(No Model.)

2 Sheets—Sheet 1.

J. BOYD.

HOISTING MACHINE.

No. 308,340. Patented Nov. 25, 1884.

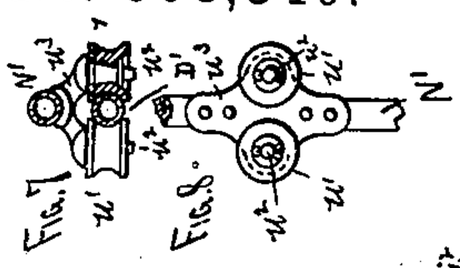

Fig. 7.

Fig. 8.

Fig. 2.

Fig. 10.

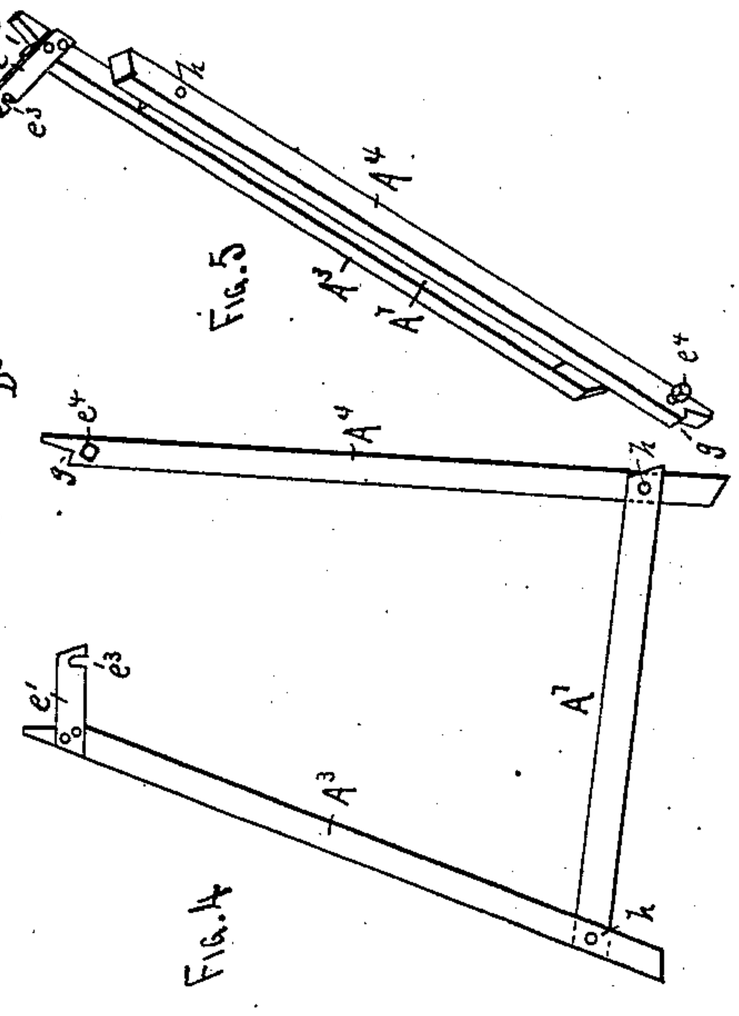

Fig. 5.

Fig. 4.

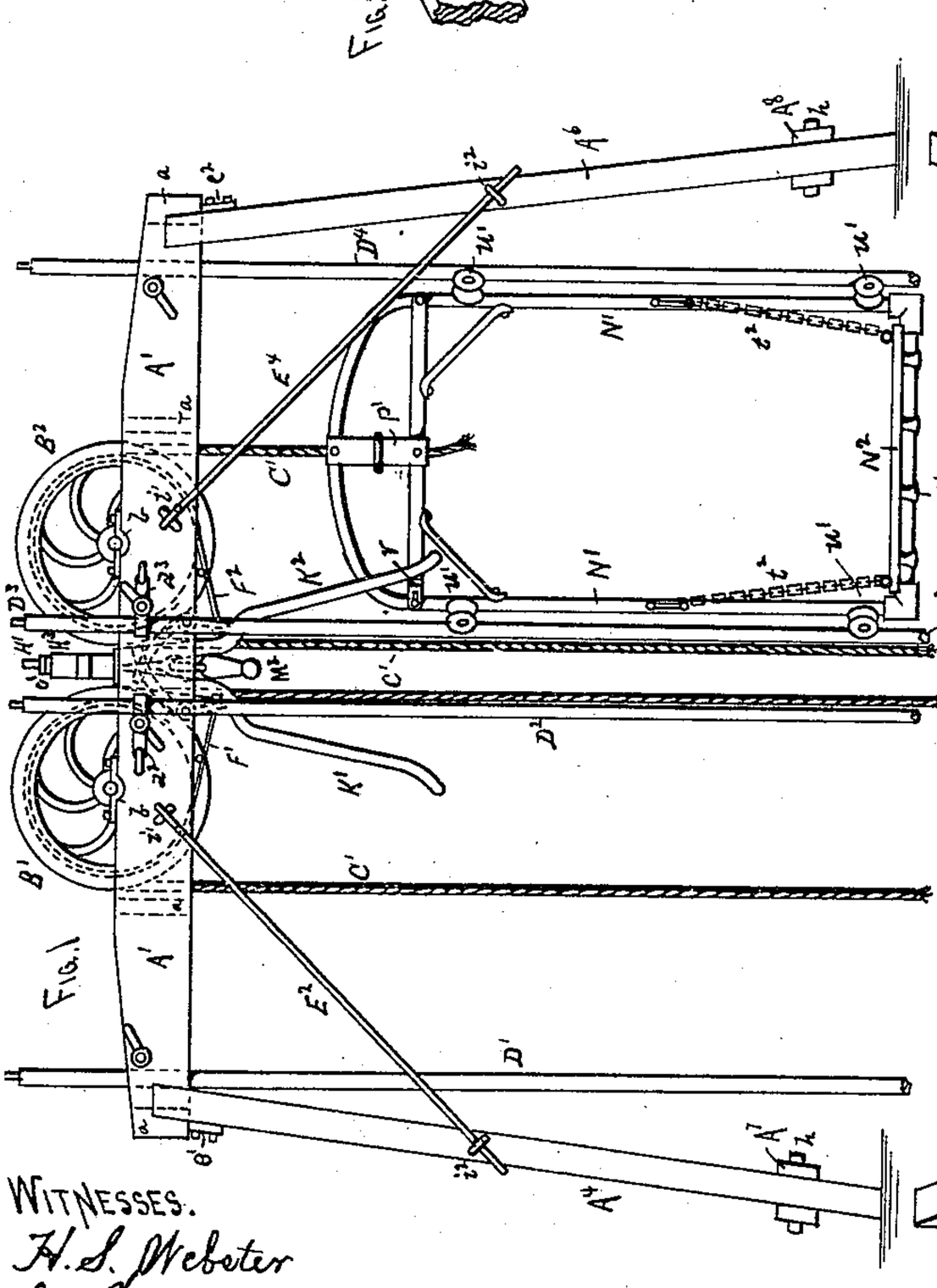

Fig. 1.

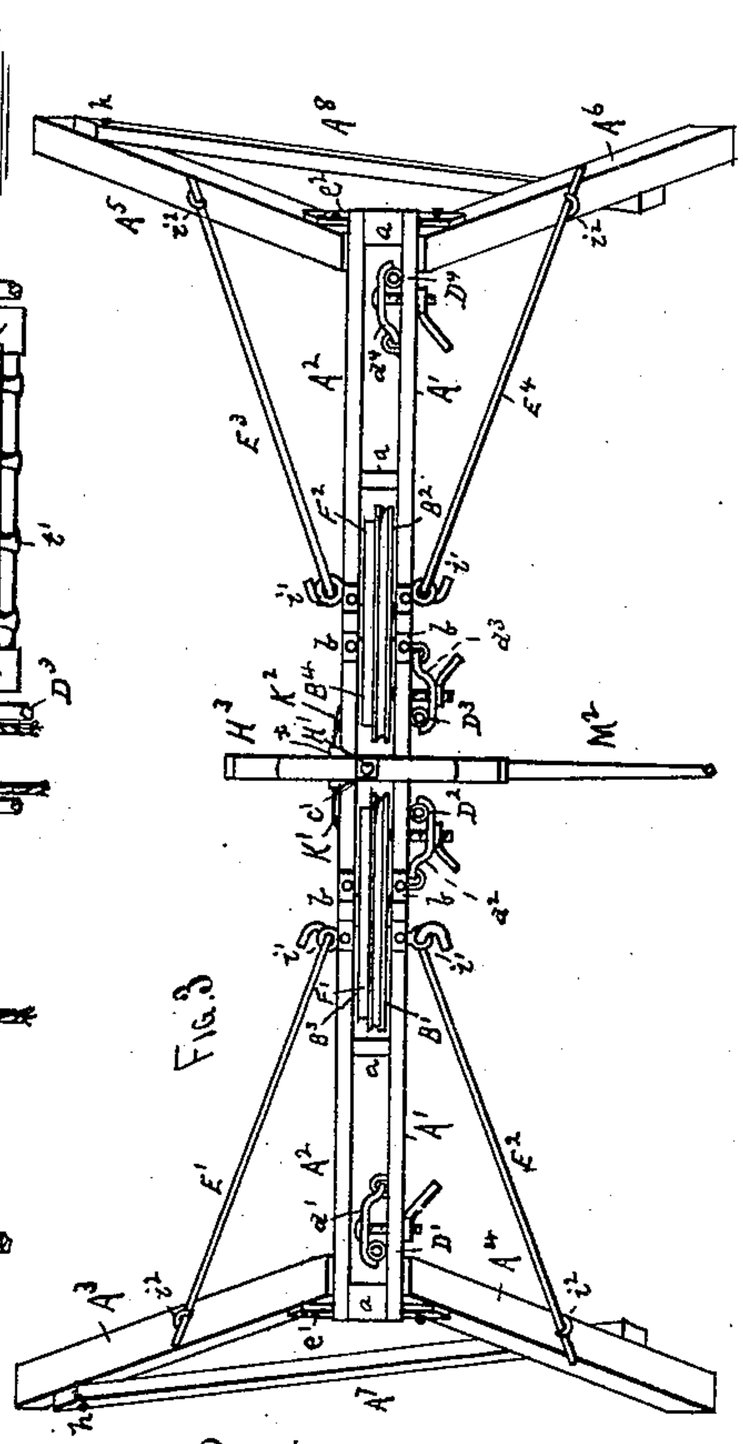

Fig. 3.

WITNESSES.

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INVENTOR. BY

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(No Model.)

2 Sheets—Sheet 2.

J. BOYD.

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No. 308,340. Patented Nov. 25, 1884.

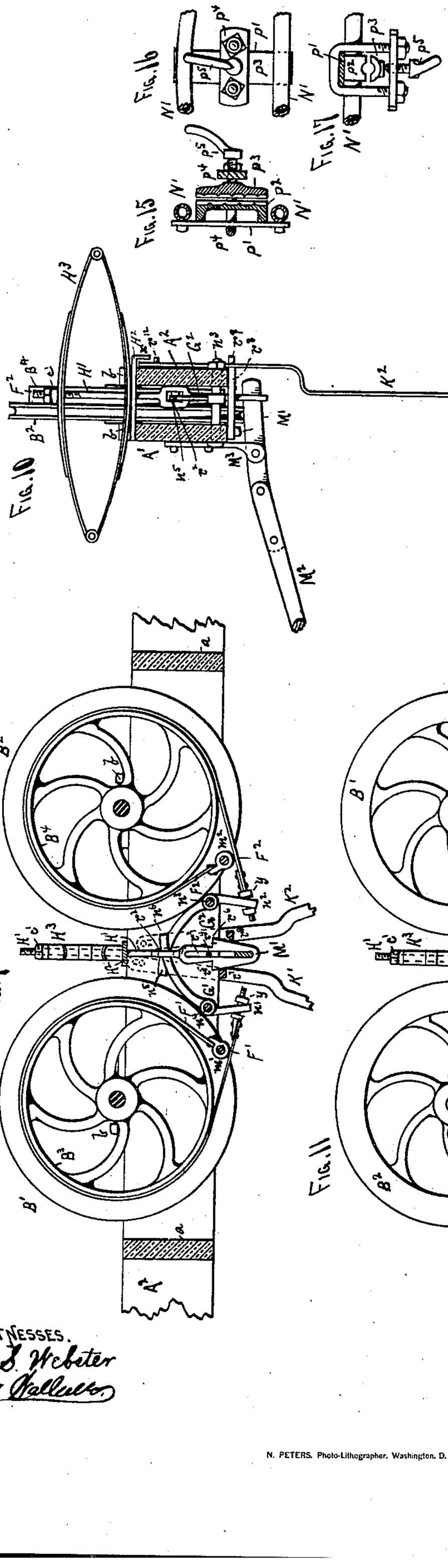

Fig. 10

Fig. 15

Fig. 17

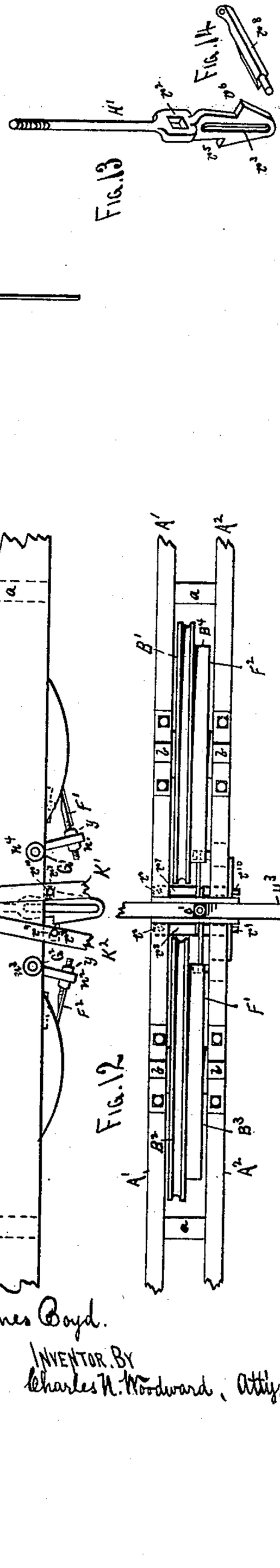

Fig. 13

Fig. 14

Fig. 9

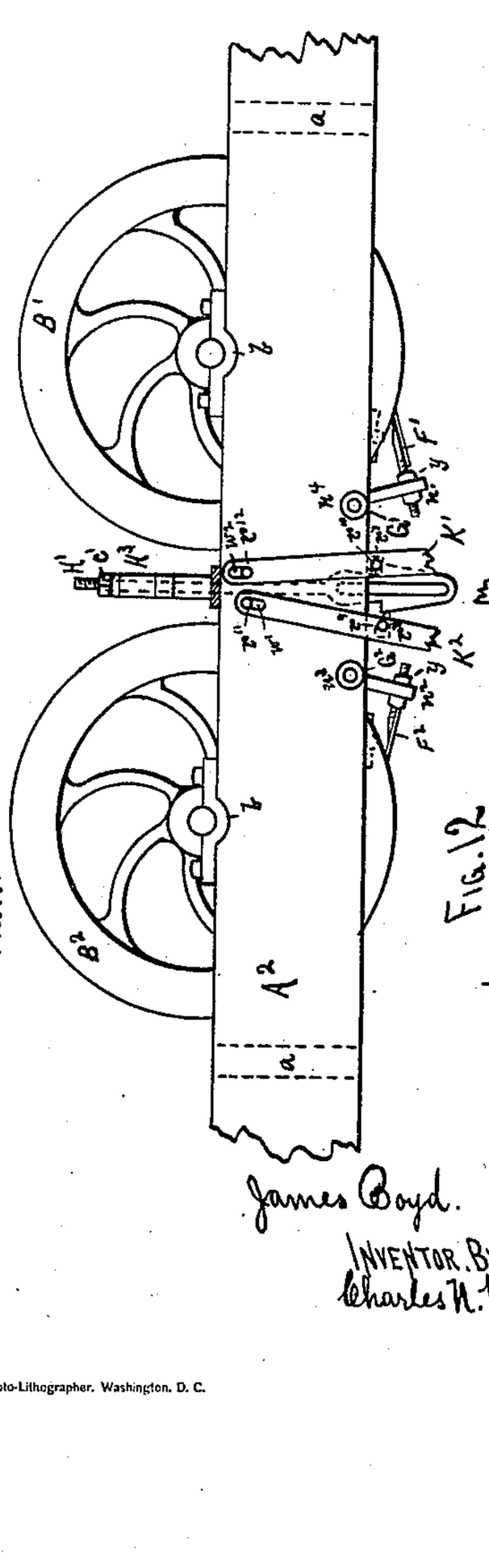

Fig. 11

Fig. 12

WITNESSES.
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UNITED STATES PATENT OFFICE.

JAMES BOYD, OF ST. PAUL, MINNESOTA.

HOISTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 308,340, dated November 25, 1884.

Application filed July 24, 1884. (No model.)

To all whom it may concern:

Be it known that I, JAMES BOYD, a citizen of the United States, and a resident of St. Paul, in the county of Ramsey and the State of Minnesota, have invented certain new and useful Improvements in Hoisting-Machines, of which the following is a specification, reference being also had to the accompanying drawings, in which—

Figure 1 is a side elevation, Fig. 2 is an end elevation, and Fig. 3 is a plan view, of the hoisting and brake mechanism, supporting-horse, and one of the hoisting-cages. Fig. 4 is a view of one pair of the folding-horse legs detached and partially open preparatory to folding, and Fig. 5 is a perspective view of the same folded up. Fig. 6 is an enlarged detached perspective view of a section of the horse, illustrating a slight variation in the manner of pivoting the upper ends of trip-levers. Figs. 7 and 8 are enlarged detached views of the guide-rollers of the hoisting-platforms. Fig. 9 is an enlarged sectional side view. Fig. 10 is a cross-sectional view of a portion of the horse, illustrating the construction of the automatic brake mechanism. Fig. 11 is a rear view of a section of the horse as shown in Fig. 9. Fig. 12 is a plan view of Fig. 11; Figs. 13 and 14, detached perspective views of the spring holding-bar and one of the catches. Figs. 15, 16, and 17 are enlarged detached details of the hoisting-cable clamp.

This invention relates to that class of hoisting-machines used by builders in elevating building material from floor to floor in erecting buildings, and is an improvement on the hoisting-machine for which Letters Patent No. 271,681 were issued to me bearing date of February 6, 1883.

A' A^2 are two planks or side pieces, forming the body of the horse for supporting the hoisting mechanism, and connected to each other at suitable intervals by "chocks" *a*, leaving open spaces between the sides.

B' B^2 are two sheaves, mounted in bearings *b* on top of the body A' A^2, and with their rims projecting down between the sides of the body and parallel therewith. The hoisting-rope C' passes over these sheaves and is connected to the hoisting-cages, and is run over pulleys and "snatch-blocks" and adapted to operate in the same manner as in my patent above referred to.

D' D^2 D^3 D^4 are the sections of gas-pipes which form the guides for the hoisting-cages, the center pipes, D^2 D^3, being held by clamps to the front of the side A' of the horse-body, and the outside pipes, D' D^4, being held by clamps to the rear of the same side piece, as shown in Figs. 1 and 3. By this means the outer edge of the sheaves B' will come in a direct line between the pipes D' D^2, and the outer edge of the sheaves B^2 will come in a direct line between the pipes D^3 and D^4, so that the hoisting-ropes and cage-frames and guide-pipes will all be in line, and thus avoid cramping and straining. This manner of setting the pipes also avoids the necessity for setting the sheaves at an angle to the horse-body A' A^2.

The clamps by which the guide-pipes are held to the horse-body consist of simple curved plates d' d^2 d^3 d^4, with one end of each hinged or otherwise loosely connected to the side A', and the other end of each partially encircling the outside of the pipe which it is designed to hold. Each clamp-plate d' d^2 d^3 d^4 is provided with a bolt passing through the side A' and a handled nut by which the plates d' d^2 d^3 d^4 may be clamped to the guide-pipes. By this simple device the guide-pipes may be very quickly connected to and disconnected from the horse when the machine is set up or taken down or moved from floor to floor of the building as the work proceeds. The horse or body A' A^2 is supported at the ends by legs A^3 A^4 and A^5 A^6, the legs A^3 A^4 being connected at the bottoms by a cross-bar, A^7, and the legs A^5 A^6 being similarly connected by cross-bars A^8, while the tops of each pair are connected at their tops by iron plates e' e^2. The upper ends of each pair of the legs are formed to fit into cavities in the ends of the sides A' A^2, shoulders *g* in the legs and the plates e' e^2 forming supports beneath the ends of the body. One end of each of the plates e' e^2 is rigidly bolted to the legs A^3 A^5, while the other end of each plate is provided with an open-ended slot, e^3, adapted to fit over a headed bolt, e^4, in each of the legs A^4 A^6. By this means the weight of the horse-body, cages, &c., hold the plates e' e^2 down upon the bolts e^4 and the legs connected to the body; but when it is desired to disconnect them it is only necessary

to lift off the body A′, raise the legs A^2 A^4 until the slots e^3 are free from the bolts e^4, when the legs A^4 or A^6 may be moved off to one side, as shown in Fig. 4, and then each pair of the legs folded together, as shown in Fig. 5, to occupy less space when being transported. The cross-pieces A^7 A^8 are pivoted by bolts *h* to opposite sides of their respective legs, so that they will fold in between the legs, as shown in Fig. 5. The journals of the sheaves B′ B^2 are merely set in their bearings *b* upon top of the sides A′ A^2, so that they can be easily lifted off when the horse or frame is to be moved. The legs and body of the horse are further strengthened and held by brace-rods E′ E^2 E^3 E^4, each hooked by one end into eyebolts *i*′ in the sides A′ A^2, and each held by a screw-clamp, i^2, to its respective leg.

Upon the sides of each of the sheaves B′ B^2 bands or rims B^3 B^4 are cast, and over these bands steel straps F′ F^2 are placed, each strap being pivoted by one end at m' m^2 to the side A^2, and by the other end to the ends n' n^2 of levers G′ G^2, the latter pivoted on bolts n^3 n^4 across the sides A′ A^2, as shown.

H′ is a rod running up through a plate, H^2, secured across the top of the sides A′ A^2 between the sheaves B′ B^2, and also through a spring, H^3, to the top of which it is held by nut *c*′. The lower end of this rod is provided with a slot, r^2, through which the upper ends, n^5 n^6, of the levers G′ G^2 pass in opposite directions. Below the slot r^2 the rod is formed with a long slot, r^3, through which a bolt, r^4, passes, the slot r^3, bolt r^4, and plate H^2 forming guides to cause the rod to move upward and downward in a straight line. Opposite the slot r^3 the rod is provided with two shoulders, r^5 r^6, having straight upper sides and inwardly-slanting rear sides.

r^7 r^8 are two stops or bars, each pivoted by one end beneath the side A^2, and projecting forward beneath the side A′ on each side of the rod H′, and each pivoted at r^9 r^{10} to two long trip-levers, K′ K^2. The upper ends of these trip-levers are pivoted at r^{11} r^{12} to the upper edge of the side A^2, while their lower ends are curved outward and inward, as shown in Figs. 1, 2, and 9. A lever-arm formed of a thin metal plate, M′, and a wooden handle, M^2, is pivoted by a hanger, M^3, to the side A′ of the "horse-body," and with the end of the plate M′ resting in the slot r^3 in the rod H′, so that the rod H′ may be pulled down and the spring H^3 compressed by raising the lever M^2. The trip-levers by branching outward will have a tendency to hold the small catch dogs or stops r^7 r^8 inward against the inclined edge of the rod H′ below the shoulders r^5 r^6, so that when the rod H′ is pulled down by the lever M^2 the dogs will be thrown in above the shoulders and hold the spring compressed, as hereinafter shown.

As before stated, the upper ends, n^5 n^6, of the levers G′ G^2 pass through the slot r^2; hence when the spring H^3 is depressed by drawing the rod H′ downward the ends n^5 n^6 of the levers G′ G^2 will also be drawn downward, and thus cause the ends n' n^2 to push the straps F′ F^2 backward and loosen them from the bands or rims B^3 B^4. Then when the trip-levers K′ K^2 are moved outward the stops r^7 r^8 will be detached from the shoulders r^5 r^6, and allow the spring to draw the rod H′ and with it the levers G′ G^2 upward, and compress the straps F′ F^2 tightly upon the bands B^3 B^4 and "brake" the sheaves B′ B^2.

The hoisting platforms or cages each consist of a gas-pipe frame, N′, similar to those shown in my patent above referred to, and with a platform, N^2, hinged by clips or other suitable devices, *t*′, to the bottom cross-piece of the frame N′, and supported by chain-guys t^2 to the sides of the frame. The chain-guys are detachable, so that they may be disconnected, and the floor N^2 turned up parallel with the frame N′ to occupy less room in transporting the machine.

Upon one side of the upper part of one of the frames N′ a plate, P′, is bolted. To the face of this plate is attached or formed in one piece therewith a concave-surfaced block, P^2, on which a similarly-concaved cap, P^3, fits, and is held thereto by a strap, P^4, and set-screw P^5. The inner surface of these pieces P^2 and P^3 are roughened, so that when the rope C′ is placed between them and the set-screw P^5 "set up" a clamp is formed to hold the rope securely connected to the cage-frame and easily adjustable at any desired point. The other end of the rope C′ may be attached to the other cage by a simple hook, or other means, the adjustment being necessary only on one cage.

I have shown only one cage, but of course two cages will be used upon each machine, one running up while the other runs down. The concave guide-wheels *w*′ will be used between the guide-pipes and frames N′, as in my patent above referred to, and as shown in Figs. 1 and 2. In Figs. 1 and 2 these guide-pulleys are hung at an angle to the guide-pipes; but they may be set at right angles thereto, as shown in Figs. 7 and 8, if preferred. The pulleys *w*′ will be mounted upon studs w^2, projecting from a plate, w^3, the latter being bolted, riveted, or otherwise secured to the frames N′ of the hoisting-cages. Each of the cages has an adjustable tripping-arm, *v*, attached to the upper part of the frame N′, adapted to strike the trip-levers K′ K^2 when the cages rise and release the brake-spring H^3, as hereinafter described.

The operation is very simple, and can be easily understood by reference to the drawings. The material to be elevated is placed upon the platform N^2, which happens to be down, (the other cage being up to its highest point of elevation,) and with its trip *v*, holding the lever K^2 and dog r^8 out away from the shoulder r^6. The upper ends of the levers K′ K^2 are provided with slots w' w^2, in which their pivotal pins r^{11} r^{12} fit, (see Fig. 8,) so that the levers are free to rise and fall a short distance, and the stops r^7 r^8 are left loose

enough so that they will rise and fall with them. The end of the plate H^2 next to the levers K′ K^2 is turned down over the ends of the levers at *x*, to form a stop to hold them in place upon their pivots. Additional guides may also be used to hold the levers and prevent them being thrown out of place. By this means, when the lever M^2 is raised upward to release the brake-spring H^3, the rod H′ and its shoulders r^5 r^6 will be pulled downward. The upper end of the slot r^3 will be arranged so that it will strike the bolt r^4 and stop the further downward movement of the rod H′ when the shoulders r^5 r^6 are far enough below the side A^2 to permit one of the stops r^7 or r^8 to pass inward between the shoulder and side A^2, when the lever K′ or K^2 is elevated up as far as the slot w' w^2 will permit it to go; but the rod H′ will not be permitted to fall far enough to permit either of the stops r^7 or r^8 to pass in above the shoulders when the lever K′ or K^2 is down to the lowest point which the slot w' w^2 will permit it to fall. The cage-frame N′, which happens to be upward, as shown in Figs. 1 and 2, will hold the lever K′ or K^2 and its respective stop r^7 or r^8 outward and not permit it to catch upon the shoulder r^5 or r^6 when the rod H′ is drawn downward. Then when the rod H′ is drawn downward the free lever K′ or K^2 will fall inward of its own weight and throw the stop r^7 or r^8 inward above its contiguous shoulder r^5 or r^6, and thus hold the spring H^3 compressed and release the brake-straps F′ F^2 from the bands B^3 B^4. The spring will draw the stop r^7 or r^8, which happens to be above the shoulder r^5 or r^6, upward against the side A^2, (the slot w' or w^2 permitting this movement,) while the free lever K′ or K^2 and its stop r^7 or r^8 on the side next the upper cage will be down below the free shoulder r^5 or r^6 and rest against the rod H′, as shown in Fig. 8. The cages are thus left free to be run up and down, and when the stop *v* on the rising cage strikes the lever K′ or K^2 it will throw the stop r^7 or r^8 free from the rod H′, and permit the spring H^3, through its action upon the rod H′ and levers G′ G^2, to "set" the brake-bands F′ F^2 firmly upon the rims B^3 B^4, and thus hold the upper cage and its load and prevent all danger of its falling until the brake is released. This is a very important feature of my invention, as serious accidents would be likely to occur were some such preventive not used. The straps F′ F^2 will be made adjustable by nuts *y* where they are attached to the levers G′ G^2, so as to regulate the power and action of the brake, while the stops *v* will also be made adjustable upon the frames N′ to regulate the throw of the levers K′ K^2.

In Fig. 6 is shown a slight variation in the manner of holding the upper end of the levers K′ K^2, consisting in a plate, T′, attached to the face of the side A^2, and carrying the pivots r^{11} r^{12} and provided with a strap or stirrup, T^2, beneath which the upper end of the levers K′ K^2 run instead of beneath the lips *x*, as in Figs. 1 and 2.

Having thus described my invention, what I claim as new is—

1. In a hoisting-machine, a horse or frame, sheaves B′ B^2, journaled on said horse and provided with rims B^3 B^4, a hoisting-rope running over said sheaves, hoisting platforms or cages connected to said rope, brake-straps F′ F^2 encircling said rims, means, substantially as described, whereby said brake-straps will be held detached from said rims when said platforms are running up and down, and be automatically compressed upon said rims to brake said sheave by the action of either of said platforms when it rises to its highest point of elevation.

2. In a hoisting-machine, the combination of a horse or frame, sheaves B′ B^2, journaled upon said horse or frame, and adapted to receive the hoisting-cable C, and having rims B^3 B^4, brake-straps F′ F^2 encircling said rims, and pivoted by their ends to the horse or frame and to levers G′ G^2, slotted and shouldered rod H′, spring H^3, stops r^7 r^8, trip-levers K′ K^2, and hoisting cages or platforms attached to said cable, and means whereby the elevation of said cages alternately trips and sets said brake-straps upon said sheaves.

3. In a hoisting-machine, the horse for supporting the hoisting mechanism, consisting of the body A′ A^2, removable legs A^3 A^4, and A^5 A^6, cross-bars A^7 A^8, plates e' e^2, and braces E′ E^2 E^3 E^4, substantially as set forth.

4. In a hoisting-machine, the combination, with the horse or frame for supporting the hoisting mechanism, of the sheaves B′ B^2, journaled upon the body of said horse or frame parallel with the sides, inner platform-guides formed of sections D^2 D^3 of gas-pipe, and secured by clamps d^2 d^3 to the outsides of said horse or frame, outer platform-guides, D′ D^4, secured by clamps d' d^4 to the interior of said horse or frame, substantially as and for the purpose set forth.

5. In a hoisting-machine, the hoisting cages or platforms consisting of the frame N′, formed of gas-pipe, platform N^2, hinged to said frame, and supporting-chains t^2, substantially as set forth.

6. In a hoisting-machine, the combination, with the frame N′, of the hoisting cage or platform, of the cable clamp consisting of the concave plate P^2, attached to said frame, concave cap P^3, strap P^4, and set-screw P^5, substantially as set forth.

In testimony whereof I have set my hand in the presence of two subscribing witnesses.

JAMES BOYD.

Witnesses:
C. N. WOODWARD,
FRANK P. BLAIR.