-box—such, for instance, as the one patented to me March 2, 1886, in Patent No. 337,318, whereby the snow will be caught and melted and all necessity for manual labor in removing the same be obviated.

My invention consists, first, in the combination, with an ice-elevator, of a snow-remover hinged to swing and automatically yield to accommodate the differences in cakes from the same run or field; second, in the combination, with an ice-elevator, of a snow-remover pivotally hung to swing in the direction the ice moves; third, in the combination, with an ice-elevator, of a snow-remover, pivotally hung to swing in the direction the ice moves and weighted so as to prevent its yielding too freely; fourth, in the combination, in an elevator and with the snow-remover thereof acting on the ice as it passes up the elevator, of elevator-chains having a greater rise than the cake at the point where the remover commences work, so that the slats are lifted to overcome the tendency of the cake to tip backward.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a side elevation of that portion of an ice-elevator to which my invention is applied. Fig. 2 is a longitudinal vertical section, and Fig. 3 is a horizontal section thereof. Fig. 4 is a transverse section upon lines 4 4 of Fig. 3. Fig. 5 is a section upon the line 5 5 of Fig. 4. Figs. 2 to 5 are enlargements upon the scale of Fig. 1.

In said drawings, A represents the framework of an ice-elevator. B B are the endless chains, and *b* the slats forming the moving parts of the elevator, while *a a* are the slides or runways along which the ice is forced by the chains and slats. All these parts are of any usual construction, and while the elevator shown is a double one, having two runways or paths so that two series of ice-cakes

may be carried up at once, it will be understood that the invention may be employed where there is only one way or path.

C C are the snow removers or scrapers, one being used over each runway of the elevator. They may be simple plain-edged blades, though I prefer to serrate their edges, as indicated at Fig. 4, when the ice is soft upon top or covered with frozen snow, as they act in such case somewhat more efficiently than the plain-edged blades. They are supported upon frames *c c*, which are suspended by eye-bolts *d* from a cross-bar D, the latter having vertical adjustability by means of the rods E, threaded at their upper ends where they engage the gears *e*, acting as nuts to said rods and bearing upon the cross-beam *f*, resting upon side standards F, by which this part of my invention finds support from the elevator-frame. The nuts *e* are rotated in unison by worms *g* upon the cross-shaft G, operated by the hand-wheel H. Being thus pivotally supported the removers and their frames are at liberty to swing outward in the direction in which the ice moves, so that they may yield when necessary to accommodate cakes of different thicknesses in the same run, but lest their yielding be too free, I make the remover-frame quite heavy. This may be done by means of weights *h*. The remover-blades present their broad side to the advancing ice and act as scrapers merely and not like a knife or planer. They are not likely to cut or break away any portion of the good ice, nor are they adapted to shovel up and hold accumulations of the removed material.

The push bars or slats *b* ordinarily engage the rear ends of the cakes at their lower edges and the snow-remover commences its action at the upper edges of the advance ends, so that with very thick ice the resistance caused by the snow-remover might tip the cake over backward. To avoid this the chain is made to rise and lift the slats to a point near or above the central plane of the cake, so that as the latter continues its ascent in an unchanging line the planes in which the pushing and resistance are exerted approach each other so nearly as to render the turning of the cake an impossibility. This rise in the path of the chains is located immediately below the remover, and may be accomplished by inclined planes or risers J, one under each chain. Of course the extent of this rise should depend upon the thickness of the ice, and hence I prefer to pivot the rear ends of the risers at *j* and to support them by rods *i* from the cross-bar D or other appropriate support. When connected to said bar, the risers are adjusted at the same time the snow-removers are adjusted. The risers are connected by a cross-piece L, and their downward movement is limited by the brackets *o*, attached to the elevator-rails and provided with bent ends adapted to engage the risers.

In order that the removed snow, &c., may be promptly disposed of without shoveling or handling, I locate the remover immediately over a melting or slush box, which may be of the variety shown in my said patent of March, 1886. Such a box is shown at K, with a heating-pipe *k*. When the slush-box is thus located, not only the snow which is removed by the remover but all slush and small pieces of ice which fall naturally from the elevator are melted and flow off. This box may be drained through the openings *m*, or it may be made to hold a small quantity of water.

My invention not only saves all labor involved in clearing the snow, slush, soft top ice, &c., from the ice before it is harvested, but it also automatically removes everything from the surface of the solid cake immediately prior to its entering the ice-house, thereby disposing not only of the snow which may fall upon it prior to the commencement of the harvesting, but such as may fall during the harvesting and such broken portions of ice and other matter as may accumulate upon the cakes during their passage to the elevator. In short, when it enters the house it is free of all objectionable matter, including softened portions at top.

In the practical use of my invention I find that the remover should be adjusted for effective work upon the thinnest ice in the run being housed, because when so adjusted it removes no more from the thickest than it does from the thinnest cakes and no loss of good ice occurs.

I claim—

1. The combination, with an ice conveyer or elevator, of an automatically-yielding snow-remover, consisting of a hinged gravitating scraper set at nearly a right angle to the path of the ice, adapted to yield in the direction of the movement of the ice to permit of the passage of cakes of ice of varying thickness and to remove soft material therefrom, substantially as set forth.

2. The combination, in an ice-elevator and with the snow-remover thereof acting on the ice as it passes up the elevator, of the elevator-chains, having a greater rise than the cake at the point where the remover commences work, so that the slats are lifted to overcome the tendency of the cake to tip backward, substantially as set forth.

3. The combination, with the ice-remover and the elevator-chains, of the inclined planes or risers for giving the chains an additional rise, substantially as set forth.

4. The combination, with the ice-remover and the elevator-chains, of the hinged adjustable inclined planes or risers for giving the chains an additional rise, substantially as set forth.

5. The combination, with an ice conveyer or elevator, of an automatically-yielding snow-remover consisting of a hinged gravitating scraper set at nearly a right angle to the path

of the ice adapted to yield in the direction of the movement of the ice to permit of the passage of cakes of ice of varying thickness and to remove soft material therefrom, the elevator-chain having a greater rise than the cakes at the point where the remover acts, whereby the chain is lifted to engage the cake at a higher point and thereby overcome the tendency of the cake to tip backward, substantially as set forth.

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