

(No Model.)

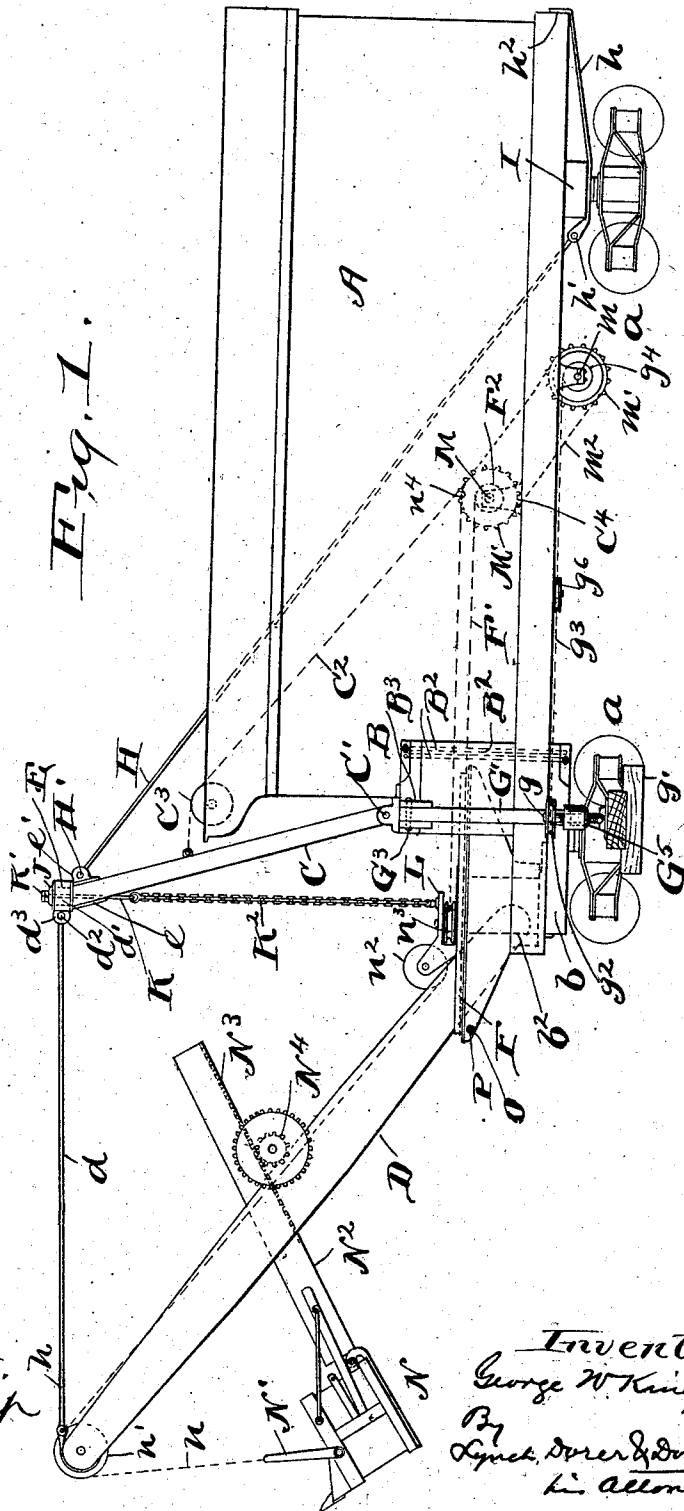
G. W. KING.
EXCAVATOR.

3 Sheets—Sheet 1.

No. 578,751.

Patented Mar. 16, 1897.

Fig. 1.



Witnesses.
E. B. Gilchrist
Ella E. Tilden

Inventor.
George W. King
By Lynet Dyer & Donnelly
his attorney

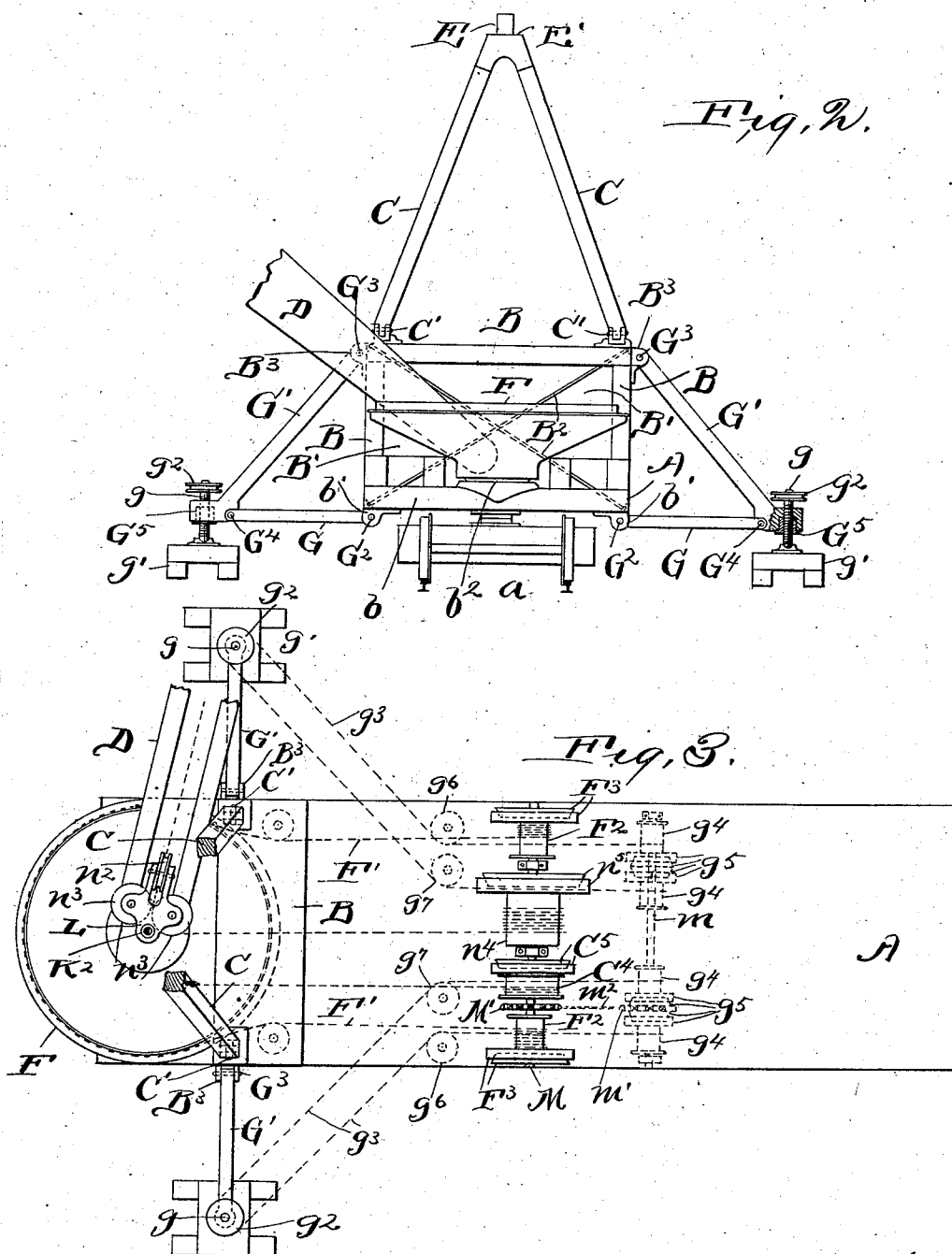
(No Model.)

G. W. KING.
EXCAVATOR.

3 Sheets—Sheet 2.

No. 578,751.

Patented Mar. 16, 1897.



Witnessed:
E. B. Gilchrist.
Ella E. Fildrum

Inventor:
George W. King
By
Sydney Dorer & Donnelly
his attorneys

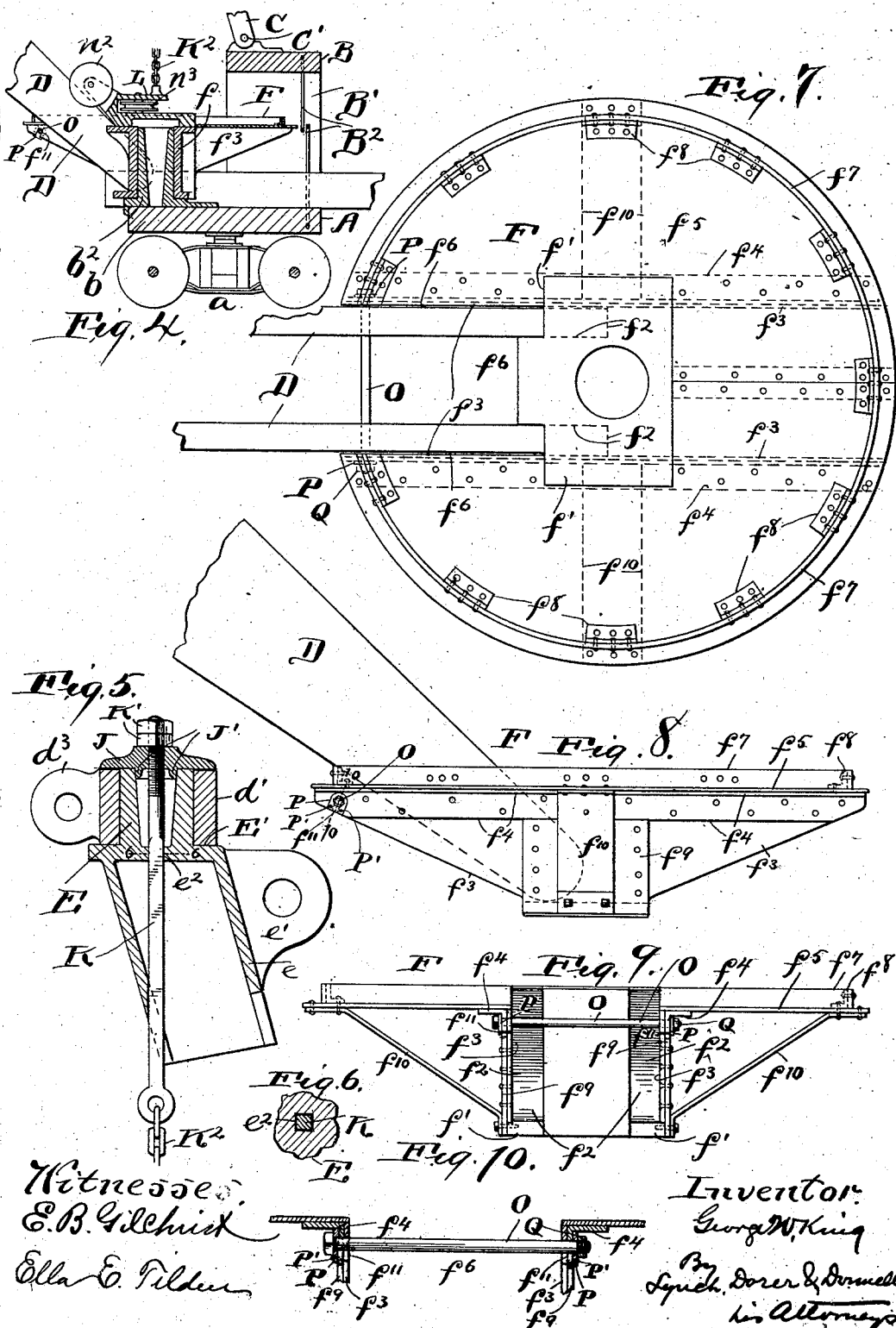
(No Model.)

3 Sheets—Sheet 3.

G. W. KING.
EXCAVATOR.

No. 578,751.

Patented Mar. 16, 1897.



UNITED STATES PATENT OFFICE.

GEORGE W. KING, OF MARION, OHIO.

EXCAVATOR.

SPECIFICATION forming part of Letters Patent No. 578,751, dated March 16, 1897.

Application filed March 9, 1896. Serial No. 582,324. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. KING, of Marion, Marion county, Ohio, have invented certain new and useful Improvements in Excavators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

10 My invention relates to improvements in excavators; and it consists, among other things, in the location of the lower vertical center or axis of the swinging boom or crane low down relative to the stationary framework or body portion of the machine, and the provision of
15 a raised upright frame or platform for supporting the feet of the so-called "A-frame," or inverted-V-shaped frame, that is instrumental in supporting the boom and in supporting a
20 brace or braces employed for bracing the excavator laterally and externally, so that the boom, when it is swung laterally and rearwardly into one of its extreme rearward positions, shall abut or come against one side of
25 the raised frame or platform, a foot of the A-frame, and upper portion of the external brace at said side of the raised platform or frame, and thereby permit the boom to be swung rearwardly beyond a line at a right
30 angle to the body portion of the excavator and at the same time accommodate the location of the feet of the A-frame and the external brace or braces in closer proximity to the lower pivotal point or axis of the boom.

35 My invention consists, also, in constructing the raised frame or platform that supports the A-frame with a chamber or hollow internally for receiving the rear portion and accommodating the operation of the turn-table
40 and to extend said platform or raised frame far enough rearwardly to accommodate the most desirable arrangement of crossed braces internally thereof, and thereby brace the entire frame effectually and render it adequately
45 rigid.

My invention consists, also, in the extension of the lower portion of said raised platform or frame forwardly to form a support for a lower brace connection and to form a bolster over the truck that supports the forward end of the machine's body portion and form

a support, furthermore, for the lower pivotal bearing of the boom.

My invention consists, furthermore, in a turn-table so constructed as to receive the
55 foot of the boom well down into it and to extend well up on the sides of the boom, so as to cause the boom-swinging chains to exert their work well upon the boom.

My invention consists, moreover, in a peculiar construction of the turn-table whereby no damage will be done to the table should the boom accidentally fall.

My invention consists, also, in several other meritorious and important features of construction and combinations of parts herein-
65 after described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of an excavator embodying my invention. Fig. 2 is a front end elevation, partly in section; and Fig. 3 is a top plan
70 of portions of the excavator, and these figures show the boom swung laterally and rearwardly beyond a line at a right angle to the body portion of the machine. Fig. 4 is a side
75 elevation, mostly in central vertical section, of boom-bearing members of the excavator and more clearly illustrates the raised platform or frame that supports the A-frame. Fig. 5 is an enlarged side elevation, mostly
80 in central vertical section, of the A-frame head, showing more clearly certain features of construction hereinafter described. Fig. 6 is a section on line 6 6, Fig. 5. Fig. 7 is a
85 top plan of the turn-table and foot of the boom or crane. Fig. 8 is a right-hand side elevation of said table and foot. Fig. 9 is a front side elevation of the turn-table. Fig. 10 is a section on line 10 10, Fig. 8.

Referring to Figs. 1, 2, 3, and 4 of the drawings, A designates the car or body portion of
90 the excavator that is mounted upon two-wheeled trucks *a a*, arranged at the forward end and rear end, respectively, of the body portion. A raised platform or upright frame
95 B is suitably constructed at and partially within the forward end of car A. The so-called "A-frame" C—an inverted-V-shaped frame—is mounted upon the forward portion of platform or frame B and is arranged width-
100 wise of the machine. Frame C is instrumental in supporting the laterally-swinging boom

or crane D of the excavator and at its upper end bears the upper vertically-arranged bearing E, upon which the boom swings. Platform or frame B extends below the machine's body portion, as shown in Fig. 1, and has its lower part enlarged or extended forwardly to form a bolster *b* over the forward truck of the excavator, and the forward portion of said member or bolster *b* affords bearing for and supports the horizontally-arranged turn-table F, whose rear portion extends into frame B, that is constructed to form a chamber or hollow B' internally thereof (see Fig. 4) to accommodate its location as far forwardly as practicable without interfering with the location and operation of the turn-table. The lower end or foot of the boom is suitably connected, preferably as hereinafter described, with the turn-table, and the axis of bearing E is coincident with the axis of the turn-table, and said table's axis constitutes the lower axis or lower pivotal center of the boom. The upper end of the boom is connected, by means of a tie-rod *d*, (see Fig. 1,) with a collar *d'*, rotatably mounted upon bearing E and resting upon a shoulder or seat E', (see Fig. 5,) formed at the lower end and externally of said bearing, and rod *d* is detachably secured at its rear end, by a horizontally-arranged pin *d*², (see Fig. 1,) to an ear *d*³, formed upon and externally of collar *d'*. Platform or frame B extends rearwardly into car A far enough to accommodate the provision of two strong crossed braces B² internally of said frame and extending between diagonally opposite corners of the frame, so as to brace the whole frame effectually and render it sufficiently rigid. The raised frame B is also instrumental in supporting the two bars or members G and G' (see Fig. 2) of the frame of a brace employed for bracing the machine externally and laterally. It will of course be understood that an excavator is usually provided with two external braces arranged at opposite sides, respectively, of the machine, and referring to either one of the braces with which the machine illustrated is provided it will be observed that the lower horizontally-arranged bar or member of its frame is detachably secured at its inner end, by means of a horizontally-arranged bolt or pin G², to a bracket *b'*, depending from and rigid with the under side of the bolster-forming member *b* of raised frame B; that the other bar or member G' of the brace's frame is arranged diagonally between the outer end of member G and the upper portion of frame B and is detachably secured, by means of a horizontally-arranged bolt or pin G³, to a bracket B³, secured to the upper portion or top of the adjacent side of frame B; that bar or member G is detachably secured at its outer end, by means of a horizontally-arranged bolt or pin G⁴, to the lower end of bar or member G'; that the lower end of said member G' projects beyond the outer end of member G and has a nut G⁵ formed or provided therein; that a

vertically-arranged screw *g* extends through and engages the nut and that said screw at its lower end, below the jack-frame, bears upon the ground-engaging base or foot *g'* of the brace; that said screw at its upper end, above the engaging nut, is operatively provided with a pulley *g*², and that the screw is turned in the direction required to cause it to bear downwardly upon foot or base *g'* or in the other direction as required to release the base or foot, according as pulley *g*² is rotated in the one or the other direction.

The extension of frame B below and forward of car A to form bolster *b* accommodates the location of the lower vertical pivotal center or axis of the swinging boom low down relative to the body portion of the machine, and this feature, together with the elevated support that said frame B affords for frame C, renders possible the arrangement whereby the boom can be swung laterally and rearwardly beyond a line at a right angle to the machine's body portion, and the boom, when swung rearwardly as far as practicable, engages or bears against a foot of frame C, frame B, and adjacent brace, at the junction of said brace and frames, as shown very clearly in Figs. 2 and 3, and the extremely low location of the lower pivotal point of the boom at the same time accommodates the desirable closer proximity of the brace or braces and feet of frame C to a line coincident with said pivotal point.

A rear support for the upper end of frame C consists, preferably, of a rod H, (see Fig. 1,) that at its forward end is secured, preferably detachably, by means of a pin H', to an ear *e'*, formed upon and externally of the rear side of the head or cap *e*, that embraces and secures together the upper ends of the two bars or beams composing the A-frame, and I would here remark that bearing E is preferably a vertically-perforated or hollow lug formed upon and integral with cap or head *e*, as shown in Fig. 5. Rod H (see Fig. 1) extends rearwardly and downwardly from cap or head *e* through the floor of car A, and below said floor is secured, preferably detachably, by means of a pin *h'*, to a rod or bar *h*, that extends in under and abuts the under side of the bolster I over the rear truck and thence extends to and overlaps or hooks over the rear end of the car, as at *h*².

A-frame C is preferably horizontally hinged or pivoted at its lower end or feet to frame B, as at C', so as to render it capable of being swung in a vertical plane longitudinally of the machine as required to lower it out of the way upon detaching rods *d* and H therefrom preparatory to transportation or shipment of the machine.

C² (see Figs. 1 and 3) designates a chain or cable for raising and lowering frame C. Chain C² is attached at one end to and preferably near the central portion of frame C, thence leads rearwardly to and over a sheave C³, suitably supported from the forward end of the

top of car A, and thence rearwardly and downwardly into operative engagement with a winding-drum C⁴, loosely mounted upon a horizontal shaft M, suitably supported from and arranged transversely of the car. Shaft M is driven, when operated, continuously in one direction in any approved manner, and a suitably-operated clutch C⁵ controls operative connection between drum C⁴ and the shaft.

10 A washer J (see Fig. 5) rests upon the upper end of lug E and overlaps and prevents upward displacement of collar d' and is suitably held in place. Washer J upon its under side is preferably provided with any suitable number of lugs or projections J', projecting downwardly into lug E and preventing lateral displacement of the washer.

The means employed for retaining washer J in place vertically comprises, preferably, the following elements: an upright eyebolt K, arranged with the screw-threaded portion of its shank uppermost and extending vertically through cap or head e; a nut or nuts K', mounted upon the bolt's shank at the upper side of the washer; a chain K², attached at its upper end to the eye of the bolt and arranged in line with the axes of the boom and secured at its lower end to a bracket L, secured to the upper side of the turn-table. (See Fig. 1.) Chain K² also performs the function of preventing the A-frame C from being thrown backwardly when the boom swings rearwardly more than a quarter-turn. Said chain does not interfere with the operation of the turn-table, but merely twists when the table turns.

To prevent the bolt K from turning upon the twisting or turning of chain K² and thereby avoid loosening of washer J and nuts K', I make the bolt-engaging hole e² in the top of head e and centrally of the lower end of lug or bearing E angular, as shown more clearly in Fig. 6, and make the bolt's portion that extends through said hole correspondingly annular in cross-section.

45 F' (see Fig. 2) designates the two turn-table-actuating chains or cables that are attached to the table in the usual manner at opposite sides, respectively, of the boom and lead rearwardly and operatively engage different winding-drums F² F³, respectively, loosely mounted upon opposite ends, respectively, of shaft M, and a suitably-operated clutch F³ is provided for each of said drums for establishing operative connection when desired between the respective drum and shaft.

N (see Fig. 1) represents the excavating dipper or shovel of the machine, N' its bail, and N² its handle or arm provided with a rack 60 N³, arranged longitudinally of the arm and meshing with a pinion N⁴, suitably supported from the central portion of the boom and driven in any approved manner, and it is obvious that the shovel is thrust outwardly, as required, to excavate or returned inwardly after excavating, according as pinion N⁴ is turned in the one or the other direction.

n (see Fig. 1) represents the hoisting chain or cable that is attached at one end to the shovel-bail, thence leads upwardly to and 70 over a vertically-arranged sheave n', supported from the outer end of the boom, and thence leads downwardly and inwardly along the boom to and in under a bear-down sheave n², supported from bracket L a suitable distance 75 forward of the axis of the turn-table. Sheave n² is also arranged longitudinally of the boom, and from said sheave cable n leads rearwardly to and between the sheaves of a pair of sister sheaves n³ n³, (see Fig. 3,) supported from 80 bracket L and arranged horizontally side by side just forward and at opposite sides, respectively, of said table's axis, and thence cable n leads rearwardly and operatively engages the winding-drum n⁴, called the "hoisting-drum," and loosely mounted upon shaft 85 M, and a suitably-operated clutch n⁵ controls operative connection between said drum and shaft. It is obvious that the excavating-shovel is hoisted upon winding up cable n 90 and lowers by gravity upon paying it out from the drum. It will also be observed that the supporting of sheaves n² and n³ from a bracket L, that is secured to the turn-table, accommodates a vertical adjustment of the 95 boom.

The construction of turn-table preferably employed (see Fig. 4) comprises a centrally-located metallic hub f, rotatably mounted upon the upright circular lug or bearing b', 100 suitably secured to the forward portion of the bolster-forming member b of frame B, as shown in Fig. 4. The boom comprises in the main two beams arranged side by side. The lower ends of said beams constitute the foot 105 of the boom, and hub f has two lateral lugs or enlargements f', (see Fig. 7,) arranged at opposite sides, respectively, of its axis and suitably chambered, as at f², for the reception of the foot of the boom. Two vertically-arranged 110 plates f³ f³, at opposite sides, respectively, of the foot of the boom, are suitably secured to the lateral enlargements of the hub. Plates f³ extend from the forward extremity to the rear extremity of the turn-table, and their 115 width at their central portion is somewhat less than the height of the turn-table and is gradually reduced toward each extremity, as shown in Figs. 4 and 8. To and externally of the upper portion of each plate f³ is secured 120 the vertical member of an angle-iron f⁴, that extends from the forward extremity to the rear extremity of the turn-table. The horizontally-arranged segmental plates f⁵ rest upon and are secured to the horizontal members of angle-irons f⁴. Plates f⁵ form the upper surface of the table around the latter's hub and at opposite sides, respectively, of the foot of the bottom. A vertical opening f⁶, 125 extending downwardly through and forward of the table's hub is thus formed, and the boom extends downwardly through said opening into pockets f². Plates f⁵ have their outer edges concentric with the table's axis. A seg- 130

mental band f^7 , resting on edge upon the upper surface of plates f^5 a suitable distance from the latter's outer edges and arranged concentric with the table's axis, extends from one side of opening f^6 around the table to the opposite side of said opening. The upper surface of plates f^5 at the outer side of band f^7 forms a seat for the table-actuating chains. Said band is held firmly in place by angle-plates f^8 , arranged at suitable intervals along the inner surface of the band and riveted to the band and band-supporting plates. To the outer side of the central portion of each plate f^8 , below the angle-iron f^4 , engaging said plate, is secured a vertically-arranged plate f^9 , that extends below said plate f^8 and is secured at its lower end to the adjacent lug or enlargement f' of the hub of the turn-table. Two diagonally-arranged braces f^{10} are arranged at opposite sides, respectively, of the table, and each brace f^{10} is secured at its lower end to the adjacent enlargement of the table's hub and at its opposite or upper end to the outer portion of the plate f^5 above it.

The construction of turn-table hereinbefore described is not only exceedingly simple and durable, but accommodates placing of the foot of the boom well down into the table and has the latter extending well up on the sides of the boom, so that the boom-swinging chains are rendered capable of exerting their work upon the boom a desired distance from the boom's lower or inner extremity. To tie together the table's portions at the sides of opening f^6 and at the same time prevent damage to the table should the boom accidentally fall, I connect said table portions together by a bolt O, that extends through opening f^6 and through upright slots f^{11} in plates f^3 and angle-irons f^4 , and has bearing at or near its ends in plates or washers P, secured to the outer sides of angle-irons f^4 , respectively, by means of two rivets P'. Washer P at the headed end of the bolt is interposed between the bolt's head and adjacent angle-iron f^4 , and washer P at the opposite or threaded end of the bolt is interposed between a nut Q, mounted upon said end of the bolt and the adjacent angle-iron f^4 . Slots f^{11} in plates f^3 and angle-irons f^4 are open at their lower ends, and hence the boom, should it fall accidentally, would deliver a blow upon bolt O and shear rivets P', and thereby free the bolt to drop with the boom through opening f^6 without incurring any damage to the turn-table.

Referring again to the operation of the screw g of either one of the machine's external braces, it will be observed that pulley g^2 upon said screw is operatively connected by a chain or cable g^3 (see Fig. 3) with different winding-drums g^4 , respectively, loosely mounted upon a horizontal shaft m , arranged rearward of and parallel with shaft M and supported from and below car-body A. A sprocket-wheel m' , operatively mounted upon shaft m , is operatively connected by means of a chain

m' with a sprocket-wheel M', operatively mounted upon shaft M. A suitably-operated clutch g^5 is provided for each drum and controls operative connection between the respective drum and drum-supporting shaft, and it is obvious that pulley g^2 , and consequently screw g , is turned in the one direction or the other, according as operative connection is established between shaft m and the one or the other drum. Chain g^3 leads forwardly from one of the drums to and over a horizontally-arranged sheave g^6 , suitably supported from and below the floor of car A, thence forwardly and laterally to and over pulley g^2 , thence to and over a guide-sheave g^7 , supported from the car-floor in close proximity to sheave g^7 , and thence to the other winding-drum.

I would remark that the raised frame or platform B forms a support as near the forward end of the machine as practicable for the external braces and A-frame and at the same time accommodates a desirable distance between the upper and lower points of connection of the braces with the excavator, and, furthermore, accommodates a shortening of the A-frame, so as to render the latter stiffer and require less trussing; also, the raised frame affords a most convenient stand for the operators—the engineer and dipper-tender. In fact, the operators, as they stand on the raised frame or platform, are in plain view of their work and out of danger.

What I claim is—

1. An excavator comprising a body portion A, a suitably-actuated turn-table supported at the forward end of the body portion, the boom operatively connected with said table, a raised frame or platform B overhanging the rear portion of the turn-table, the so-called "A-frame" mounted upon the forward portion of said raised platform or frame and connected with the boom, and the external braces having their upper portions receiving their support near the upper or forward portion of said raised frame or platform, and the lower portion of said braces receiving their support near the lower part of the machine's body portion, substantially as set forth.

2. An excavator comprising a body portion; a suitably-actuated turn-table supported at the forward end of the body portion; the boom or crane; a braced platform or frame overhanging the rear portion of the table; the A-frame mounted upon said overhanging frame or platform; a connection between the boom and A-frame's upper end, and the parts being so arranged that the boom shall be capable of swinging laterally and rearwardly of a line arranged at a right angle to the machine's body portion, and, in said rearwardly-swung position, shall engage or abut the A-frame and A-frame-supporting platform or frame, substantially as set forth.

3. An excavator comprising a body portion A, a suitably-actuated turn-table F supported at the forward end of the body portion, the

boom or crane, a rigidly-braced platform or frame overhanging the rear portion of the table, the so-called "A-frame" C mounted upon said overhanging frame or platform, a connection between the boom and upper end of the A-frame, and the arrangement of parts being furthermore such that the boom shall be capable of swinging laterally and rearwardly of a line arranged at a right angle to the machine's body portion, substantially as shown, for the purpose specified.

4. An excavator comprising a body portion A; a suitably-actuated turn-table F placed low down relative to, and suitably supported at the forward end of, the body portion; the boom or crane; a rigid platform or frame overhanging the rear portion of the table; the so-called "A-frame" C mounted upon said overhanging frame or platform; a suitable connection between the boom and upper end of the A-frame; an external and lateral brace arranged at the side of said overhanging platform or frame, and the arrangement of parts being furthermore such that the boom shall be capable of swinging laterally and rearwardly of a line arranged at a right angle to the machine's body portion, and, in said rearwardly-swung position, shall engage or abut the brace, A-frame, and A-frame-supporting platform or frame, substantially as shown, for the purpose specified.

5. An excavator comprising a body portion A; a suitably-actuated turn-table F suitably supported at the forward end of the body portion; the boom or crane; a rigid platform or frame overhanging the rear portion of the table; the so-called "A-frame" C mounted upon said overhanging frame or platform; a suitable connection between the boom and upper end of the A-frame, and a brace or braces, for bracing said overhanging platform or frame laterally and externally, and connected with the upper and lower portions of said frame or platform, substantially as set forth.

6. An excavator comprising a body portion A; trucks *a* supporting opposite ends, respectively, of the body portion; a rigid raised platform or frame B erected at the forward end of the body portion above the forward truck, and having its lower portion extended forwardly to form a bolster *b* over said truck; the suitably-actuated turn-table supported from a forward extension of said bolster, and having its rear portion overhung by the upper portion of said platform or frame; boom or crane; the so-called "A-frame" mounted upon said upper portion of the table-overhanging frame or platform, and a suitable connection between the boom and upper end of the A-frame, substantially as set forth.

7. The combination with the car or body portion, rear truck, bolster over said truck, and suitably-supported so-called "A-frame," at or near the forward end of the body portion, of a connection between the upper end of said frame and rear end of the car, said connection extending from said frame downwardly

and rearwardly to and in under the aforesaid bolster and thence to and hooks over or overlaps the rear end of the car, substantially as shown, for the purpose specified.

8. The combination of the car or body portion; rear truck; bolster over said truck; metallic bar or strap extending in under and forwardly of the bolster, and rearwardly thereof to and overhooking or overlapping the rear end of the car; the so-called "A-frame" at or near the forward end of the car; the metallic cap or head embracing the upper end of said frame and having a rearwardly-projecting ear or member; the rod II arranged between and detachably secured to said rearwardly-projecting member of the aforesaid head and the forward end of the aforesaid strap or bar, substantially as and for the purpose set forth.

9. The combination with the swinging boom; so-called "A-frame;" the cap or head *e* embracing the upper end of said frame and provided, at its upper end, with the vertical cylindrical lug or bearing E having a seat E' at its lower end and externally, and the connection between the boom and said bearing and terminating, at its inner end, in the sleeve or collar *d'* engaging the aforesaid seat and embracing the lug; of the washer J mounted upon the upper end of the lug and overlapping the collar, and means for holding said washer in place, substantially as set forth.

10. The combination with the machine's body portion, turn-table, boom, so-called "A-frame," connection between the boom and upper end of the A-frame, and connection between said frame's upper end and body portion rearward of the frame, all relatively arranged substantially as indicated, of a chain or twistable connection K² between said frame's upper end and the turn-table, substantially as and for the purpose set forth.

11. The combination with the swinging boom; the A-frame provided, at its upper end, with the vertical cylindrical lug or bearing E having a seat E' at its lower end and externally, and the connection between the boom and said bearing and terminating, at its inner end, in the sleeve or collar *d'* engaging the aforesaid seat and embracing the lug; of the washer resting upon the upper end of the lug and overlapping the collar, a member bearing downwardly upon said washer and a chain or twistable connection between the boom, at or near the latter's lower pivotal center, and the aforesaid bear-down member, substantially as and for the purpose set forth.

12. The combination with the machine's body portion; turn-table; boom; so-called "A-frame;" connection between the A-frame's upper end and body portion rearward of said frame; the cap or head *e* embracing the upper end of said frame and provided with the upwardly-projecting vertical cylindrical lug E and the shoulder or seat E' at the lower end of said lug; the connection between the boom and upper end of the A-frame and terminating, at its inner end, in a sleeve or collar em;

bracing the aforesaid lug and resting upon the aforesaid seat; of a washer J resting upon said lug and overlapping said collar; an upright bolt centrally of said lug and arranged with its shank projecting above the lug; a member upon the bolt-shank above and bearing upon the washer, and a chain extending from the head of the bolt to the turn-table and suitably connected at its upper end and lower end to the bolt's head and table, respectively, substantially as and for the purpose set forth.

18. The combination with the machine's body portion; turn-table; boom; so-called "A-frame;" connection between the A-frame's upper end and body portion rearwardly of said frame; the cap or head *e* embracing the upper end of said frame and provided with the upwardly-projecting vertical cylindrical lug E and the shoulder or seat E' at the lower end of said lug; the connection between the boom and upper end of the A-frame and terminating, at its inner end, in a sleeve or collar embracing the aforesaid lug and resting upon the aforesaid seat; of a washer J resting upon said lug and overlapping said collar; an upright eyebolt centrally of said lug and arranged with its shank projecting above the lug; a nut, or nuts, mounted upon the bolt-shank above the washer; means for preventing turning of the bolt, and a chain extending from the eye of the bolt to the turn-table and having its opposite ends suitably connected to the bolt's eye and table, respectively, substantially as and for the purpose set forth.

14. The combination with the suitably-supported boom, and boom-swinging turn-table having, in its forward side, an opening engaged by the boom, which opening extends downwardly through, and forwardly to the forward extremity of the table; of a safety bolt or member extending across the opening below the boom and instrumental in tying together the portions of the table at opposite sides of said opening, and said safety-bolt or connecting member having a support incapable of resisting a blow delivered thereon by the boom should the latter accidentally fall, substantially as and for the purpose set forth.

15. The combination with the suitably-supported boom, and boom-swinging turn-table

having, in its forward side, an opening engaged by the boom, which opening extends downwardly through, and forwardly to the forward extremity of, the turn-table: of a safety bolt or member extending across said opening below the boom and instrumental in tying together the portions of the table at opposite sides of said opening, and the holes in the table's members through which said safety member extends being elongated downwardly and open at their lower ends, and the two plates supporting opposite ends, respectively, of the bolt, and riveted to the adjacent portions of the turn-table, substantially as shown, for the purpose specified.

16. The turn-table in a machine of the character indicated, composed of the centrally-located hub having a pocket or pockets for the reception of the boom; two vertically-arranged plates *f*³ *f*³ arranged between the rear and forward extremities of the table and at opposite sides, respectively, of the hub; horizontally-arranged segmental plates *f*⁵ forming the upper surface of the table around the latter's hub; the angle-irons *f*¹; the segmental band *f*¹; angle-plates *f*⁸; plates *f*⁹, and braces *f*¹⁰, all arranged and secured in place, substantially as shown, for the purpose specified.

17. In a machine of the character indicated, the combination with the upright screw adapted to bear upon the base or platform of an external brace of the machine and a stationary nut engaging said screw: of a chain-pulley operatively mounted upon the screw; a suitably-driven shaft supported below the car-body; two drums loose upon said shaft; a clutch for each of said drums for controlling operative connection between the respective drum and shaft, and cable operatively engaging the different drums and leading from one of said drums to and over the pulley and thence to the other drum, substantially as and for the purpose set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 19th day of February, 1896.

GEORGE W. KING.

Witnesses:

FRANK. A. HUBER,
S. C. BOWEN.