(No Model.)

3 Sheets—Sheet 1.

N. J. CUYLE.

EXCAVATOR AND WRECKER COMBINED.

No. 281,844. Patented July 24, 1883.

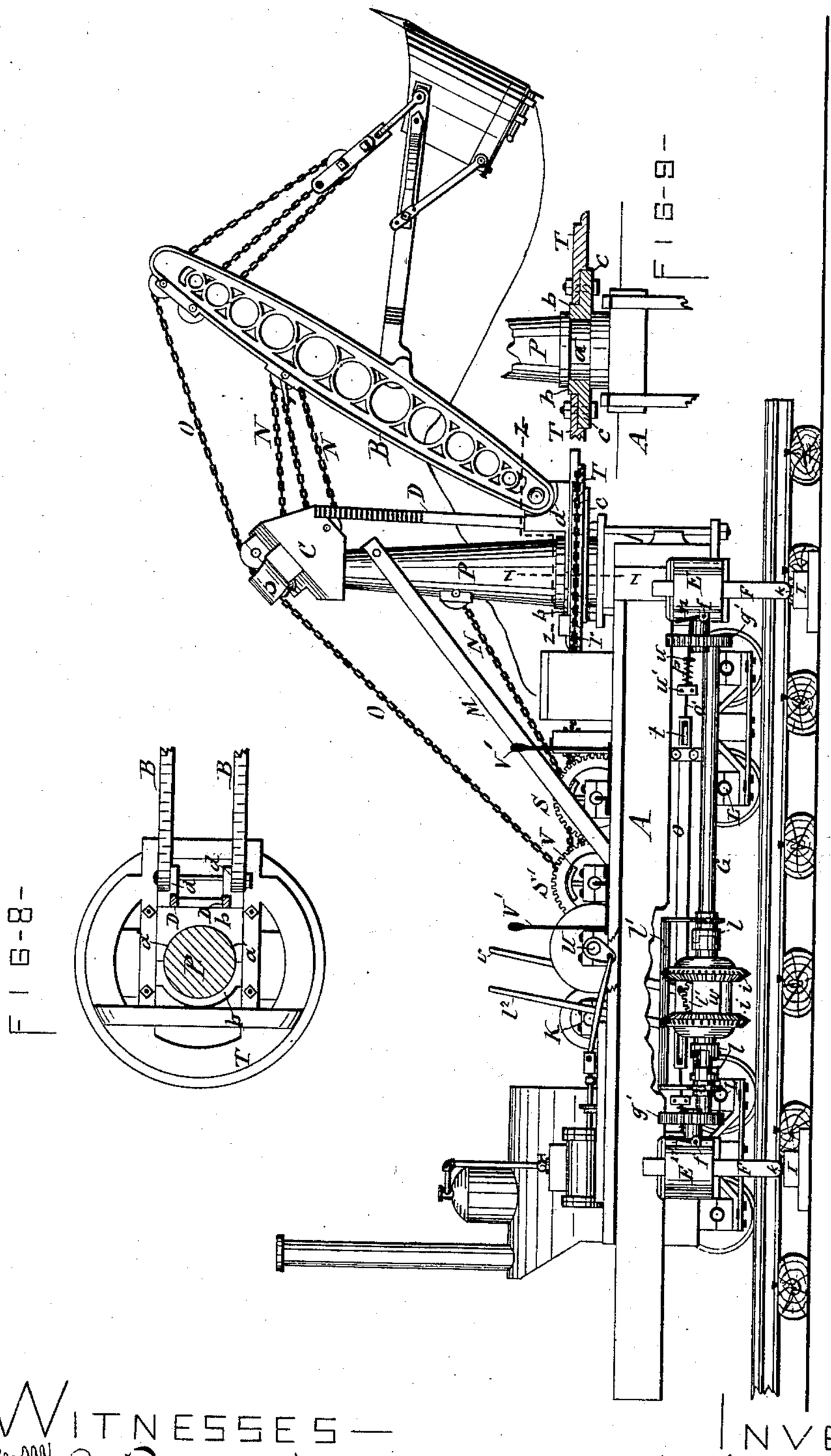

FIG-1-

FIG-8-

WITNESSES—

Wm. C. Raymond

C. Beauljour

INVENTOR—

Nathan J. Cuyle

per Duell, Laads & Hey

Attys.

(No Model.) 3 Sheets—Sheet 2.

N. J. CUYLE.

EXCAVATOR AND WRECKER COMBINED.

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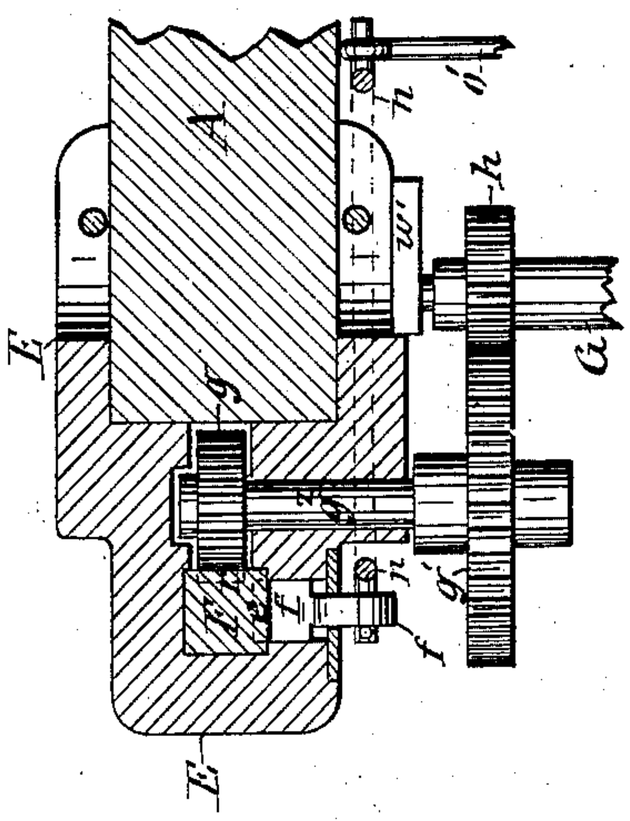


FIG-4-

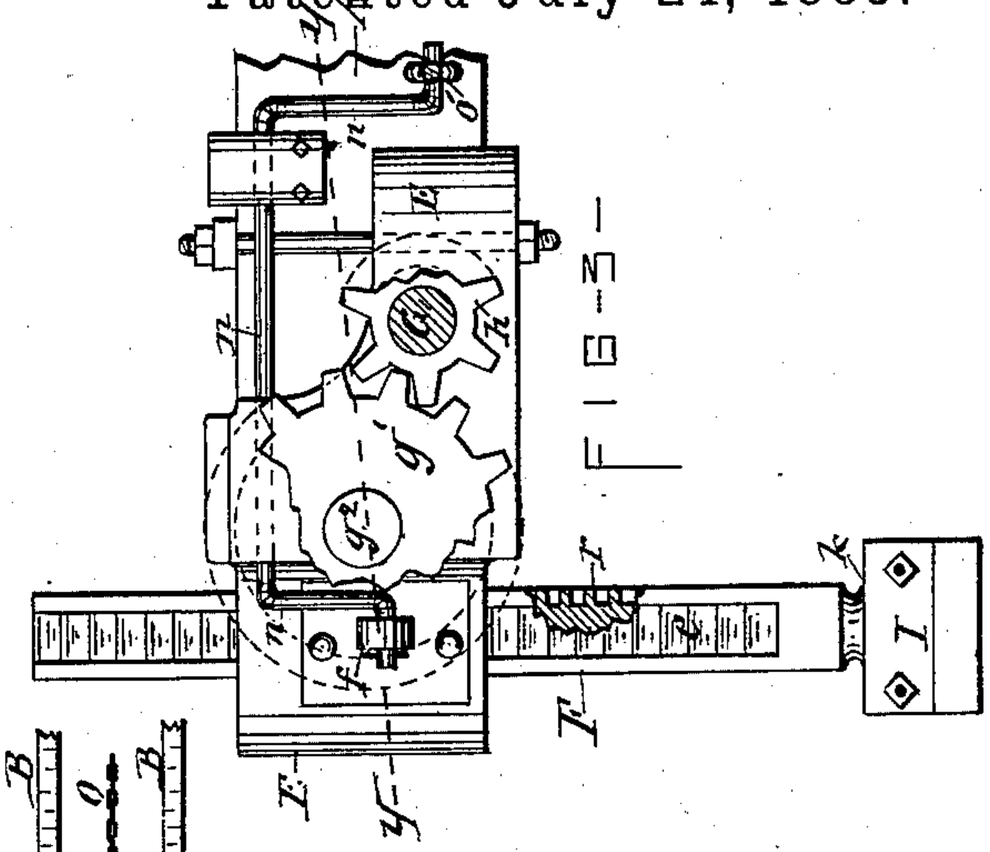


FIG-3-

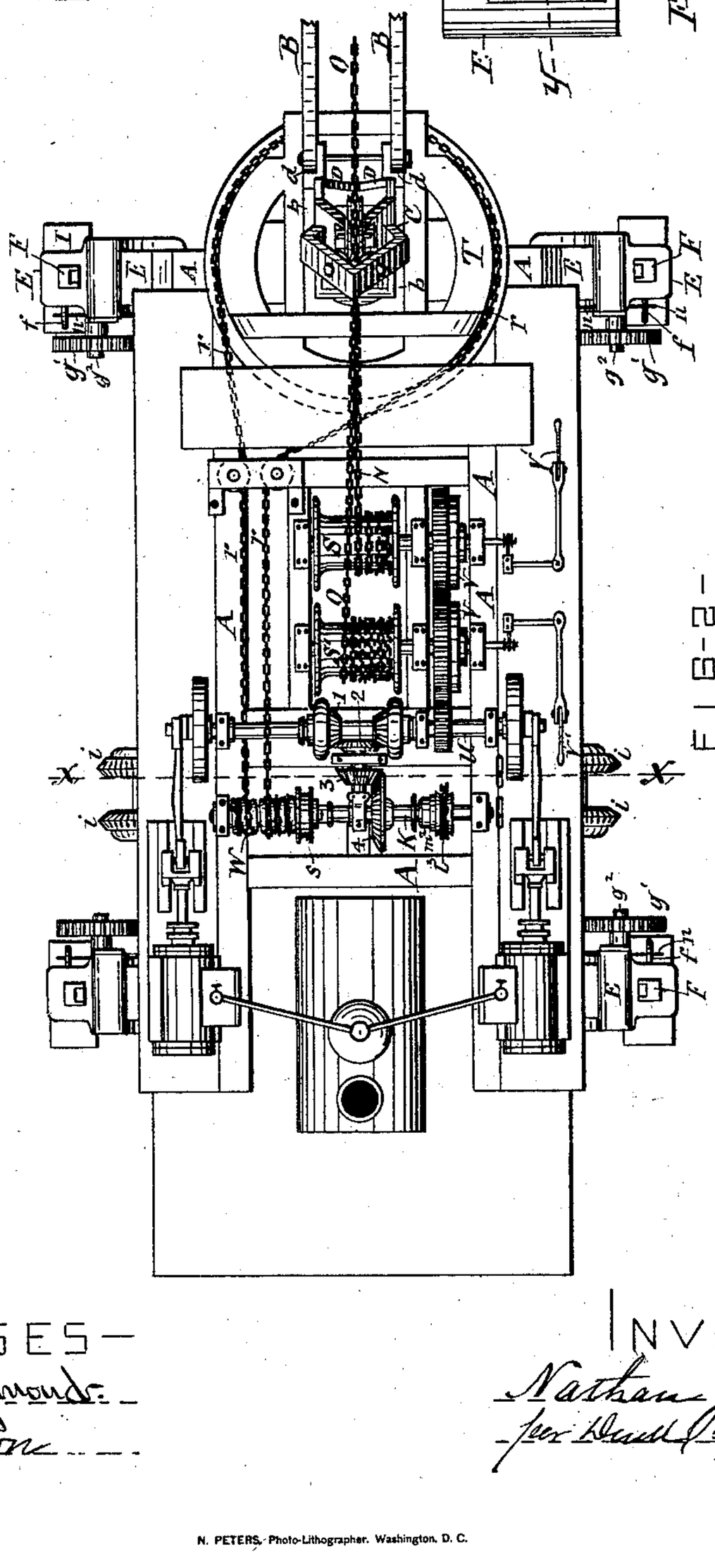


FIG-2-

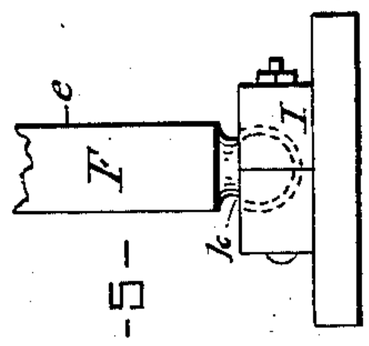


FIG-5-

WITNESSES—
Wm. E. Raymond.
E. Benderson

INVENTOR—
Nathan J. Cuyle
per Dodd Lacks & Hey
his Attys

(No Model.)

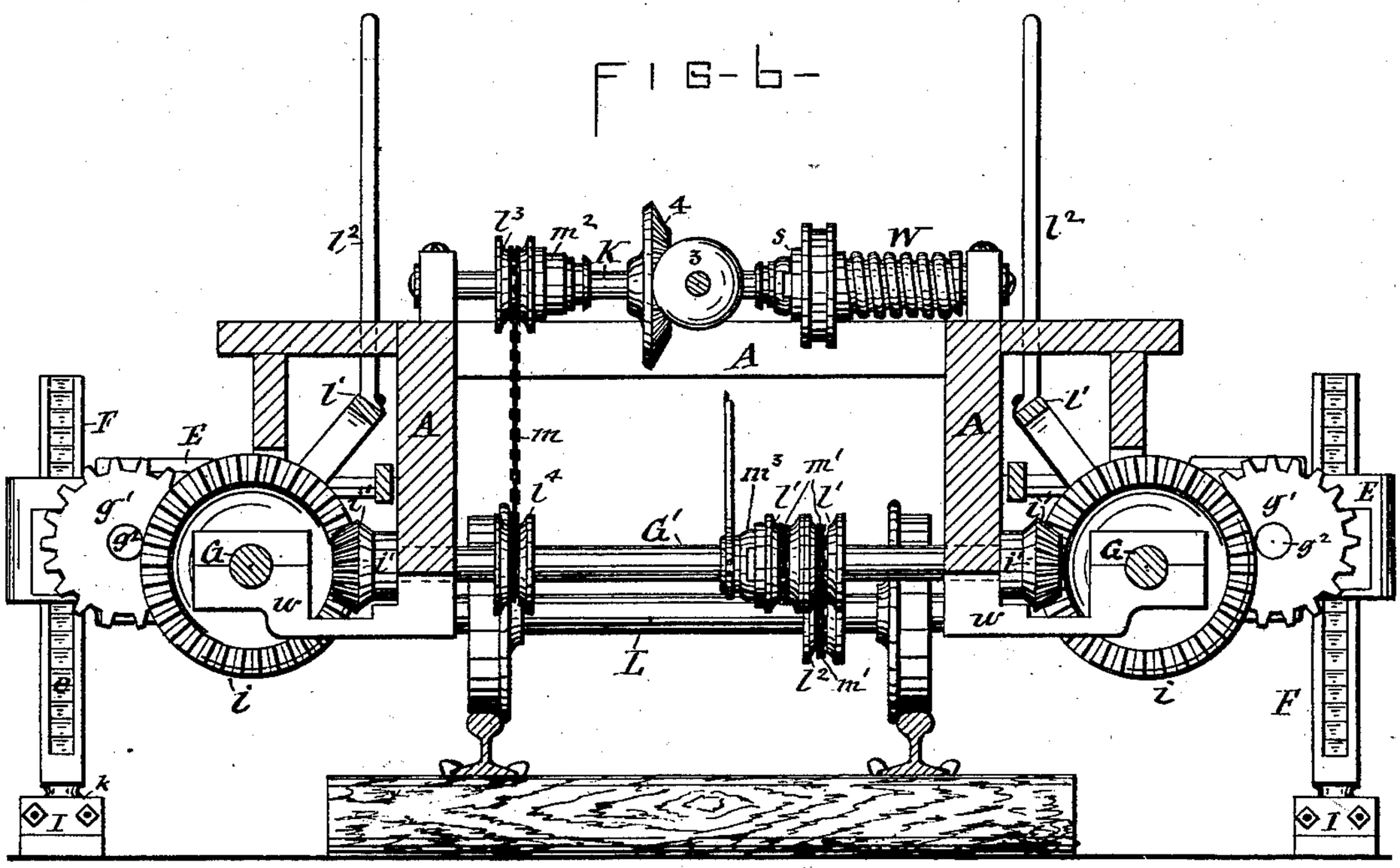
3 Sheets—Sheet 3.

N. J. CUYLE.

EXCAVATOR AND WRECKER COMBINED.

No. 281,844. Patented July 24, 1883.

FIG-6-



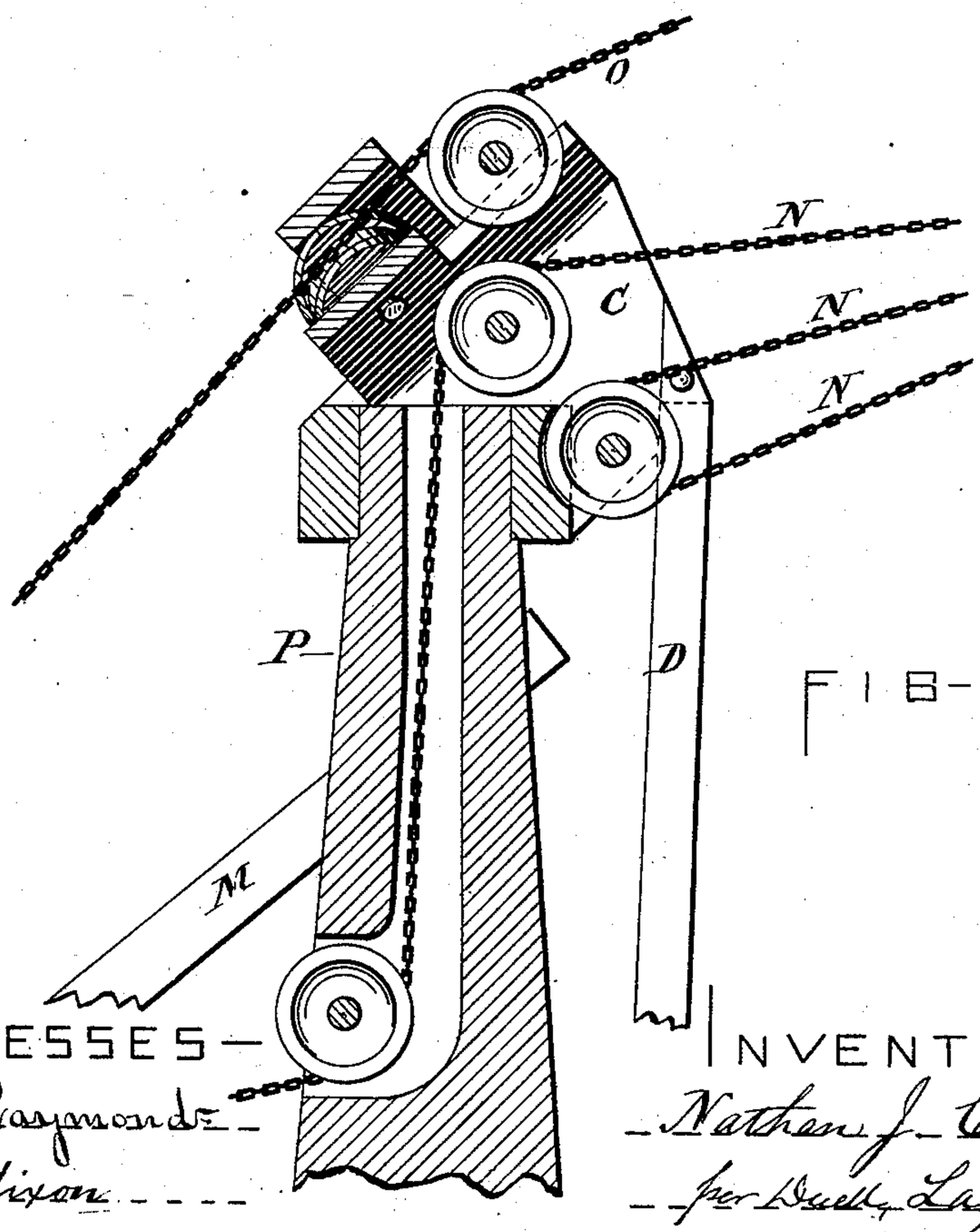


FIG-7-

WITNESSES—

Wm. C. Raymond

C. Bendixon

INVENTOR—

Nathan J. Cuyle

per Duell, Lacey & Hay

his attys.

UNITED STATES PATENT OFFICE.

NATHAN J. CUYLE, OF OSWEGO, NEW YORK.

EXCAVATOR AND WRECKER COMBINED.

SPECIFICATION forming part of Letters Patent No. 281,844, dated July 24, 1883.

Application filed April 5, 1883. (No model.)

To all whom it may concern:

Be it known that I, NATHAN J. CUYLE, of Oswego, in the county of Oswego, in the State of New York, have invented new and useful Improvements in Excavator and Wrecker Combined, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention has reference more particularly to portable cranes mounted on cars, and adapted for use in clearing wrecks on railroads, and for making excavations.

The invention consists, first, in improved means of connecting a swinging boom to a stationary mast or post; secondly, in a novel construction and arrangement of jacks connected with the main supporting-frame, and means for operating said jacks to sustain the crane during its operation; and, thirdly, in a novel arrangement of mechanism for transmitting motion from the driving-shaft of the crane to the axle of the car which carries the crane, all as hereinafter more fully explained, and specifically set forth in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my improved crane. Fig. 2 is a plan view of the same with the boom broken away. Figs. 3, 4, and 5 are enlarged detail views of the jack and that portion of its actuating mechanism which is adjacent thereto, Fig. 4 being a sectional view taken on line *y y* in Fig. 3. Fig. 6 is an enlarged vertical transverse section taken on line *x x* in Fig. 2. Fig. 7 is an enlarged vertical transverse section of the upper portion of the post or mast and the sheave-carrier mounted thereon. Fig. 8 is a horizontal section taken on line *z z* in Fig. 1; and Fig. 9, a vertical section on line 1 1, some of the figures having portions broken away to better illustrate the invention.

Similar letters of reference indicate corresponding parts.

A represents the platform or main supporting-frame of the crane, mounted on car-trucks, so that the crane may be transported on railways, and used either as an excavator or as a wreck-clearer.

P denotes the boom-supporting post or mast, formed hollow, of cast-iron, and rigidly secured to the frame A, so as to prevent its turning, its upper end being sustained by braces M, firmly secured thereto, and extending rearward therefrom, and fastened at the end to the frame A. The lower portion or foot of the post P is provided with a circumferential groove, *a*, in which is fitted to revolve a collar, *b*, which is composed of two diametrically-divided sections, so as to allow it to be applied to said groove, said collar being clamped together and the turn-table secured to the collar in the manner hereinafter more fully described.

The collar *b* is formed, on two diametrically-opposite sides and equidistant from the center of the collar, with two parallel rabbets, *c c*, on which rests and is secured the turn-table T, which is framed to form an opening through which the rigid post P protrudes, and with parallel skids or beams on two edges of the openings, which beams rest in the rabbets *c c* aforesaid, and are firmly bolted or otherwise fastened thereto. The forward portion of the collar *b* has firmly secured to it or integral with it two concave sockets or steps, *d*, in which rests the foot of the boom B. Said boom I prefer to construct of wrought-iron, its foot being convexed corresponding to the step *d*, so as to allow the suspended end of the boom to swing vertically, and to also transmit the strain directly to the step.

C represents a hollow cap pivoted on top of the post P, and having pivoted to it the usual sheaves, which carry the chains N and O, by means of which the boom B is raised and lowered and the dipper R is operated, said chains being extended to and wound upon drums S and S′, journaled in suitable bearings on the platform or frame A, back of the mast, in the usual manner. Said drums receive their requisite motion from the driving-shaft U by a train of gearing, the gears of the drums S and S′ being mounted loosely on the shafts of the drums, and when required to transmit motion to the drums said gears can be fastened by means of the usual friction-clutches, V V, controlled by suitable manipulating-levers, V′ V′.

In order to properly sustain the sheave-carrying cap C, I prop the forward-projecting portion of said cap by means of diagonal braces D D, extended from the collar *b* to the cap C. The collar *b*, turn-table T, boom B, cap C, and its braces D D all rotate about the stationary post P, and receive their motion in the usual manner by chains *r r*, attached to and extended

around the periphery of the turn-table T, and wound in opposite directions around a drum, W, which is mounted loosely on a horizontal shaft, K, journaled in suitable bearings fixed to the platform A back of the driving-shaft U. By means of a clutch, *s*, connected to the shaft K, and adapted to be thrown into and out of connection with the drum W, the latter can be set in motion when desired, the rotation of said drum unwinding one chain *r* while winding up the other chain, and thereby imparting rotation to the turn-table T, which, by its connection with the collar *b*, carries with it the said collar and parts supported thereon, as before described.

F represents the post or prop of a jack by which to raise the platform A and give it the necessary support when the crane is in operation, said post being connected with the bed-piece I by a ball-and-socket joint, *k*, so as to allow said bed-piece to conform to the unevenness of the ground without straining the post.

In order to obtain a perfect hold between the post and bed-piece, so as to allow the former to raise the latter, I make the socket reach above the horizontal diameter of the ball and embrace the greater portion thereof, the socket being made in two parts, countersunk in the adjacent sides of two timbers, which receive the ball between them, and are firmly bolted together, as illustrated in Fig. 5 of the drawings, four of such jacks (one at each corner of the platform) being generally applied to the frame A. In order to operate said jacks by the same power which operates the crane, I construct the jacks in the following manner, and employ in connection therewith the following instrumentalities:

To each corner of the frame A, I attach a stout iron shoe, E, vertically through which is extended a prop or post, F, which is adapted to slide longitudinally or vertically therein. That side of the prop F which faces toward the opposite end of the frame A, I provide with a ratchet, *e*, and in an opening in the side of the shoe E slides a dog, *f*, adapted to engage the ratchet *e*, and thus arrest the upward movement of the prop.

The dog *f* is provided with a lug which protrudes through the side of the shoe, and with the outer end of said lug is connected one of the arms of a cranked lever, *n*, pivoted to the cross-beam of the frame A, to which the shoe E is attached, as illustrated in Figs. 3 and 4 of the drawings. To another arm of the lever *n* is connected a rod, *o'*, which passes through a guide-block, *u'*, and has its opposite end connected with another rod, *o*, which is extended toward the opposite end of the frame or platform A, where it is connected with the rod *o'*, which is arranged in relation to the jack at that end of the platform in the same manner as the first-described rod, *o'*, is arranged in relation to the jack at the opposite end of the platform.

The connection between the rods *o* and *o'* is made so as to afford a certain amount of slack or longitudinal play between the engaging parts and allow the rod *o*, when moved in either direction, to draw on one rod, *o'*, without disturbing the other. This connection of said rods is represented in Fig. 1 of the drawings in the form of a longitudinal slot, *t*, near the end of the rod *o*, the end of the rod *o'* sliding through an aperture in the solid portion of the end of the rod *o*, and being provided with a head in the slot *t*, by means of which head said rods receive the necessary hold on each other, the slot *t* being of the requisite length to afford the longitudinal play aforesaid.

Between the guide-block *u'* and cranked lever *n* the rod *o'* is provided with a fixed collar or shoulder, *u*, and between this shoulder and the block *u'* a spiral spring, *p*, surrounds the rod *o'* and exerts an expansive force against the shoulder *u*, and thereby pushes the rod *o'* toward the cranked lever *n*. The latter is thus caused to normally hold the dog in engagement with the ratchet *e* of the jacking-post F.

By means of a lever, *v*, fulcrumed on the platform A and connected with the rod *o*, the latter can be shifted in either direction to draw the dog *f* out of its engagement with the ratchet of the jacking-post at either end of the frame or platform A.

The jacks are operated by the following instrumentalities. The post F is provided with a rack, *r*, on the side facing the platform A, and with this rack engages a pinion, *g*, situated in a cavity in the shoe E and fixed to a short axle, g^2, which projects through the side of said shoe facing the jack at the opposite end of the platform, and has fixed to its outer end a gear-wheel, *g'*, as best seen in Figs. 4 and 6 of the drawings. Along the side of the platform A is extended a line-shaft, G, which is divided intermediately of its length, and has the two adjacent ends journaled in a supporting-arm, *w*, which is firmly attached to the frame A and projects outward therefrom, as shown in Fig. 6 of the drawings. The opposite ends of the line-shaft are journaled in boxes *w'* on the shoe E, before described. (See Fig. 4 of the drawings.)

The two extremities of the line-shaft G have attached to them a pinion, *h*, which meshes in the gear *g'*. On the adjacent ends of the respective sections of the shaft G are loosely mounted two miter-gears, *i i*, back of each of which is a sliding clutch, *l*, which is arranged to rotate with the shaft G, the two clutches being operated by a single bar, *l'*, reaching over the two gears *i i*, and being connected with a shifting-lever, l^2, which projects above the platform A, convenient for manipulation, said arrangement allowing only one of the clutches to be thrown into engagement with its respective gear *i* at a time. Between the two gears *i i* is a miter-pinion, *i'*, fixed to the end of a counter-shaft, G', which is extended across the under side of the platform A, and is provided at its opposite end with a similar pinion, *i'*,

for transmitting motion to the line-shaft on that side of the platform.

On the counter-shaft is fastened a sprocket-wheel, l^4, which, by an endless chain, m, is connected with a sprocket-wheel, l^3, attached to the boom-swinging shaft K, hereinafter described. At the side of the sprocket-wheel l^3 a clutch, m^2, slides on the shaft K, and is adapted to engage with said sprocket-wheel, and thus compel the same to rotate with the shaft K. This shaft receives its motion from the main driving-shaft by a train of gearing, 1, 2, 3, and 4, as shown in Fig. 2 of the drawings.

When it is desired to raise the platform A, the clutch m^2 is to be thrown into engagement with the sprocket-wheel l^3, the rotation of which transmits motion to the counter-shaft G′ by the medium of the chain m and sprocket-wheel l^4. Then by means of the lever l^2 one of the clutches l can be thrown into engagement with the adjacent miter-gear i, and thus cause its respective shaft-section G to revolve. The revolution of this shaft transmits motion to the gear g' by the medium of the pinion h on the extremity of said shaft, and with the gear g' revolves the pinion g, which engages the rack r of the jacking-post. When the platform has been raised to the desired elevation, the motion of the aforesaid train of gearing is stopped by releasing the wheel l^3 from the clutch m^2, or by throwing the clutch l off the gear i. The dog f, engaging the ratchet e of the post F, retains the platform in its elevated position.

When it is desired to lower the platform A, the dog can be thrown out of the ratchet e by means of the lever v, which is connected therewith in the manner hereinbefore described.

In order to utilize the crane-operating power for propelling the car on which the crane is mounted, and to obtain this propelling-power without the employment of additional shafting, I mount loosely on the counter-shaft G′ two sprocket-wheels, l', which are firmly united or formed in one piece, a sliding clutch, m^3, being connected to the shaft at one side of the sprocket-wheels, to lock the latter on the shaft and compel them to rotate therewith when desired. One of the axles L of each truck of the car has fixed to it a sprocket-wheel, l^2, and the two latter wheels are connected with the two wheels l' l' by endless drive-chains m', one of which is crossed, so as to drive the two truck-axles in the same direction.

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

1. The combination of the fixed post P, provided at its base with the groove a, the collar b, divided diametrically, and provided with a step for the foot of the boom, and with rabbets c c, and the turn-table T, seated and fixed on said rabbets, substantially as described and shown.

2. The combination, with a crane and its main supporting-frame, of jacks connected to opposite sides of the ends of said frame, line-shafts extended from jack to jack, mechanism for transmitting motion from said shafts to the jacks, and mechanism for transmitting motion from the motor of the crane to the line-shaft, substantially as set forth.

3. In combination with the main frame A and motor of the crane, the shoe E, fixed to said frame, the prop F, provided with the ratchet e and rack r, the dog f, the pinion g, and gearing g', connected to the shaft g^2, the line-shaft G, provided with the pinion h and with gear i, the counter-shaft G′, provided with pinions i', and mechanism for transmitting motion from the crane-motor to the said counter-shaft, substantially as set forth.

4. In combination with two jacks connected with the frame A, a line-shaft, G, arranged to actuate said jacks, and separated intermediately of its length, gears i i, mounted loosely on the adjacent ends of the shaft, shifting-clutches l, for fastening and releasing said gears on the shaft, and mechanism for transmitting motion from the crane-motor to the gears i i, all as described and shown.

5. In combination with the line-shaft G, arranged to actuate the jacking-props F, as described, the gears i, counter-shaft G′, provided with pinion i and sprocket-wheel l^4, the boom-swinging shaft K, provided with the sprocket-wheel l^3 and clutch m^2, and the chain m, all combined and operating substantially in the manner shown and set forth.

6. In a portable crane, the combination of the axle L, provided with the sprocket-wheel l^2, the counter-shaft G′, provided with sprocket-wheels l' and l^4 and with clutch m^3, drive-chain m', the shaft K, provided with sprocket-wheel l^3 and clutch m^2, and the driving-chain m, all substantially as shown and described, for the purpose set forth.

7. In combination with the posts F, applied to opposite ends of the platform A, and provided, respectively, with the ratchet e and the dog f, the cranked levers n n, the rods o', connected to the levers n and provided with the shoulder or collar u, the guide u', the spring p, interposed between said collar and guide, the rod o, connected at opposite ends with the respective rods o' o', with a slack or longitudinal play between the engaging parts of the connection, and a shifting-lever, v, connected with the rod o, all combined and operating substantially in the manner set forth and shown.

In testimony whereof I have hereunto signed my name and affixed my seal, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 7th day of March, 1883.

NATHAN J. CUYLE. [L. S.]

Witnesses:
C. H. DUELL,
F. H. GIBBS.