

No. 640,865.

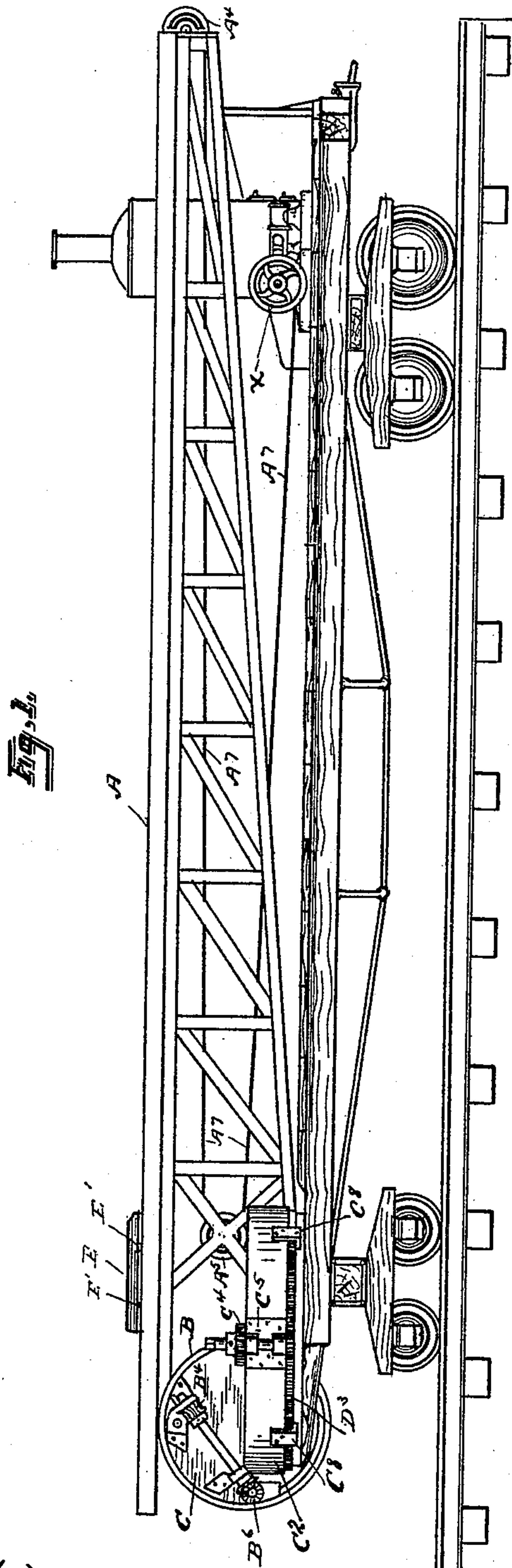
Patented Jan. 9, 1900.

J. W. BLUNDON.
PILE DRIVER.

(Application filed Apr. 5, 1899.)

(No Model.)

5 Sheets—Sheet 1.



WITNESSES:

Jno. B. Robbins,
W. H. Harms.

INVENTOR.

Joseph W. Blundon

BY

E. J. M. Madsen & Co.

ATTORNEYS.

No. 640,865.

Patented Jan. 9, 1900.

J. W. BLUNDON.

PILE DRIVER.

(Application filed Apr. 5, 1899.)

(No Model.)

5 Sheets—Sheet 2

Fig. 7.

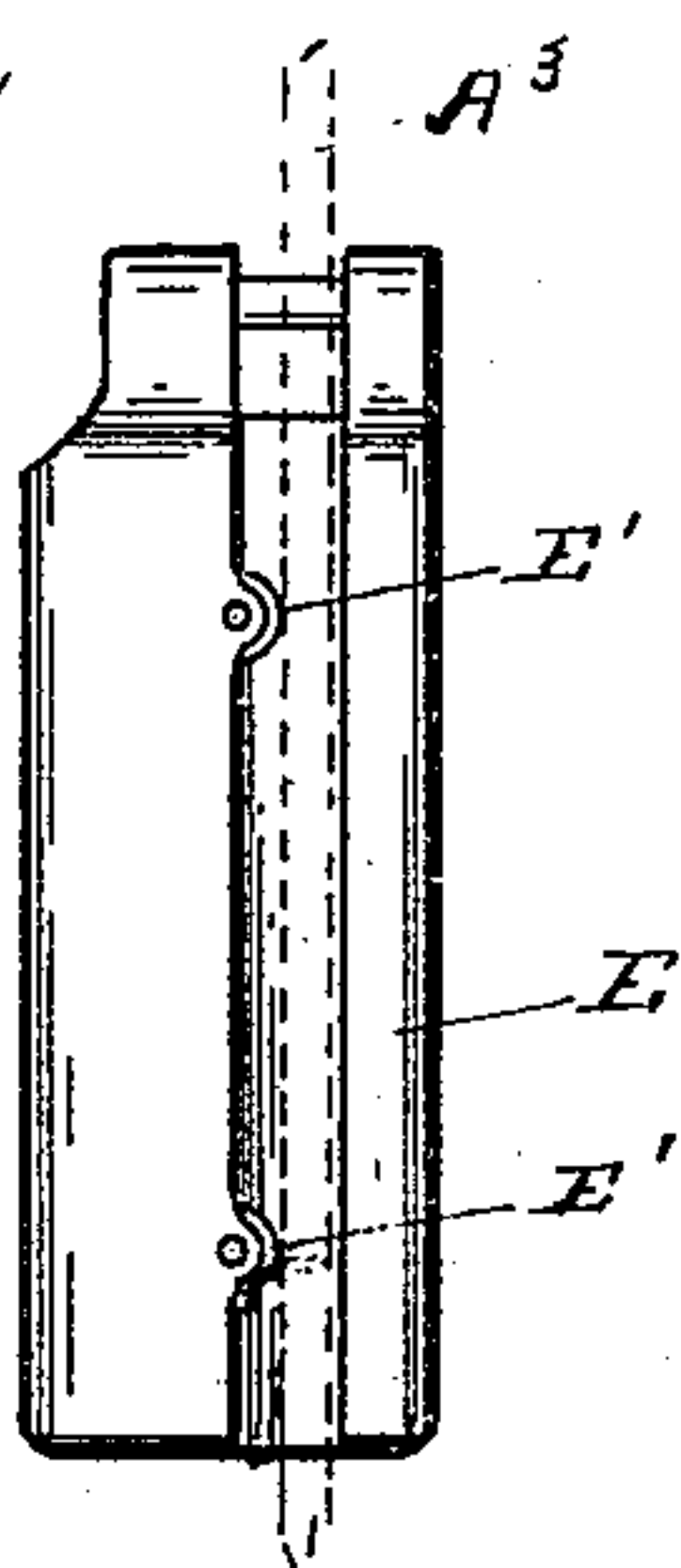


Fig. 8.

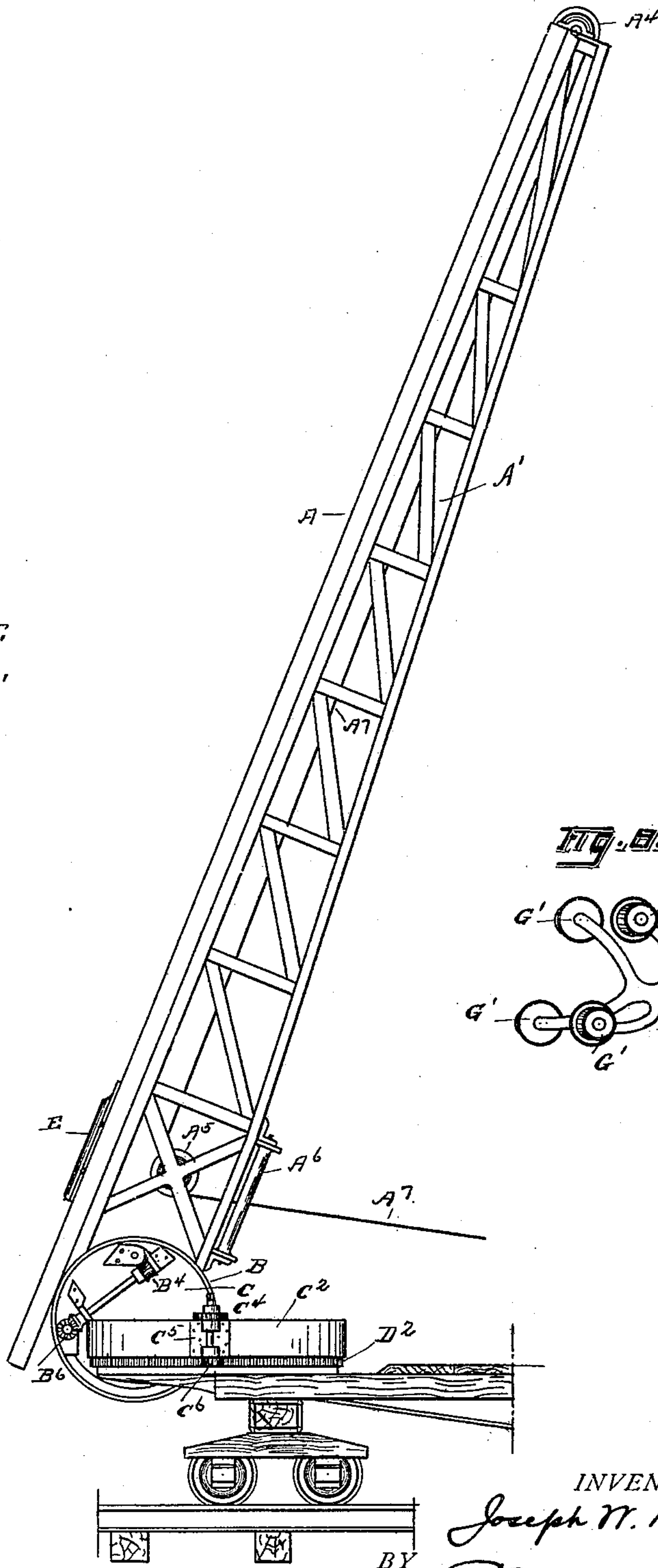
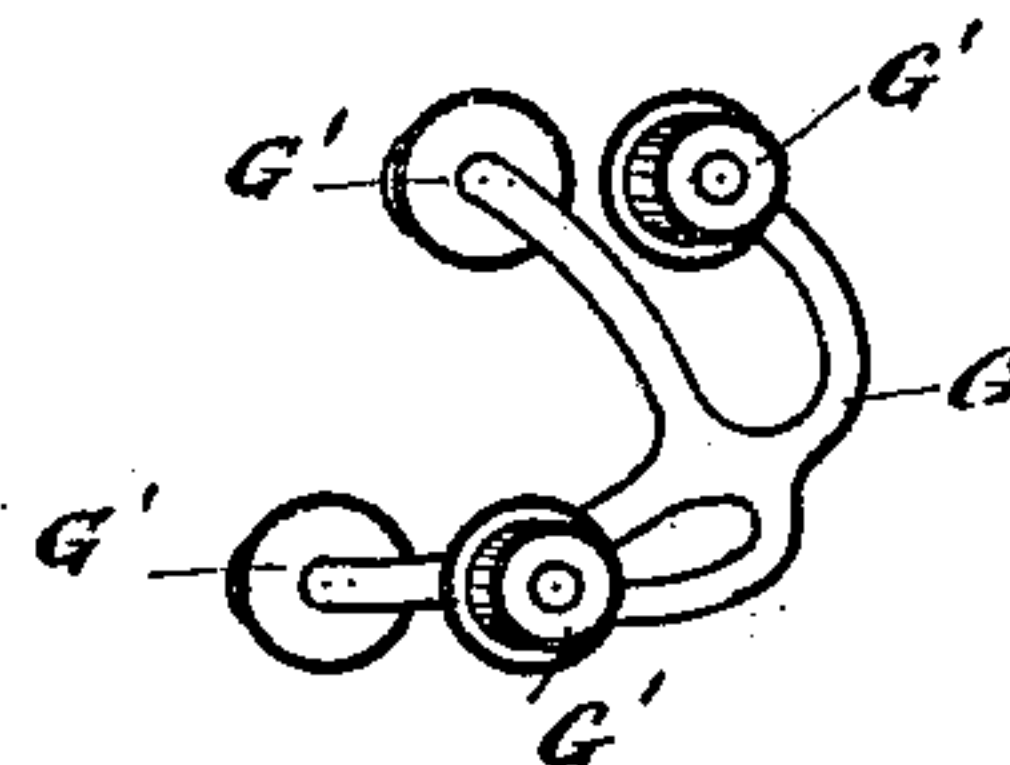


Fig. 9.



WITNESSES:

Jno. S. Robbins,
M. H. Harmon.

INVENTOR.

Joseph W. Blundon

E. A. M. M. & Co.

ATTORNEYS

No. 640,865.

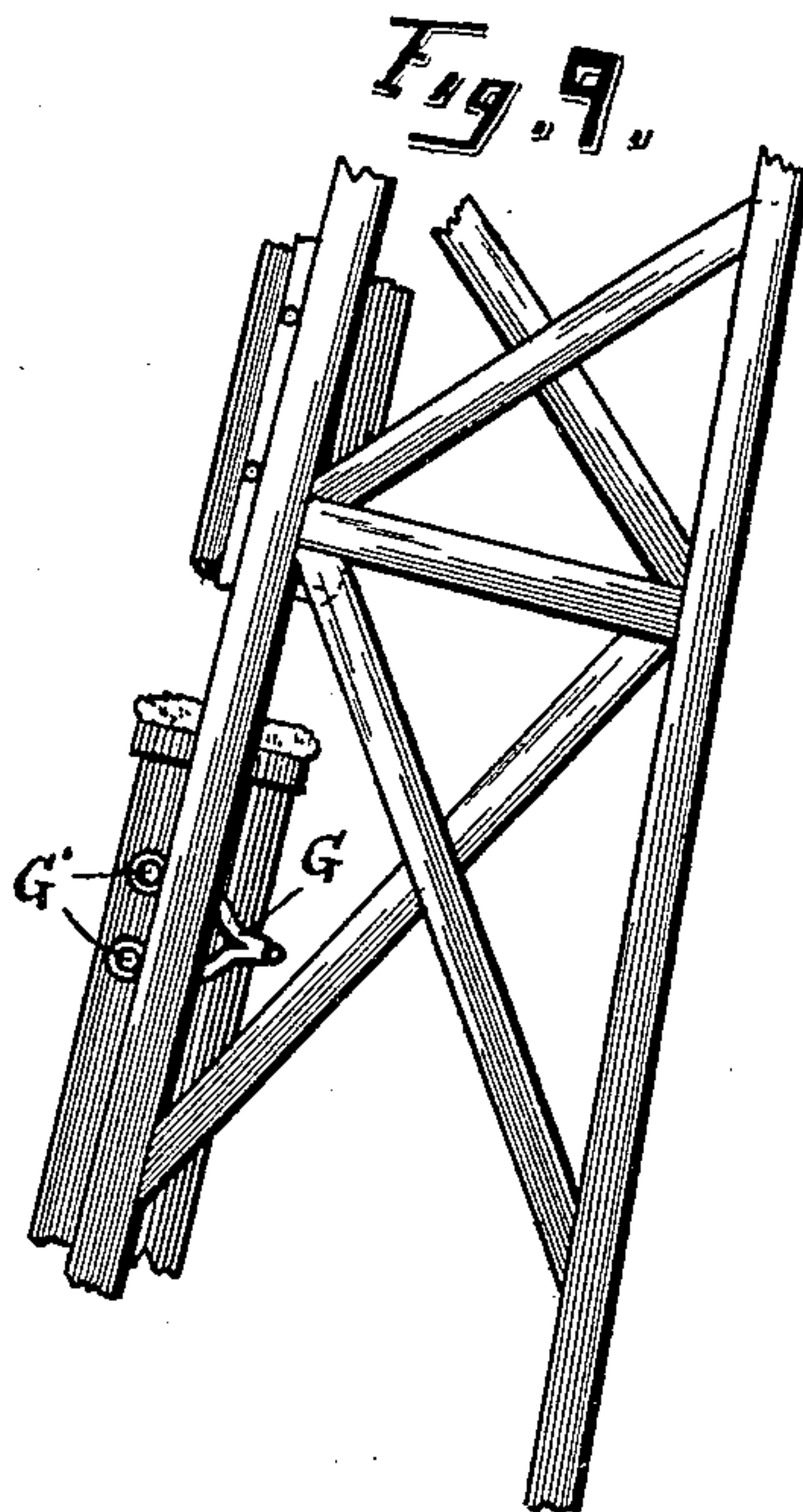
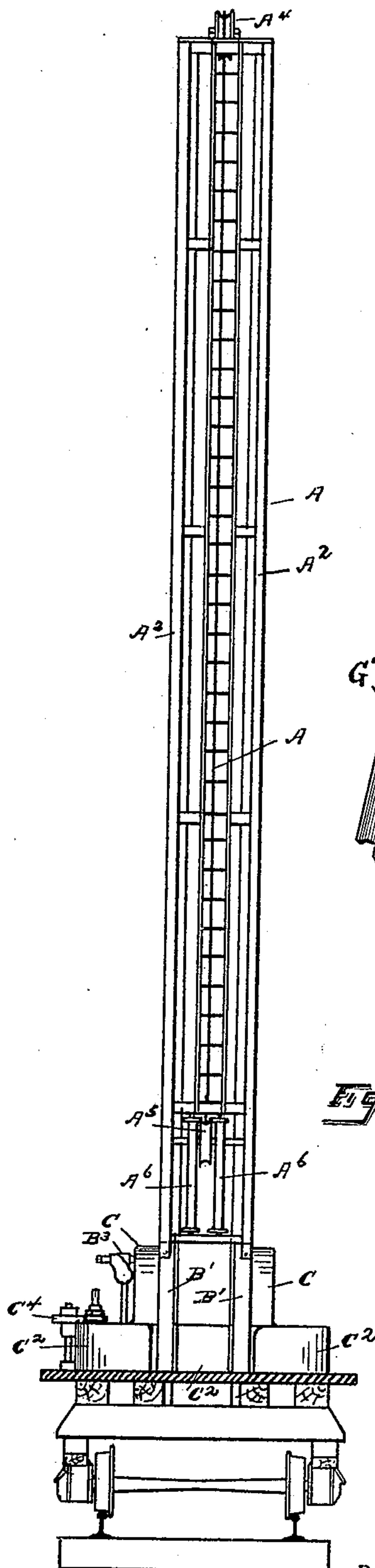
Patented Jan. 9, 1900.

J. W. BLUNDON.
PILE DRIVER.

(Application filed Apr. 5, 1899.)

(No Model.)

5 Sheets—Sheet 3.



WITNESSES:

Geo. L. Robbins,
M. H. Harris

INVENTOR.

Joseph W. Blundon
BY *E. M. Madsen & Co.*
ATTORNEYS.

No. 640,865.

Patented Jan. 9, 1900.

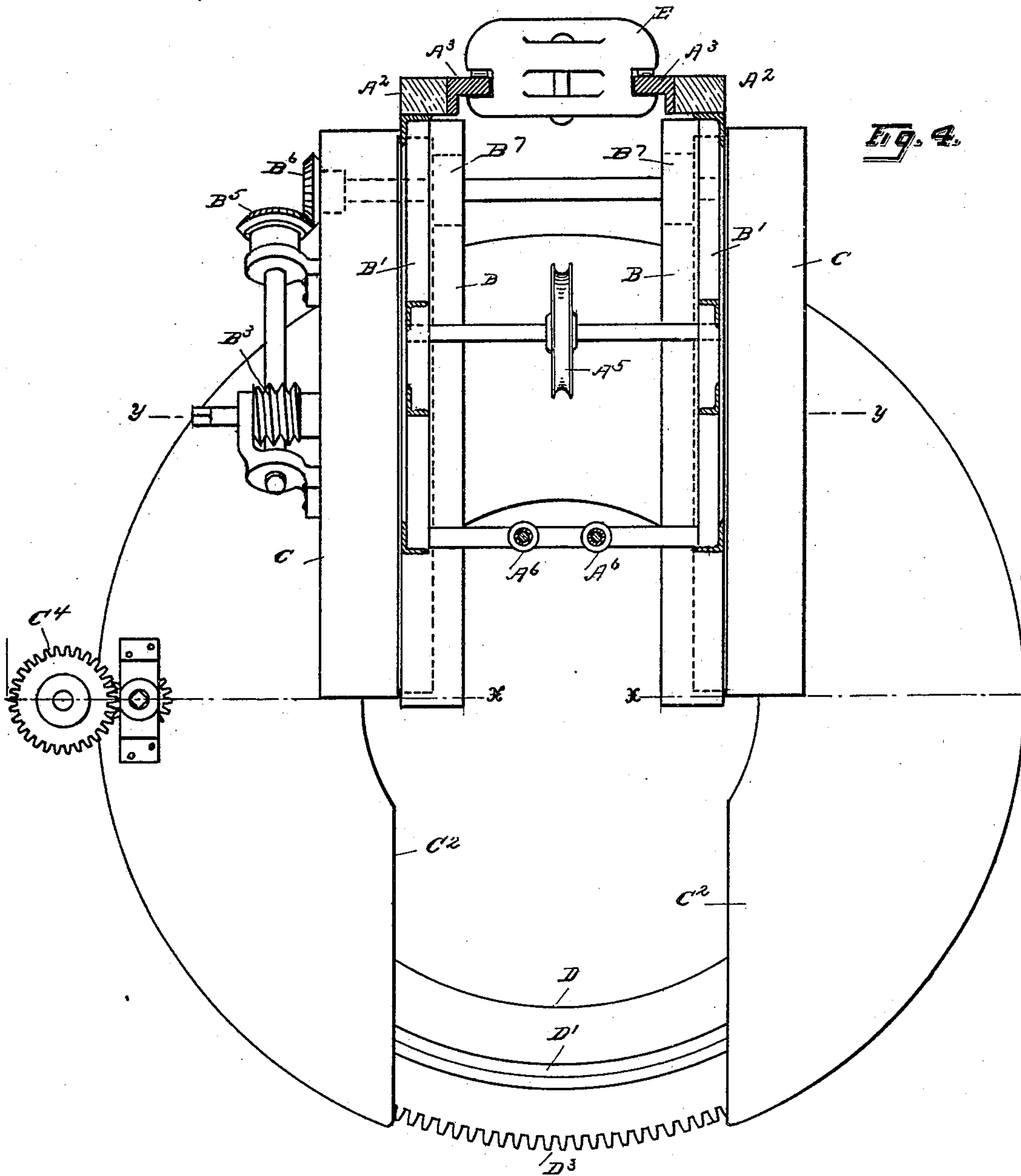
J. W. BLUNDON.

PILE DRIVER.

(Application filed Apr. 5, 1899.)

(No Model.)

5 Sheets—Sheet 4.



WITNESSES:

Geo. S. Robbins,
W. N. Harms.

INVENTOR.

Joseph W. Blundon
BY
Edmunds & Co.
ATTORNEYS

No. 640,865.

Patented Jan. 9, 1900.

J. W. BLUNDON.

PILE DRIVER.

(Application filed Apr. 5, 1899.)

(No Model.)

5 Sheets—Sheet 5.

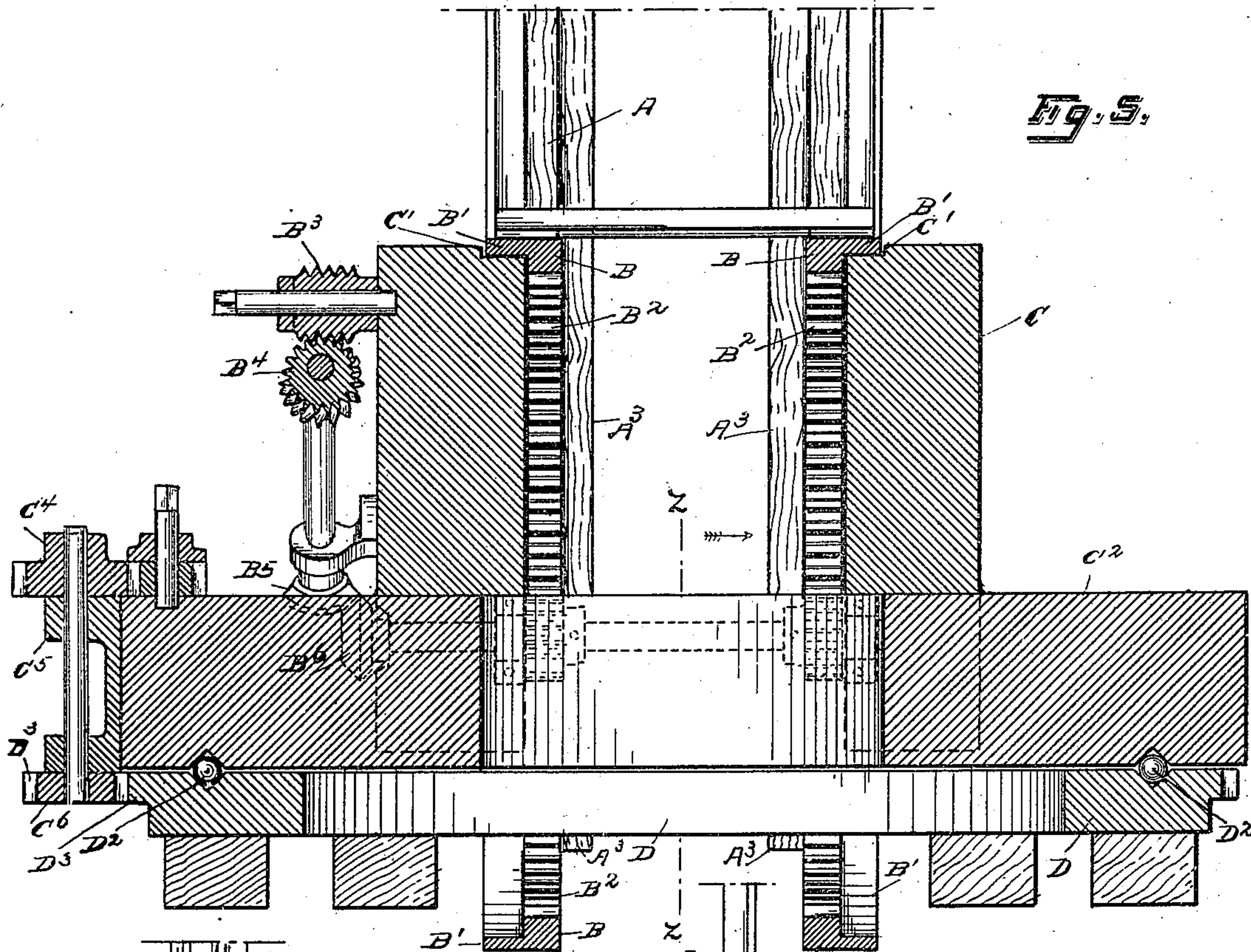


Fig. 5.

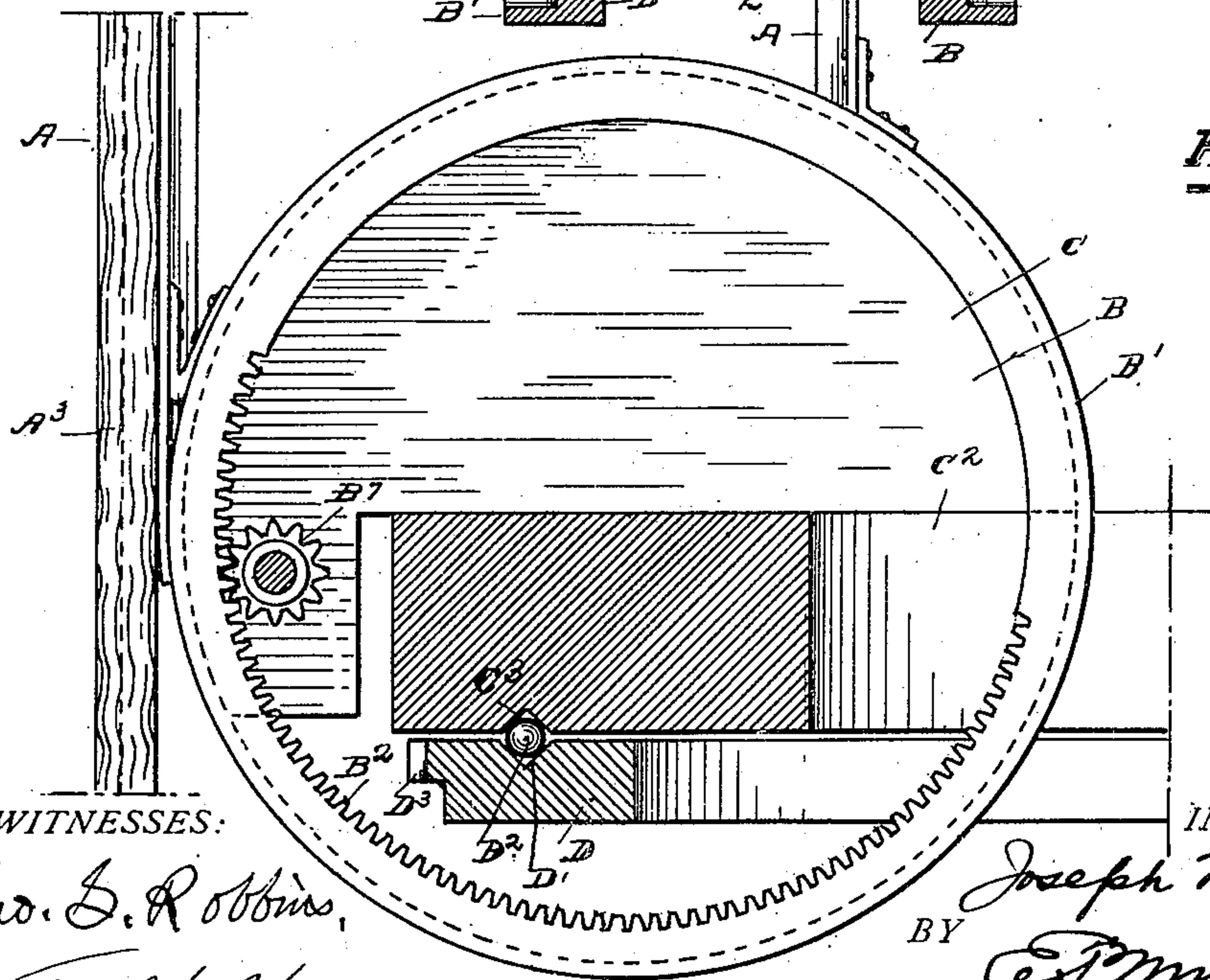


Fig. 6.

WITNESSES:

Geo. S. Robbins,
M. W. Harms.

INVENTOR.

Joseph W. Blundon
BY E. J. Mordock & Co.
ATTORNEYS

UNITED STATES PATENT OFFICE.

JOSEPH W. BLUNDON, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO JOHN R. SHOCK, JOHN S. COPLY, AND CHARLES E. KIMBALL, OF SAME PLACE.

PILE-DRIVER.

SPECIFICATION forming part of Letters Patent No. 640,865, dated January 9, 1900.

Application filed April 5, 1899. Serial No. 711,779. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH W. BLUNDON, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Pile-Drivers; and I do hereby declare the following to be a full, clear, and exact description of said invention, such as will enable others skilled in the art to which it most nearly appertains to make, use, and practice the same.

This invention relates to improvements in pile-drivers.

In the drawings, Figure 1 is a side elevation of a pile-driver constructed in accordance with this invention and mounted upon a railroad-car. Fig. 2 is a side elevation of the pile-driver lifted to an inclined position, showing in connection therewith the forward end of a car. Fig. 3 is a front elevation of the pile-driver as shown in Fig. 2, the view being taken from the rear, or from the rear of the car. Fig. 4 is a detail view in plan of the turn-table and pivotal mountings of the pile-driver, showing in section the framework of the hammer-frame and in full lines the top of the hammer. Fig. 5 is a vertical section of the detail as shown in Fig. 4, being the sections Y Y and X X combined. Fig. 6 is a detail view, partly in side elevation, of the pivotal bearings of the hammer-frame and a section of the turn-table, taken on the lines Z Z in Fig. 5. Fig. 7 is a detail view, in side elevation, of the hammer. Fig. 8 is a detail view in perspective of the pile-head truck sometimes used in connection with this invention. Fig. 9 is a detail illustrating the pile-head truck applied to a pile.

This invention has for its objects to provide a pile-driver which will control the direction at which a pile is driven as the same is inclined from the vertical; further, to provide a pile-driver which will operate about a segment of a circle drawn around the end of a car-body; further, to provide a simple and effective construction whereby the equilibrium of the machine may be obtained in all angles of operation, and, further, to provide a simple and effective mechanism by means of which the angle of operation of the pile-

driver may be changed and also the location of the point of operation about a given center.

The invention consists in providing upon the end of a car-body a turn-table suitably mounted upon stationary tracks on the said car-body to overhang the one end and adjacent sides of the car and provided with suitable standards to form the bearing for the hammer-frame to swing upon.

It further consists in providing the turn-table with suitable weights or detention devices by means of which it is caused to counterbalance the weight of the hammer-frame in its various positions.

It further consists in providing a pivotal bearing for the hammer-frame and a raising and lowering mechanism in connection therewith, whereby the angle of operation of the hammer-frame is changed at will.

It further consists in providing the hammer with antifriction devices upon which it is run while operating in an inclined position of the hammer-frame, and it further consists in the construction and employment of a pile-head carrier or truck by means of which the head of the pile is maintained in the line of the angle of operation.

To facilitate the description of the invention with reference to the drawings, we will use the letter A to designate the hammer-frame. This may of any suitable construction, that shown in the drawings being preferred. This consists in the two side frames or trusses A', carrying on the front stringers A² rails or guides A³, over which the guide flanges on the hammer rest. At the upper and lower ends of the hammer-frame it is provided in any suitable manner with the idler-pulleys A⁴ A⁵. Set opposite the lower pulley A⁵, so as to form guides to the same, are mounted the friction-rollers A⁶ A⁶, between which the lifting-line passes to the pulley from the hoisting-engine. At the lower end the hammer-frame is provided with or secured rigidly upon two twin rings B B, which are provided with the outwardly-extended flanges B' B' and internal cog-teeth B².

The outwardly-extending flanges B' B' rest over and upon suitable recesses or rabbets C', formed in the heavy standards C C. The

rings B B are controlled to move around the circular standards C C by means of a train of gears consisting of the worm B³, the worm-gear B⁴, the beveled gears B⁵ B⁶, and the cog-gears B⁷ B⁷, both of which are mounted upon the same shaft. By this means the motion which is transmitted to the cog-gears B⁷ B⁷ is exactly the same, and through the interposition of the train of gears the power required to move the rings B B and the hammer-frame is proportionately slight. The mounting of these various gears is contained within the circular standards C C and the turn-table C², which in the preferred form are made in an integral casting, the united weight of which is designed to be extreme, so as to counterbalance the overhanging weight of the hammer-frame and the hammer when in a raised position, and with this object in view the parts are made as large and solid as can be accomplished.

The standards C C are formed of a complete circle, in the outer edge of which is formed the recesses C' to receive the flanges of the rings B B and to constitute a guide therefor.

It will now be observed that with a construction formed as thus far described the hammer-frame A and the rings B B may be revolved about the standards C C to present the hammer-frame at any angle to the horizontal which is desired and at which pile-driving is practicable; also, it will permit the hammer-frame being set back to rest upon the body of the car, as shown in Fig. 1 of the drawings.

The turn-table C² is mounted upon a track D, which in the present instance consists of a round circular ring-plate having in the upper surface an annular V-shaped groove D'. A groove C³, corresponding in diameter and shape, is formed in the under side of the turn-table C². These grooves D' and C³ are provided to receive antifriction-balls D². For this construction, however, there may be substituted conical-shaped rollers, wheels, or a smooth track. The turn-table is rotated by means of the gear-wheel C⁴, which is mounted in the bracketed bearing C⁵, set on the side of the turn-table. This wheel is provided with suitable rotating devices, such as a crank-lever or any suitable gear. As it is rotated it transmits a rotary motion to a gear C⁶ of similar or less size than the gear C⁴. The turn-table is provided with stirrupped stops C³, which prevent the table being lifted off the track D by any uncalculated weight.

The gear C⁶ engages gear-teeth D³, formed in the outer edge of the plate D. The plate D being stationary, when the train of gears above enumerated are rotated the effect is upon the table C² to cause it to move slowly about its center. The grooves C³ and D' maintain it centrally located.

By means of the construction thus far described it will be observed that the hammer-frame A may be raised and lowered to any suitable angle of inclination to the horizon-

tal; also, that the table may be rotated upon its center to present the point of operation of the pile-driver at any point within the swing of the table when not obstructed by the frame of the car-body.

The hammer E is raised by means of a hoisting-line A⁷, which is trained over the idler-pulleys A⁴ A⁵ and extends to the hoisting-engine X, as before mentioned. The hammer E is provided with a longitudinal groove, both sides of which extend over the track or guide on the stringers A². In some instances and in the preferred form the groove is provided with antifriction-rollers E' E', which maintains the hammer in the most advantageous position with reference to its effectiveness. This mounting of the hammer upon rollers is particularly effective in a construction of the present design, where it is intended that the hammer will operate while the hammer-frame A is in an inclined position. With the ordinary guides and grooves there would be danger of jamming the hammer in the ways or of losing a portion of the effectiveness of the stroke by reason of friction.

The invention has been described as being applied to a car-body; but it will be understood that the construction may be adapted and used on a suitably-constructed barge for marine pile-driving; also, it may be used upon a stationary platform. The structure upon which it is carried forms no part of the present invention, only as the same is altered in its construction to adapt itself to the needs and requirements of the invention.

The advantages which may be attained by means of this construction are particularly shown when it is desired to drive piling at an inclination to the horizontal, which is often the case in constructing sea-walls, breakwaters, and the like. In the use of the invention in such positions I have designed and employ a pile-head truck G, which is shown in perspective at Fig. 8 of the drawings. This consists of a stirrupped construction mounted upon wheels G', which are adapted to rest upon the guides or rails set in the hammer-frame. This is secured to the head of the pile, and as the same is thrown off the balance and rests upon the hammer-frame the wheels of the carrier or truck hold the head of the pile in line with the point. As the pile-head is driven the truck runs with the head of the pile at every stroke of the hammer and in its full course until the end of the hammer-frame is reached, and the head of the pile is maintained throughout in its desired position.

When the hammer-frame is swung to either side of the perpendicular, it will be noticed that its tendency to tilt is exerted upon one extremity or the other of the turn-table C², but is compelled to use the edge to the side to which the weight is thrown as a fulcrum. This necessitates the lifting of the whole weight of the turn-table upon that edge.

In some instances where it is desired that

the turn-table should be made of a lighter construction I have supplemented the weight of the table by guying down the turn-table to a part of the structure already constructed.

5 These guys are attached to those parts of the turn-table in the line of movement of the throw or swing of the hammer-frame.

Having thus described this invention, it is claimed—

10 1. In a device of the nature indicated, a supporting structure, a standard having a curved guideway, a hammer-frame, and a bearing-ring secured upon said hammer-frame and engaging the curved guideway of the
15 standard, said ring being rotatable upon the standard; substantially as described.

2. In a device of the nature indicated, a supporting structure, a standard having a curved guideway, a hammer-frame, a bearing-ring secured upon said hammer-frame and engaging the curved guideway of the stand-
20 ard, said ring being provided with teeth on its periphery, and a suitably-mounted actuating-gear engaging said teeth; substantially
25 as described.

3. In a device of the nature indicated, a supporting structure, a standard having a curved guideway, a hammer-frame, and a bearing-ring secured upon said hammer-
30 frame, said ring having a flange engaging the curved guideway and being rotatable upon the standard; substantially as described.

4. In a device of the nature indicated, a supporting structure, a standard having a curved guideway, a hammer-frame, a bearing-ring secured upon said hammer-frame and en-
35 gaging the curved guideway of the standard, said ring being provided with teeth on its periphery, a shaft journaled in said standard, a gear upon said shaft engaging the said teeth
40 on the ring, a worm with means for rotating it journaled upon the standard, a shaft journaled upon the standard and having a worm-gear meshing with the said worm, and beveled
45 gears between said shafts; substantially as described.

5. In a pile-driver, in combination with a hammer-frame provided at the lower end with bearing-rings having gear-teeth formed in the
50 periphery thereof; a turn-table mounted upon a suitable track or ways, and adapted to be rotated upon the same about its center; standards mounted upon the said table and rigidly
secured thereto and adapted to receive and
55 become bearings for the said rings; a cog-wheel suitably mounted in the said standards or table to engage the gear-teeth formed in the said rings and provided with suitable rotating mechanism, substantially as described.
60 6. In a pile-driver, in combination with a

hammer-frame provided at the lower end with bearing-rings, having in the periphery thereof gear-teeth; a turn-table mounted upon a suitable track or ways to be rotated about its center; standards mounted upon and rigidly at-
65 tached to the said table to receive and form a guide for the said rings; a gear-toothed track, or segment stationarily mounted upon and secured to the said track structure; a train of gear-wheels and suitable connections adapted
70 to engage the gear-teeth in the said bearing-rings and adapted to rotate the same about the said standards; and a second train of gear-wheels and suitable connections mounted in the said turn-table and engaging the
75 said toothed track or segment mounted upon the track structure and adapted to turn the said turn-table about its center when the said train of gears is rotated, substantially as de-
80 scribed.

7. In a device of the nature indicated, a hammer-frame having guides thereon, said frame being adapted to lie in an inclined position, and a pile-head carrier consisting of a
85 suitable frame to receive the head of the pile and provided with members adapted to rest upon said guides and thus control the movement of the pile during the operation of driving; substantially as described.

8. In a device of the nature indicated, a hammer-frame having guides thereon, a hammer adapted to travel on said guides, said
90 frame being adapted to lie in an inclined position, and a pile-head carrier consisting of a suitable frame to receive the head of the pile and provided with members adapted to rest
95 upon said guides and thus control the movement of the pile during the operation of driving; substantially as described.

9. In a pile-driver, in combination with a hammer-frame having guides to control the
100 path of operation of the hammer, and having at the lower end pivotal bearings; a rotating mechanism adapted to swing the said frame about its pivotal bearings and main-
105 tain the same in an inclined position; a suitable lifting hammer mechanism adapted to raise and release a hammer; and a pile-head carrier consisting of a suitable frame to receive the head of a pile, and provided with
110 wheels adapted to rest upon the guides in the said hammer-frame, substantially as described, whereby the pile is guided throughout the operation of driving.

In testimony whereof I have hereunto set
115 my hand this 29th day of March, 1899.

JOSEPH W. BLUNDON.

Witnesses:

E. F. MURDOCK,
M. H. HARMS.