

No. 635,048.

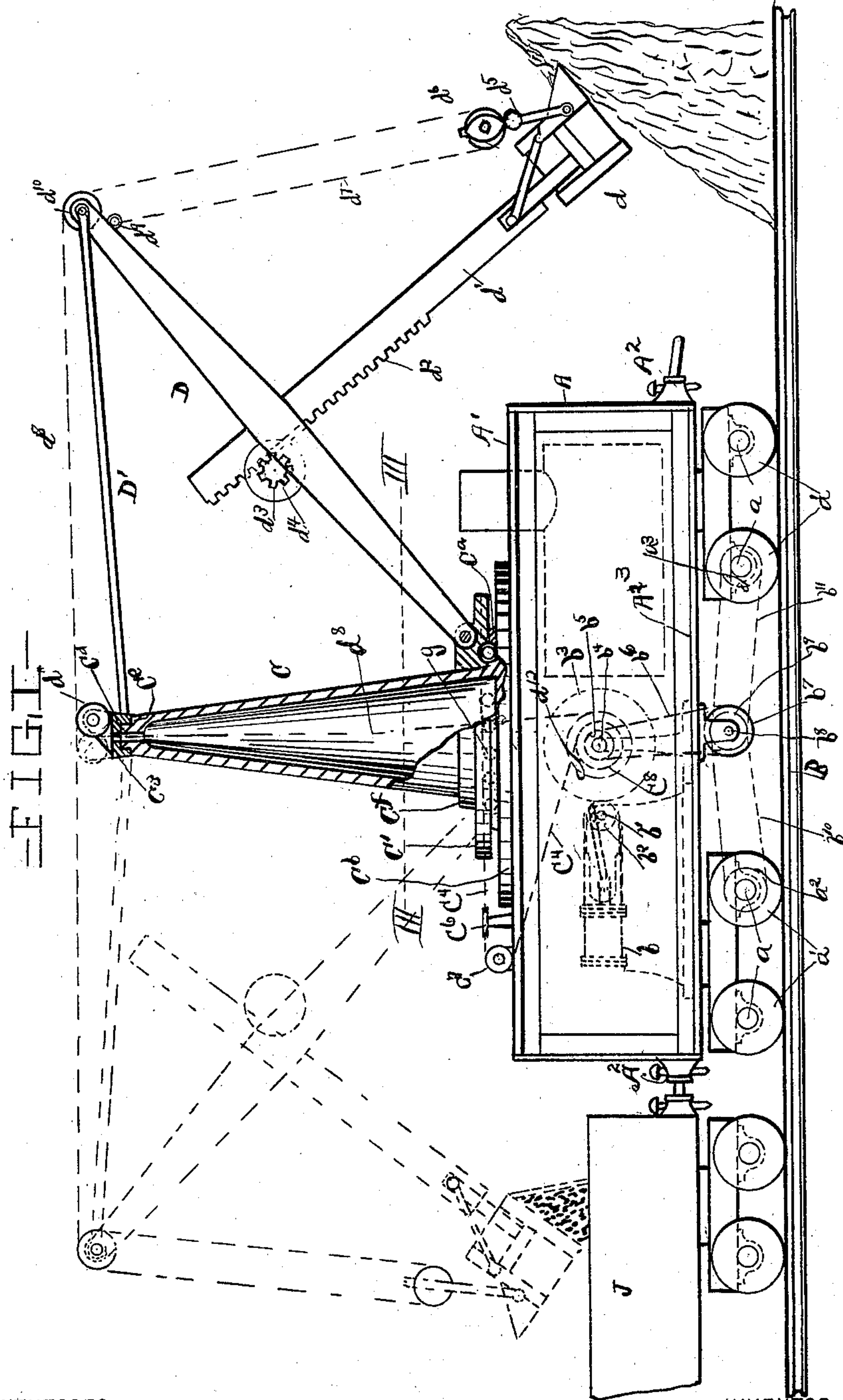
Patented Oct. 17, 1899.

G. W. KING.
DERRICK AND EXCAVATOR.

(Application filed Sept. 13, 1897.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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FIG. II

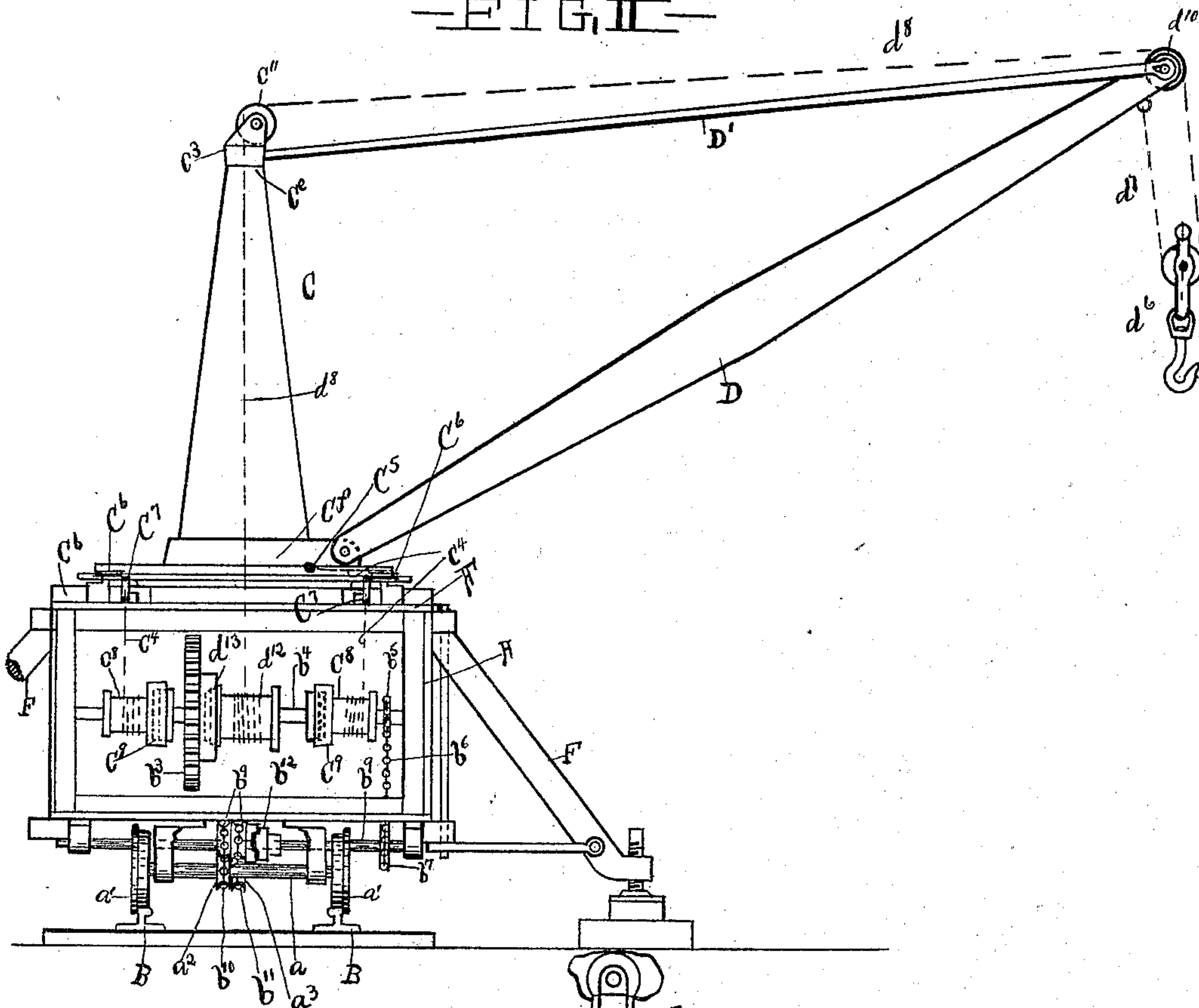
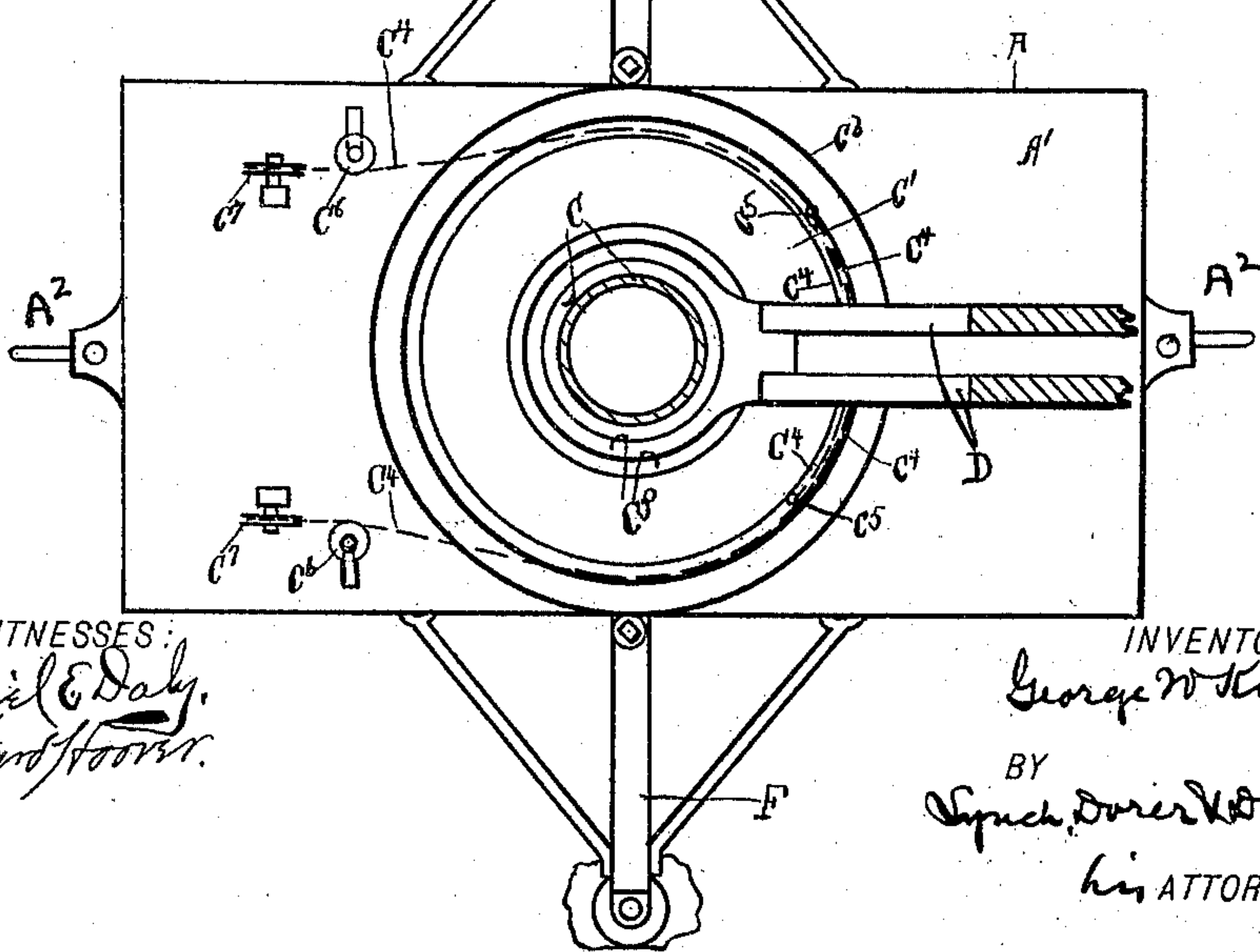


FIG. III



UNITED STATES PATENT OFFICE.

GEORGE W. KING, OF MARION, OHIO.

DERRICK AND EXCAVATOR.

SPECIFICATION forming part of Letters Patent No. 635,048, dated October 17, 1899.

Application filed September 13, 1897. Serial No. 651,431. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. KING, of Marion, in the county of Marion, State of Ohio, have invented certain new and useful
5 Improvements in Derricks and 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
10 the same.

My invention relates to a portable derrick or excavator, and particularly to a combined locomotive, excavator, portable derrick, and wrecking-car.

15 The object is to make a portable machine that will be found very useful in loading iron ore, coal, and other material from stock-piles into cars; that can be used as a locomotive as well as an excavator; that can be coupled
20 onto a car, haul the latter to the stock-pile, dip or shovel up the material at one end of it, and swing the dipper or shovel to its other end and there dump or deposit the material into the car and then haul the laden car to
25 the place desired; that can be readily converted into a derrick by removing the dipper or shovel, and that can also be used as a wrecking-car.

30 With this object in view, and to the end of making a strong and durable machine, my invention consists in certain features of construction and combinations of parts herein-after described, and pointed out in the claims.

In the accompanying drawings, Figure I is
35 a side elevation, partly in section, of a machine embodying my invention. Fig. II is an end elevation of portions of the machine and shows particularly the boom-actuating drums, the hoisting-drums, and the machine-propel-
40 ling mechanism. Fig. III is a top plan in section on line III III, Fig. I.

Referring to the drawings, A designates the car-body or body portion of the machine, which car-body is provided at the bottom with
45 wheeled axles a , whose two wheels a' are the distance apart required to enable the machine to run upon a standard-gage railway-track B. Car-body A is provided with a suitably-operated engine or motor b , and b' designates
50 the engine-shaft, that is operatively provided with a pinion b^2 , meshing with a spur-gear b^3 , that is fixed upon a shaft b^4 , supported within

and from and arranged horizontally and transversely of car-body A, centrally between the ends of the car and between the roof A' and
55 floor A^2 of the car. Upon one end of shaft b^4 is operatively mounted a sprocket-wheel b^5 , that is operatively connected by a chain b^6 with a sprocket-wheel b^7 , that is operatively
60 mounted upon a shaft b^8 , that is arranged horizontally and transversely above the car-body and supported from and below the car-floor A^2 . A double chain-pulley b^9 is loosely
65 mounted upon the central portion of shaft b^8 . A chain b^{10} operatively connects pulley b^9 with a chain-pulley a^2 , operatively mounted upon one of the axles below one end of the
70 car-body. A chain b^{11} operatively connects the said pulley b^9 with a chain-pulley a^3 , operatively mounted upon one of the axles below the other end of the car-body. A suit-
ably-operated clutch b^{12} of any approved construction is employed for establishing and in-
75 terrupting operative connection between pulley b^9 and shaft b^8 . The machine is propelled upon track B when the engine is in operation
by establishing operative connection between pulley b^9 and shaft b^8 , and is moved in the
80 one direction or the other, according as the engine-shaft is rotated in the one or the other direction. It is obvious, therefore, that the
machine thus far described forms a locomotive, and the car-body A is preferably pro-
85 vided at each end with an ordinary car-coupler A^2 , Fig. I, for facilitating the coupling of the said locomotive to cars.

Upon the top or roof A' of the car-body, centrally between the ends of the locomotive, is
90 suitably mounted a perpendicular mast C, that consists, preferably, of a hollow cast-steel column. An annular turn-table C' encircles the lower end of the mast-forming column
and extends over an annular horizontally-
95 arranged shoulder C^a , formed upon the base C^b of column C. The column is rigidly secured to the car-body, and antifriction devices—such, for instance, as balls g —are in-
terposed between the opposing surfaces of the
100 said base and the table. Column C gradually tapers toward its upper end and at said end is provided with a vertical bearing forming a hollow or vertically-perforated lug C^d . A collar C^3 is rotatably mounted upon the
said lug C^d and rests upon an annular shoul-

der C^c at the lower end of said lug or bearing. A boom D is supported from table C' and the collar C³. The table C' is preferably provided at the top with an annular flange C^f, that encircles the column C, and the boom that extends outwardly and upwardly from the table is suitably secured at its lower end to the said flange. The boom at its upper and outer end is connected by means of a rod D' with collar C³, and the said rod is secured to the collar and boom in any approved manner. Collar C³ and table C' have their axes coincident or in line vertically, and the said axes constitute the pivotal centers of the boom. The excavating-shovel *d* in Fig. I is supported from the boom in any well-known manner, and in the case illustrated said shovel has an arm *d'*, provided with a rack *d²*, arranged longitudinally of the arm and meshing with a pinion *d³*, that is operatively mounted upon a suitably-driven reversible shaft *d⁴*, mounted upon the boom, and it is obvious that the shovel is thrust in or out, according as the said shaft is rotated in the one or the other direction. The shovel *d* has a bail *d⁵*, that is attached to the block or strap of the hoisting-tackle *d⁶*, whose sheave engages the fall *d⁷* in the hoisting-cable *d⁸*, that is fixed at one end, as at *d⁹*, to the boom's outer end, thence leads downwardly to and in under the sheave of tackle *d⁶*, thence upwardly to and over a vertically-arranged sheave *d¹⁰*, supported from the boom's outer end, thence inwardly, over, and approximately parallel with rod D' to and over a vertically-arranged sheave *d¹¹*, supported from collar C³, and thence downwardly through hollow bearing C^d and through the column C into car A, and leads to and in under and operatively engages a winding-drum *d¹²*, called the "hoisting-drum," that is loosely and slidably mounted upon the central portion of the shaft *b⁴*, as shown in Fig. II. A friction-clutch *d¹³* (see Fig. II) is employed for establishing and interrupting operative connection between drum *d¹²* and shaft *b⁴*. One member of this clutch is formed upon the gear *b³* and the companion clutch member is formed upon the drum. It is obvious, therefore, that the hoisting-cable is actuated in the direction required to lift the hoisting-tackle by rendering the clutch operative and that the said tackle will lower by gravity upon rendering the clutch inoperative and permitting paying out of the said cable.

The location of the boom upon the roof of the car and the running of the hoisting-cable over a sheave located at the apex of the boom-carrying column or mast, it will be observed, accommodate a comparatively long stretch of chain between the said sheave and the drum, which stretch enables the twisting of the said cable a full turn without injuring the cable. Means for revolving or turning the mast and thereby enabling the boom to be swung to any point within a complete circle is provided and comprises, preferably,

two chains or cables C⁴ C⁴, fixed at C⁵ to the outer peripheral surface of table C'. One cable C⁴ leads along the said peripheral surface of the table in the one direction and the other cable C⁴ leads along the said surface in the opposite direction. Each cable C⁴ leads to and from the table C' to and over a horizontally-arranged guide-sheave C⁶, supported from the roof of car A near table C'. The two sheaves C⁶ C⁶ are located, preferably, a suitable distance apart at the same side of table C'. Each cable C⁴ leads from the engaging sheave C⁶ to and over a vertically-arranged guide-sheave C⁷, supported from the said car-roof, and thence downwardly to and in under and operatively engages a winding-drum C⁸, loosely mounted upon shaft *b⁴*, and a friction-clutch C⁹ for establishing and interrupting operative connection between the drum and the shaft is provided. One of the clutch members is rigid with the drum, and consequently loose upon the shaft, and the companion clutch member is fixed to the shaft. The two drums C⁸, called the "swinging" drums, are arranged at opposite ends, respectively, of and a suitable distance from the hoisting-drum *d¹²*, and it is obvious that upon rendering the clutch for either of said drums C⁸ operative, while the clutch for the other drum C⁸ is inoperative, the boom will be swung laterally and rearwardly in one direction and that the boom is swung in the one or the other direction, according as the one or the other swinging drum is operatively connected with the shaft. Each cable C⁴ is fixed to table C' preferably at a point diametrically opposite or approximately diametrically opposite the engaging sheave C⁶.

In my improved machine hereinbefore described it will be observed that the boom's sweep extends completely around the boom's axis and the boom can be swung into any position radially of a circle whose axis is coincident with the boom's axis, and consequently the hoisting-tackle can take up and deposit a load at any side of the boom's axis, and the boom-swinging machinery and hoisting machinery and propelling machinery are carried directly by the car-body, that is made sufficiently strong for the purpose and has sufficient weight and strength to afford a substantial support for the derrick or boom-carrying mast. The heavy machinery is therefore not carried by the boom, and consequently does not have to be moved with the boom, and is located out of the way of the boom's sweep. The machine's body portion is preferably braced externally at the sides and at opposite sides of the elevated column by jacks or braces F, as shown in Figs. II and III.

My improved machine will be found useful not only in excavating, but in loading and transferring coal, ore, and other material at stock-piles and docks and at industrial plants engaged in the manufacture of iron and steel.

In the case illustrated in Fig. I the ma-

chine is coupled to a car J, that is upon track B. In solid lines, Fig. I, the machine is shown taking up a load at one end of the car and in dotted lines is shown depositing a load into the said car J. In Fig. II the boom is swung into a position at right angles to the car-body A of the machine.

What I claim is—

1. A machine of the character indicated, comprising a car or body portion; a mast rigidly secured upon the body portion; a boom revolubly supported at the upper and lower ends of the said mast and having a sweep extending completely around the mast and provided with hoisting-tackle; the boom-swinging drums and the hoisting-drum supported from the body portion independently of the boom and operatively connected with the boom and the hoisting-tackle, respectively, and the drum-operating machinery, and the said machinery and drums being arranged out of the way of the boom's sweep, substantially as and for the purpose set forth.

2. A machine of the character indicated, comprising a car or body portion; a mast rigid with the body portion; a boom revolubly supported at the upper and lower ends of the said mast and provided with hoisting-tackle and boom-swinging apparatus and hoisting apparatus supported from the body portion below the mast and independently of the boom, and operatively connected with the boom and the hoisting-tackle, respectively, substantially as and for the purpose set forth.

3. A machine of the character indicated, comprising a portable car-body containing boom-swinging apparatus, and bearing a rigid mast above said apparatus, and a boom revolubly supported at the upper and lower ends of the mast and operatively connected with the said apparatus, substantially as and for the purpose set forth.

4. A machine of the character indicated, a car or body portion, a boom revolubly supported upon said body portion and provided with hoisting-tackle; a suitably-operated shaft supported from the body portion below and independently of the boom; the hoisting-drum loose upon said shaft and operatively connected with the hoisting-tackle; the boom-swinging drums loose upon the same shaft and operatively connected with the boom, and a clutch for each drum for establishing and interrupting operative connection between the drum and shaft, substantially as and for the purpose set forth.

5. A machine of the character indicated, comprising a wheeled car or body portion; a laterally-swinging boom supported from and

above the body portion, and provided with hoisting-tackle; a suitably-operated shaft arranged within and transversely of and supported from the body portion; the hoisting-drum loose upon the said shaft and operatively connected with the hoisting-tackle; the boom-swinging drums loose upon the same shaft and operatively connected with the boom; a clutch for each of the said drums for establishing and interrupting operative connection between the respective drum and the shaft, and propelling apparatus operatively connected with wheels of the body portion and including a clutch for rendering the said propelling apparatus operative or inoperative as required, substantially as set forth.

6. A machine of the character indicated, comprising a wheeled car or body portion; a laterally-swinging boom supported from and above the body portion, and provided with hoisting-tackle; a suitably-operated shaft arranged within and transversely of and supported from the body portion; the hoisting-drum loose upon the said shaft and operatively connected with the hoisting-tackle; the boom-swinging drums loose upon the same shaft and operatively connected with the boom; the clutches for the said drums; another shaft arranged below and transversely of and supported from the body portion and operatively connected with the first-mentioned shaft; a pulley loosely mounted upon the lower shaft and operatively connected with wheels of the body portion, and the clutch for the said pulley, substantially as set forth.

7. A machine of the character indicated, comprising a car or body portion; a mast rigidly secured upon and centrally between the ends of the body portion; a boom revolubly supported at the upper and lower ends of the mast and having a sweep extending from one to the other end of the body portion, and provided with hoisting-tackle; the boom-swinging drum and the hoisting-drum supported from the body portion independently of the boom and operatively connected with the boom and hoisting-tackle, respectively, and the said machinery and the aforesaid drums being arranged out of the way of the boom's sweep, substantially as and for the purpose set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 8th day of July, 1897.

GEORGE W. KING.

Witnesses:

SYDNIE C. BOWEN,
J. F. DOMBAUGH.