

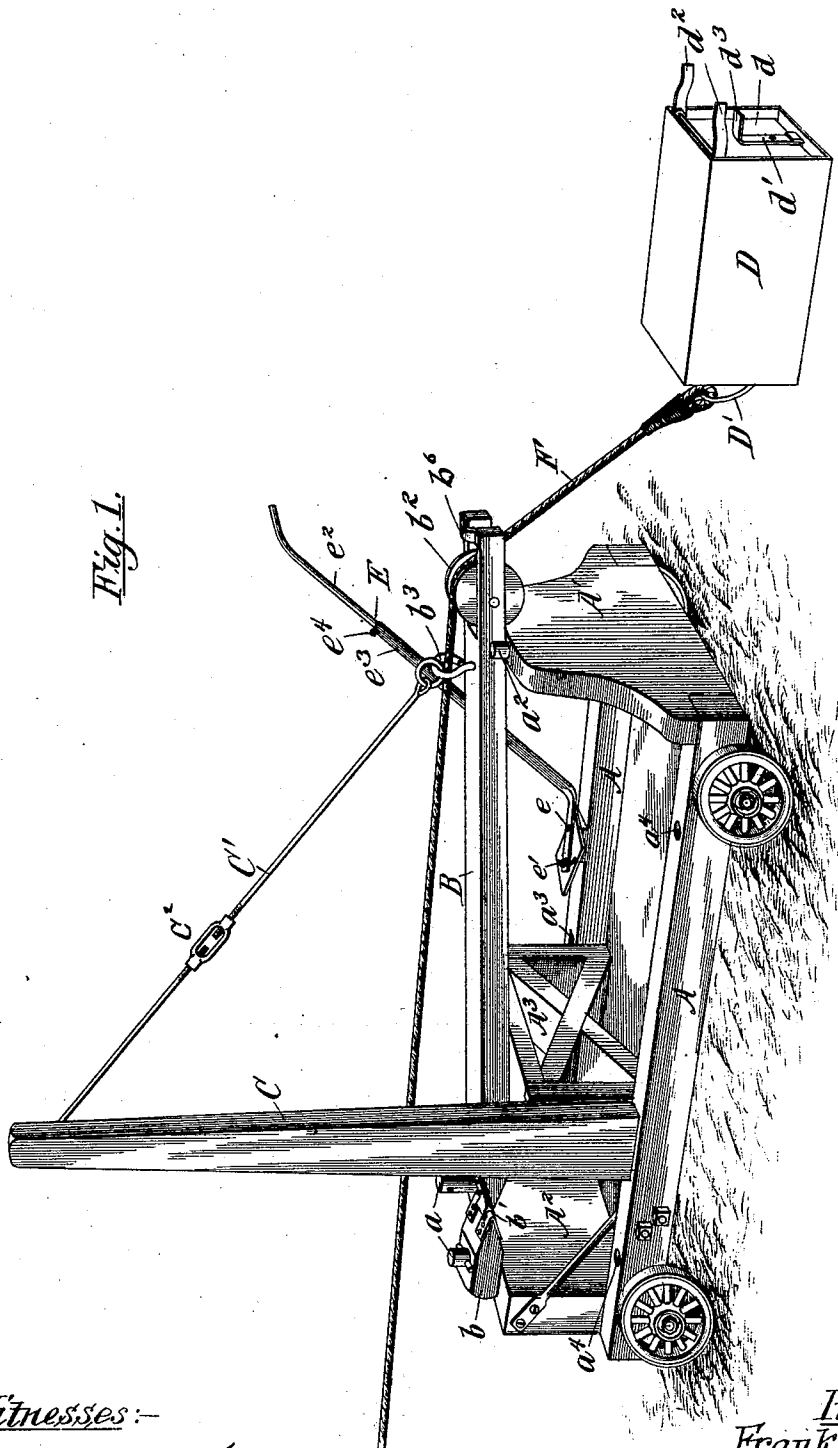
(No Model.)

3 Sheets—Sheet 1.

F. H. SCHULTE.
EXCAVATOR.

No. 508,437.

Patented Nov. 14, 1893.



Witnesses:—

Samuel K. E.
Louis M. F. Whithead.

Inventor:
Frank H. Schulte.
by: *Dayton, Poole & Moore*
Attorneys:

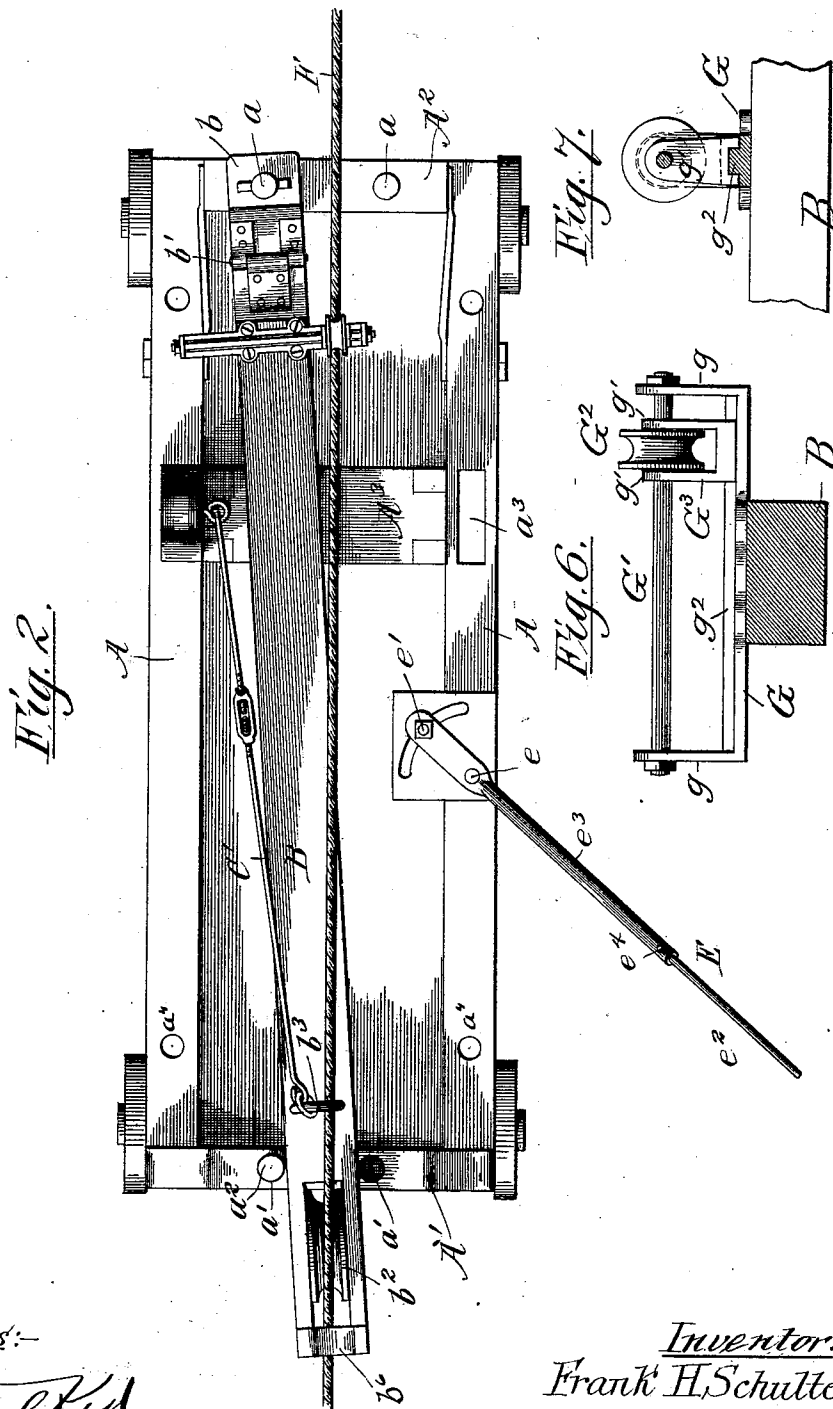
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3 Sheets—Sheet 3.

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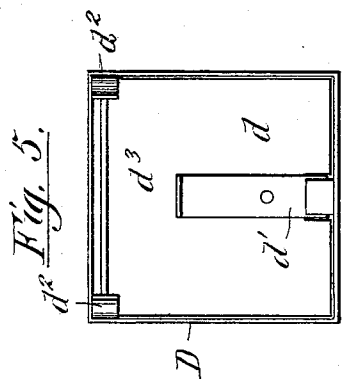


Fig. 3.

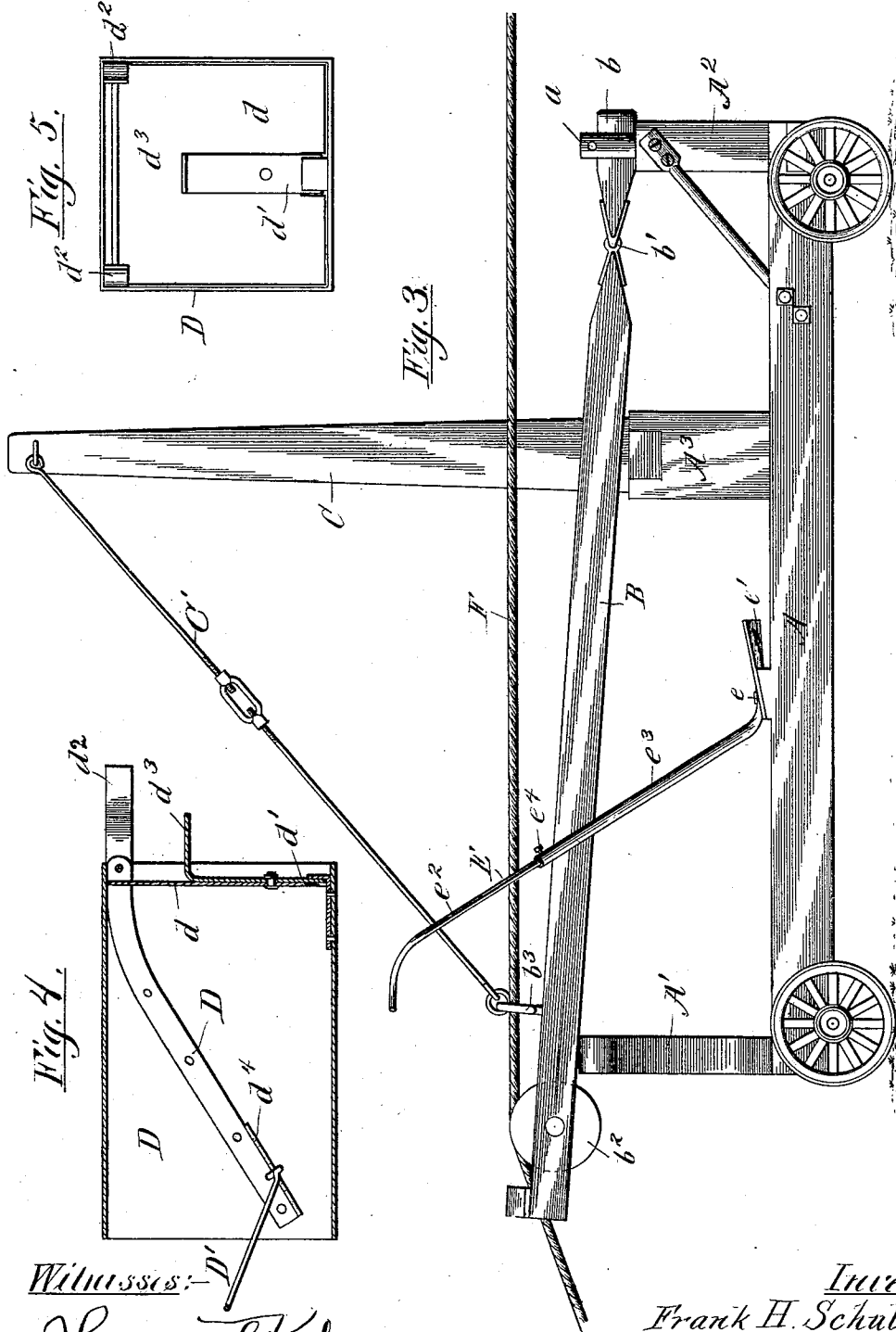
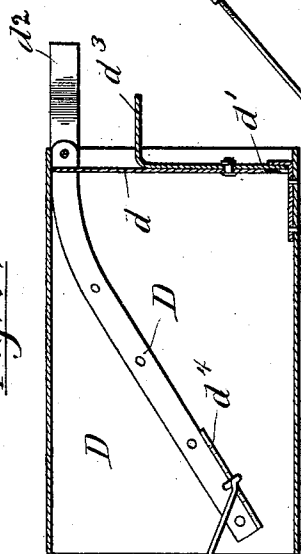


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANK H. SCHULTE, OF RACINE, WISCONSIN.

EXCAVATOR.

SPECIFICATION forming part of Letters Patent No. 508,437, dated November 14, 1893.

Application filed May 17, 1892. Serial No. 433,302. (No model.)

To all whom it may concern:

Be it known that I, FRANK H. SCHULTE, of Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in Excavators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to power excavating or ditching machines, and the object of my invention is to produce an efficient, convenient and inexpensive construction in machinery of this class.

To this purpose my invention consists in certain peculiar and novel features of construction and arrangement, as hereinafter described and claimed.

The more precise nature of my invention will be better understood from the ensuing description, taken in connection with the accompanying drawings in which—

Figure 1 is a perspective view of a power excavating or ditching machine embodying my invention. Fig. 2 is a plan view of the same. Fig. 3 is a side elevation of the same. Fig. 4 is a vertical longitudinal section of the excavator-scoop. Fig. 5 is a rear end elevation of the same. Fig. 6 is an enlarged view, in side elevation, of the guide for the draft-rope. Fig. 7 is an enlarged view, partly in end elevation and partly in transverse vertical section, of the draft-rope guide.

In the said drawings, A designates the two side beams of the main frame of the machine, these beams extending parallel with each other horizontally, and being connected together at their rear and front ends respectively by cross-pieces A' which preferably rise considerably above the upper surfaces of the side beams, approximately as shown. The frame thus constructed is of oblong rectangular form and is mounted upon suitable carrying-wheels so as to be easily portable; there being any desired form of running-gear employed as circumstances may demand. Into the upper surface of each side-beam A is formed a socket a³; these two sockets being placed precisely opposite each other, and being located somewhat nearer to the front end of the machine-frame than to its rear end.

Into one or the other of these sockets is inserted the lower end of a mast or standard C which extends vertically upward from the machine-frame, and to the head or upper end of which is secured the upper end of a stay-rod C'. The lower end of this stay rod is secured to the rear end portion of a boom B, preferably by an eye-bolt b³, as shown, and said stay-rod is preferably composed of two sections which are connected together by a turn-buckle C², or said stay-rod is preferably made adjustable in length in any suitable manner. The boom B is pivotally connected at its front end to the front end of the machine frame, so as to rise and fall vertically and to swing horizontally, as hereinafter fully explained, and said boom is of such length as to overhang, at its rear end, the rear end of the machine frame. To effect the required pivoting of the boom B to the front end of the machine frame, a pivot block b is employed; the rear end of this block being connected by hinges b' to the front end of the boom, and said block loosely and removably surrounding one or the other of two vertical pivot pins a which rise from the front cross-beam A² at opposite points from the median line of the machine frame. By virtue of this arrangement the boom can be raised and lowered at its rear end, the hinges b' permitting such movement, and can also be swung laterally over either side of the machine frame, according as the block b is engaged with one or the other of the pivot pins a. Furthermore, the arrangement is such that, when the rear or free end of the boom B is directly over the median line of the machine frame, the boom diverges forwardly and laterally from such median line, and a pull upon a draft cord which is trained forwardly over the free end of the boom will swing the boom laterally over that side of the machine frame which is remote from the point of pivotal attachment of the front end of the boom to the machine frame. In order to assist the mast C to withstand the lateral strains produced by the lateral swinging of the boom, a transverse brace A³ is provided at the upper part of the machine frame; this brace being so located as to abut at one or the other of its ends against the side of the mast, and thus receive the strains from said mast. The return move-

ment of the boom B is preferably limited by a stop-pin a^2 which is removably inserted into one or the other of two sockets a' formed in the rear cross-beam A' , at opposite points from, but near to, the middle thereof; the pin being set remotely from that side of the machine frame over which the boom is swung, and the boom striking the pin during its return movement, and thus being prevented from violently striking the mast C.

The scoop is shown as of the shovel type, and is of approximately oblong rectangular form, closed at its bottom and sides and open at its front end and top; the rear end of the scoop being provided with a gate d having a pivotal latch d' for normally holding the gate in closed condition. The latch d' may be operated, in opening the gate, either by pulling upon a suitable cord attached to the latch, or by contact with a fixed object located in the path of movement of the scoop A. As a desirable means for accomplishing this latter result, I have shown a tripping arm E which is removably secured to either side of the machine frame by a clamping bolt e' extending through the lower end of the tripping arm and into one or the other side bar A of the machine frame. The tripping arm E may be either a fixed arm adapted to engage the latch d' always at the same point in the movement of the scoop, or it may be an adjustable arm adapted to engage the latch in various points of said movement. To this latter purpose, the tripping arm is shown as composed of two telescoping sections e^2 and e^3 ; the lower section e^3 being of tubular form and the upper section e^2 , which is either of solid or tubular form, being arranged to slide longitudinally within the lower section. A set screw e^4 , which is inserted into the upper part of the lower section e^3 , binds against the upper section e^2 and serves to retain the latter in any desired position of adjustment. The lower end of the lower tripping arm section e^3 is pivoted at e upon the main frame of the machine, and is retained in its required position of adjustment by the attaching bolt e' before referred to. The upper end of the upper tripping arm section e^2 is bent laterally so as to enable said tripping arm to effectively engage an outward projection d^3 of the prolonged outer part of the latch d' ; this latch being pivoted intermediately of its ends, as at d^5 , upon the end-gate d . The scoop D is provided at its front end with a bail D' preferably adjustably connected to the sides of the scoop, so as to vary the draft on the scoop for changing its digging action. For this purpose the scoop is shown as provided with side bars D^2 secured to the inner surface of the sides of the scoop and inclined upwardly and rearwardly; the lower or front ends of these side bars having flanges d^4 which are provided with sets or series of holes, and the ends of the bail D' are engaged with cer-

tain of said holes, according to the point at which it is desired to apply the draft to the scoop. The upper ends of the side bars D^2 are extended rearward as at d^2 , so as to form handles which enable an attendant to guide the scoop in its work.

F. designates the draft-rope for the scoop, this rope being secured at its rear end to the bail D^2 and a team of draft animals being hitched to the opposite end of the rope, or the front end of the rope being connected to an engine if preferred. This draft line F may be a rope, cable, or a chain, and it is led upward over a peripherally grooved guide sheave b^2 journaled in the rear end of the boom B, and also preferably through the eyebolt b^3 , so as to prevent displacement. As a further means for preventing displacement of the draft rope F from the sheave b^2 , said sheave is journaled between two arms formed by longitudinally recessing the rear end of the boom; these arms embracing the draft-rope just before it reaches the pulley and being provided with a connecting brace or bridge b^6 which strengthens the arms.

To further guide the draft rope and particularly to limit its lateral movements within the required limits at the front end of the boom, and also to retain the draft rope properly depressed at the heel of the boom so as to lie about on a level with the team, I have devised guiding attachments shown in Figs. 2, 6 and 7. In these figures, G designates a supporting-bar of suitable length which is bolted to the upper side of the boom B so as to extend transversely thereof, near the front end or heel of the same, and which is provided at its ends with two upright arms or standards g . Through these standards extend the ends of a non-revoluble rod or shaft G' upon which is loosely mounted a peripherally grooved guide sheave G^2 , beneath which extends the draft rope F. The guide sheave G^2 is arranged to revolve freely upon the rod G' and also to slide longitudinally thereon between the arms g , and to retain the draft rope in engagement with the sheave, a bifurcated block G^3 is employed. This block is provided at its ends with two upwardly extending arms g' which embrace the opposite sides of the sheave G^2 ; the base of the block being grooved to embrace a longitudinal rib g^2 on the supporting arm G, as shown in Fig. 7. The extension of the supporting bar G at opposite sides of the boom B and the sliding action of the sheave upon the rod G' are to accord with the laterally reversible character of the machine, and, in a machine not so reversible, these features would be correspondingly modified.

To retain the wheeled main frame in its required position and to prevent undesirable shifting of the same by the working strains of the machine, a number of openings a^4 are formed through the side beams A of the main

frame, and suitable stakes are intended to be inserted through these openings and driven firmly into the ground.

When the machine is in operation, the scoop D is drawn backward a considerable distance from the machine, and power is then applied to the draft-rope F either by a team or by an engine. The scoop is thus drawn forward toward the machine, an attendant guiding it by its handles d^2 , and the scoop becomes filled. The continued draft raises the scoop from the ground, rear end downward, at the rear end of the machine frame, and also swings the boom B laterally over one or the other side of the machine frame, according to the position in which the front end of the boom is set. As the boom swings laterally, it carries the scoop and brings the arm d^3 of its latch d' into contact with the tripping arm E; thus unlocking the latch and permitting the end-gate d to swing downwardly, and consequently dumping the load from the scoop. The boom B is now swung back to its original position and the scoop is carried rearwardly from the machine as before, after which the above described operations are repeated.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. An excavator comprising a portable main frame, a swinging boom pivoted at one end of the frame and adapted to overhang the other end thereof, a mast or standard upon the frame arranged at one side thereof and between the ends of the boom, a stay connecting the upper end of the mast with the boom, a rope trained over the free end of the boom and adapted to extend over the opposite end of the machine frame, substantially as set forth.

2. An excavator comprising a portable main frame having a rear cross-beam the upper surface of which is elevated considerably above the main frame, a boom pivoted to the front of the main frame and at one side of its middle point and so supported as to rest upon the middle of the rear cross-beam, a mast or standard upon that side of the main frame toward which the boom is pivoted, a draft-rope trained over the free end of the boom,

and a scoop attached to the end of the rope which overhangs said free end of the boom, substantially as described.

3. An excavator comprising a main frame, a mast or standard adapted to be shifted to opposite sides of the main frame, a boom adapted to be pivoted at points opposite the middle of the front end of the main frame, and to rest upon the rear end of said main frame, means applied to said rear end beam of the frame for limiting the lateral movement of the boom, a stay connecting the boom with the mast, a rope trained over the free end of the boom, and a scoop connected with the rear end of the rope, substantially as set forth.

4. An excavator comprising a boom, a scoop, a draft-rope trained over the free end of the boom, and a guide for the draft rope applied to the boom near its opposite end and arranged at one side of the longitudinal axis of the boom and also movable transversely of the end of the boom, substantially as set forth.

5. A reversible excavator comprising a boom, a scoop, a draft rope trained over the free end of the boom, a guide for the draft rope applied to the opposite end portion of the boom and consisting essentially of a sheave support projecting laterally at both sides of the longitudinal axis of the boom, and a sheave mounted movably upon the support and adapted to be shifted from one end to the other thereof, substantially as set forth.

6. An excavator comprising a main-frame, a swinging boom arranged to swing over the side of the frame, a scoop having a hinged gate provided with a locking latch, and a bar or arm secured pivotally to one side of the machine frame and composed of two telescopic sections the uppermost of which extends into the path of movement of the scoop so as to engage the latch thereof, substantially as set forth.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

FRANK H. SCHULTE.

Witnesses:

M. E. DAYTON,
ALBERT H. GRAVES.