

APPLIOATION FILED JULY 23, 1908.

Patented Feb. 9, 1909.

2 SHEETS—SHEET 1.

Fig.1.

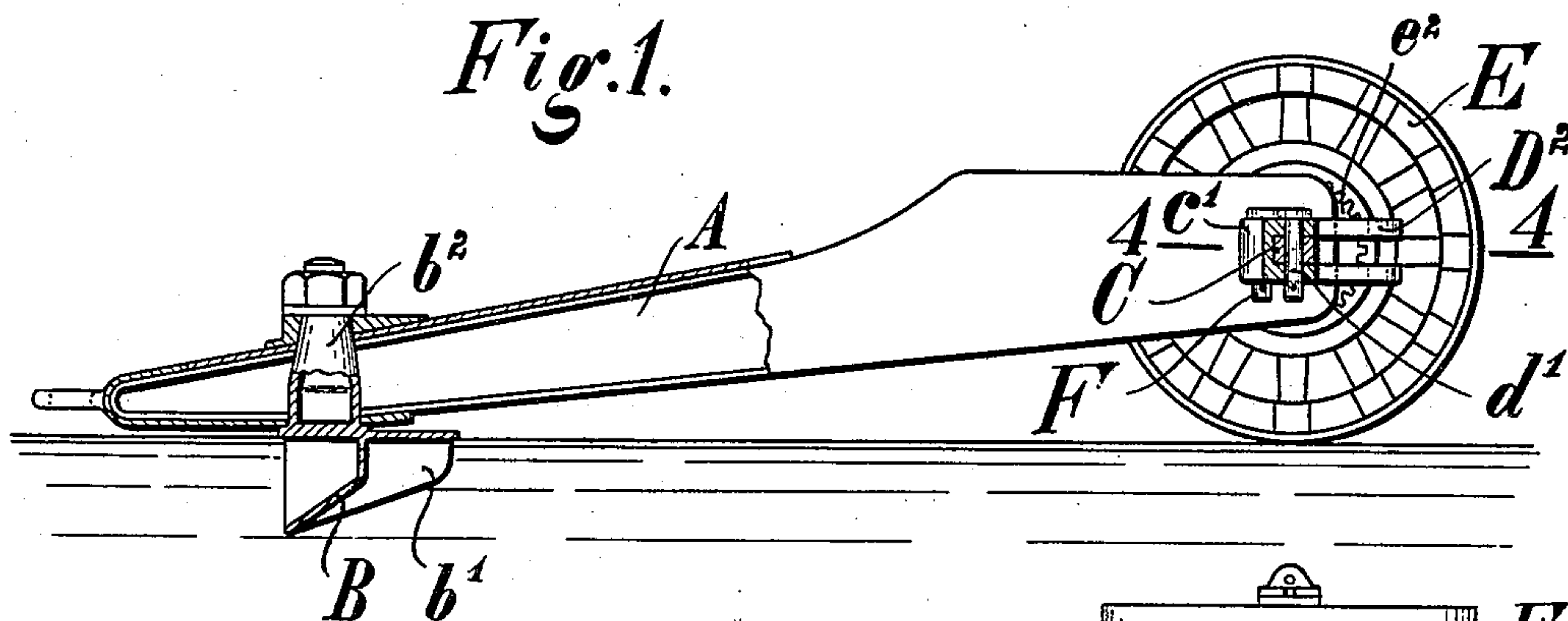


Fig. 2.

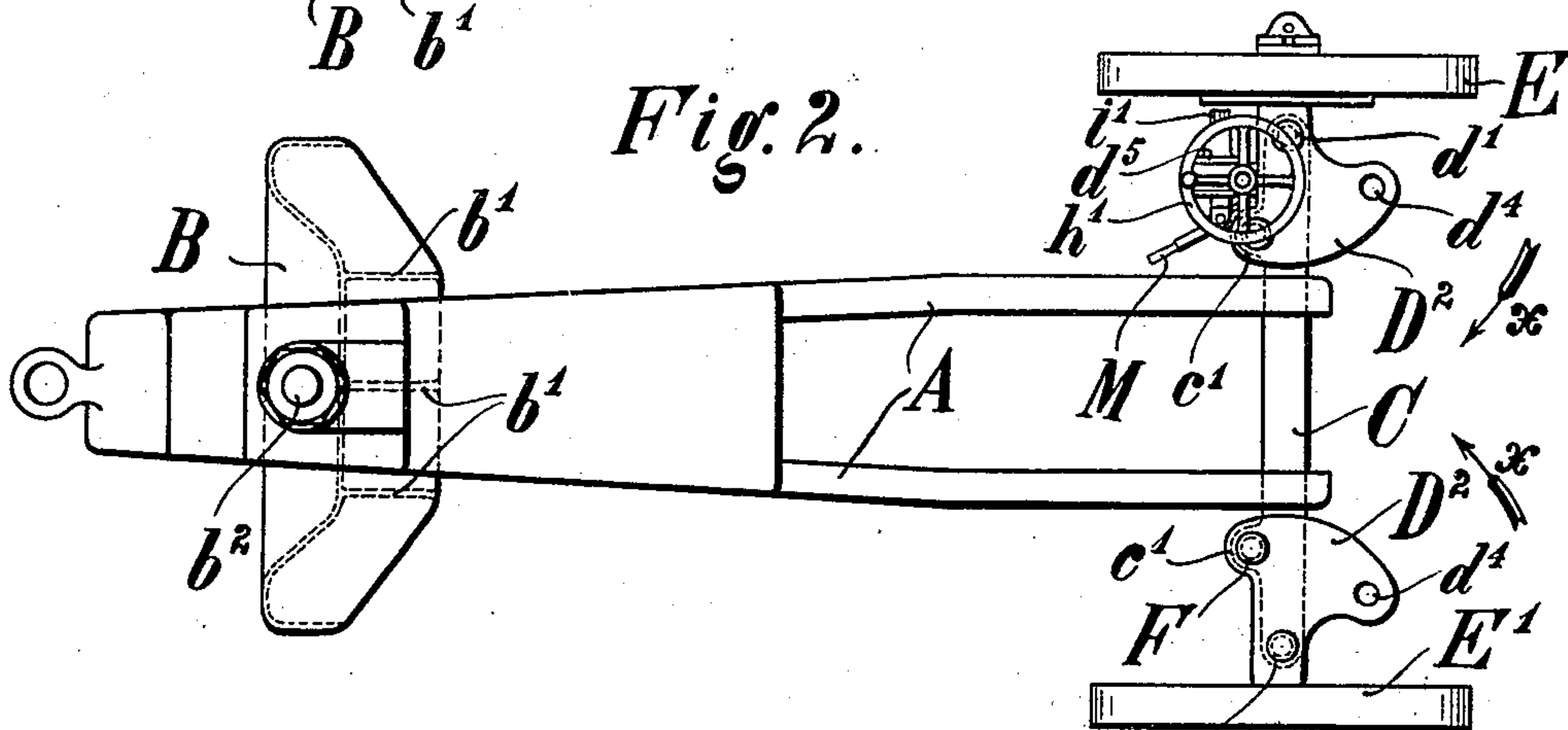
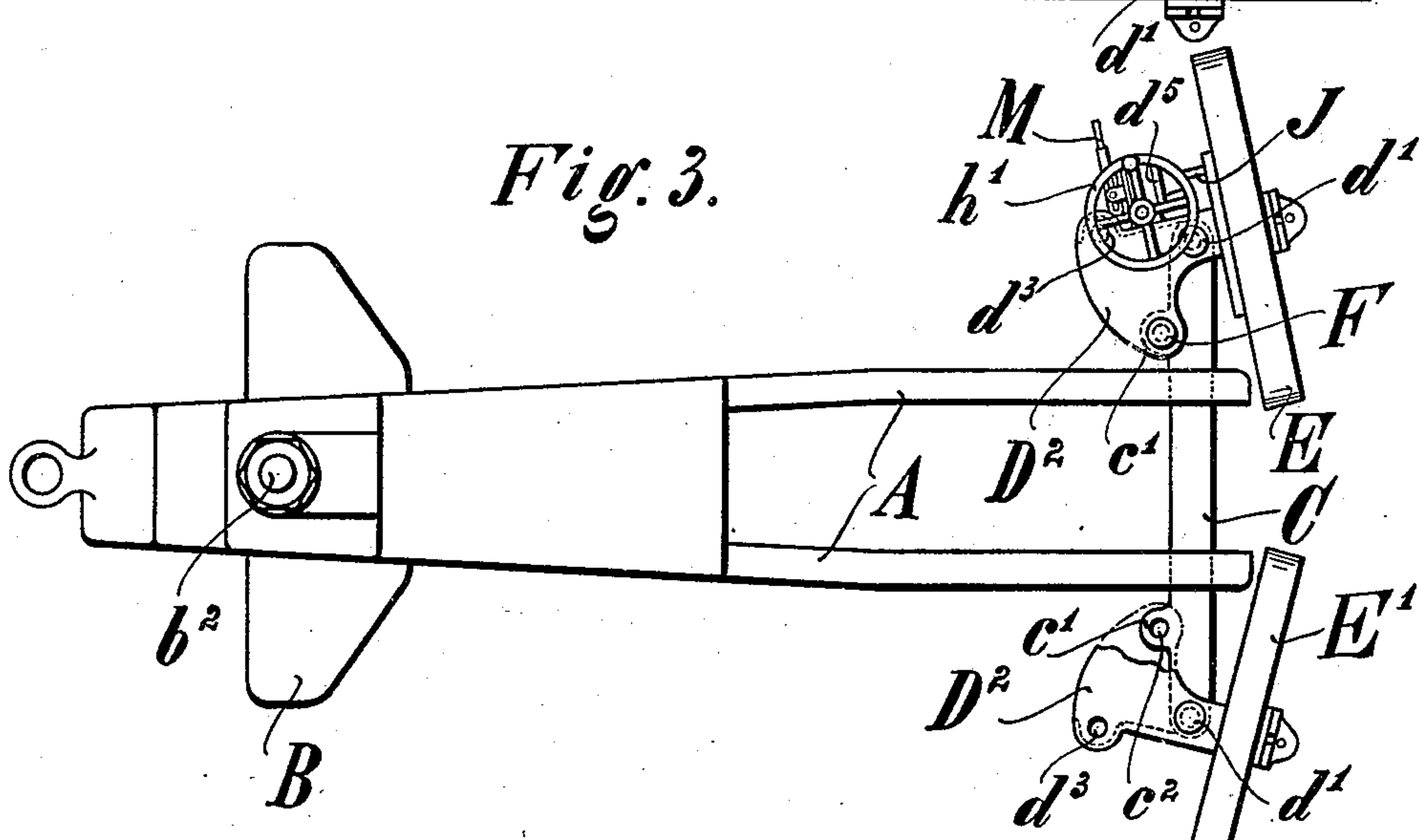


Fig. 3.



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GUN CARRIAGE.

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2 SHEETS—SHEET 2.

Fig. 4.

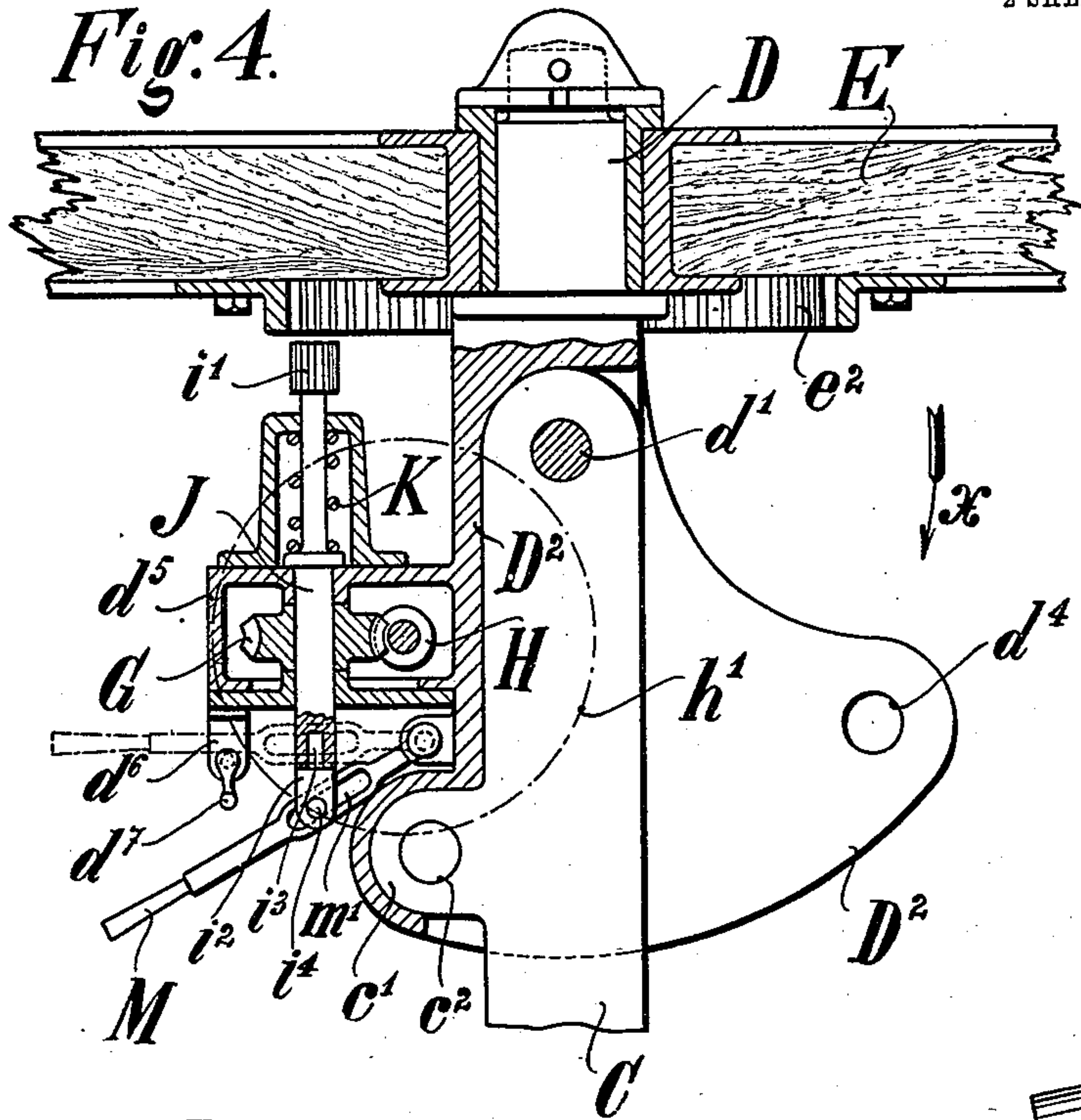


Fig. 5.

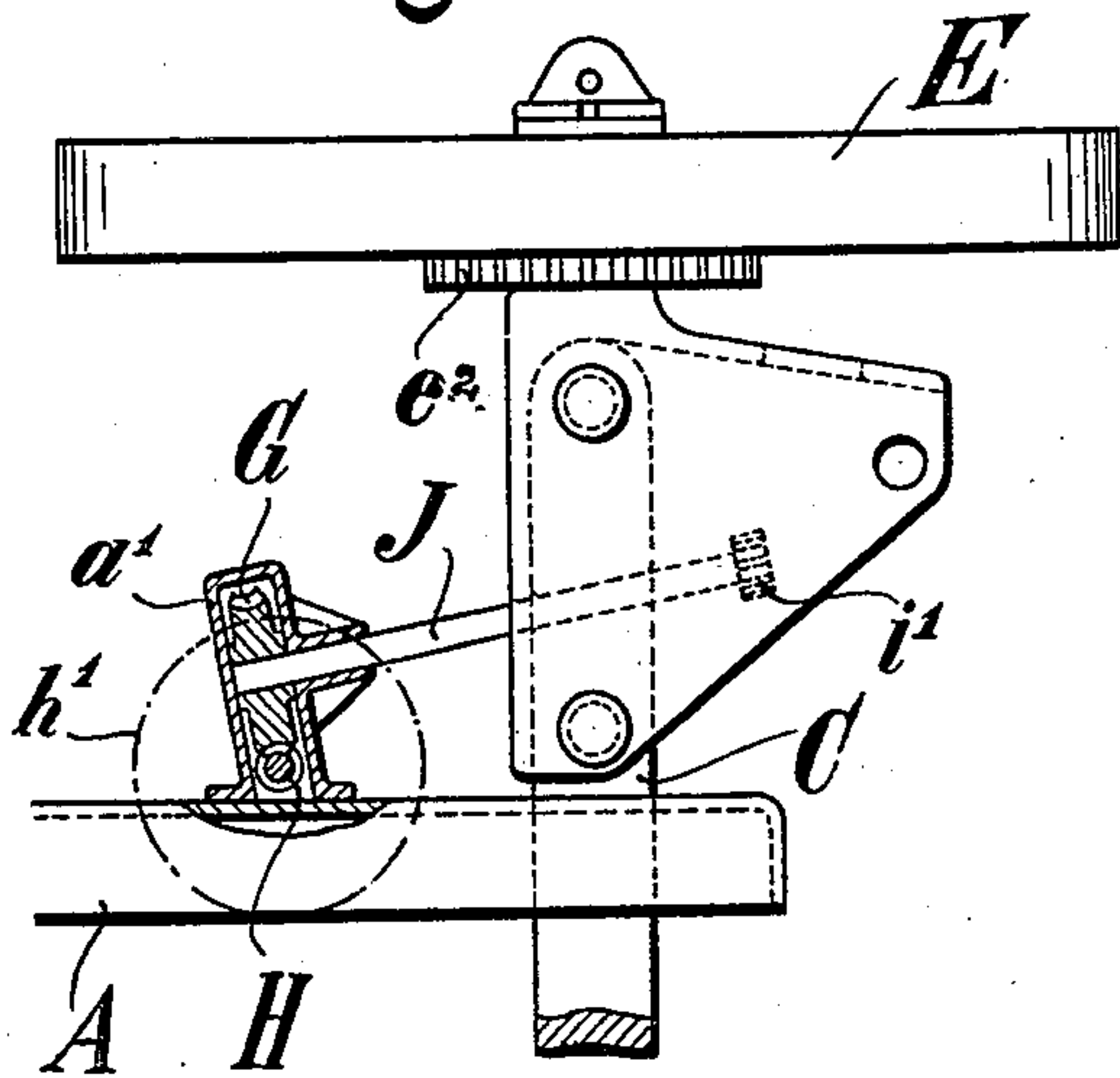
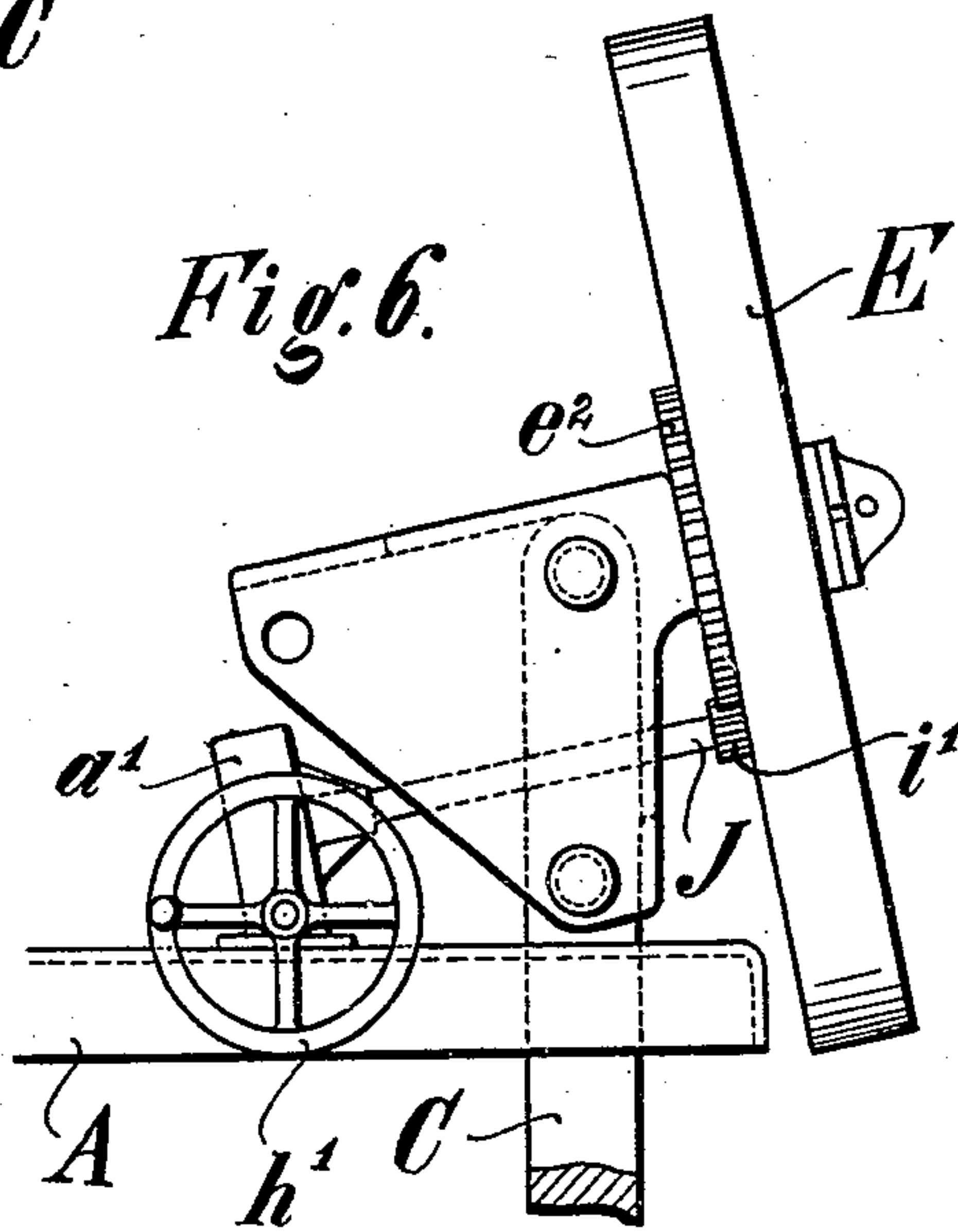


Fig. 6.



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GUN-CARRIAGE.

No. 912,135.

Specification of Letters Patent.

Patented Feb. 9, 1909.

Application filed July 23, 1908. Serial No. 445,054.

To all whom it may concern:

Be it known that I, NORBERT KOCH, a subject of the Emperor of Germany, and a resident of Essen-on-the-Ruhr, Germany, have invented certain new and useful Improvements in Gun-Carriages, of which the following is a specification.

The present invention relates to wheeled gun carriages of the type in which the carriage is provided with a spade which is rotatable about a vertical axis and the object of the invention is to construct carriages of this type in such a manner that the lateral direction of the gun can easily be changed within any desired limits without necessitating lifting the spade off the ground. In accordance with the present invention, this object is attained by having the wheels of the carriage mounted in such a manner that they can be swung about a vertical axis and can be secured in an angular position in which their axes of rotation intersect the axis of rotation of the spade.

The accompanying drawings show two embodiments of the invention, by way of example.

Figure 1 is a side view, partly in section, of one embodiment of the invention; Fig. 2 is a top view of Fig. 1; Fig. 3 is a view corresponding to Fig. 2, the position of some of the parts being changed; Fig. 4 is a section, on an enlarged scale, on line 4—4, Fig. 1; Fig. 5 is a top view, on an enlarged scale, of a part of another embodiment of the carriage; and Fig. 6 is a view corresponding to Fig. 5, the position of some of the parts being changed.

Reference will first be had to the embodiment shown in Figs. 1 to 4. In the trail-end of the carriage-body A, a spade B, which is provided with a plurality of ribs b^1 , is mounted through the medium of a trunnion b^2 in such a manner that the spade can turn about an axis at right angles to the supporting plane of the carriage. The wheel-axle C is secured in the other end of the carriage-body A. The spindles D (Fig. 4) of the carriage-wheels E and E^1 are jointed to the ends of the axle C through the medium of bolts d^1 and in such a manner that each of the spindles can be swung about an axis which is parallel to the axis of the trunnion b^2 of the spade B. Each spindle D is provided with a bifurcated plate D^2 in a recess of which rests the adjacent end of the axle C (Fig. 1). The ends of the axle C are provided with lateral projec-

tions c^1 , which are provided with bores c^2 (Figs. 3 and 4). Each plate D^2 has two bores d^3 (Fig. 3) and d^4 (Figs. 2 and 4). By swinging the plates D^2 about the axis of the bolt d^1 , each of the bores d^3 and d^4 can be brought into register with the corresponding bore c^2 in the axle C. When the bores d^3 register with the bores c^2 , the wheels E and E^1 are in the position required for the travel of the carriage (Figs. 2 and 4). On the other hand, when the bores d^4 register with the bores c^2 the axes of rotation of the wheels E and E^1 intersect the axis of the trunnion b^2 of the spade B (Fig. 3). In this position of the wheels, the carriage can easily be swung about the trunnion b^2 of the spade B for the purpose of lateral training. The plates D^2 can be coupled to the axle C in either of the aforesaid two positions through the medium of key-bolts F (Figs. 1 to 3), which fit the bores c^2 and also fit the bores d^3 and d^4 .

The plate D^2 of the wheel E is provided with a housing d^5 (see especially Fig. 4), in which is journaled a gear consisting of a worm wheel G and a worm H. The worm H can be turned by means of a hand-wheel h^1 (Figs. 2 and 3). The worm-wheel G is mounted on a shaft J, which is slidably arranged in the housing d^5 ; the worm wheel G is non-slidably mounted in the housing d^5 and the shaft J is connected with the worm-wheel in such a manner that the shaft can move longitudinally in the nave of the worm-wheel and must partake of the rotation of the worm-wheel. On one end of the shaft J is mounted a pinion i^1 which is capable of entering into engagement with a circular rack e^2 (Fig. 4) secured on the wheel E. A helical spring K tends to always hold the shaft J in a position in which the pinion i^1 is out of engagement with the rack e^2 . In that end of the shaft J which is nearest the carriage-body A, a bifurcated thrust-member i^2 is rotatably, but non-slidably, journaled through the medium of a pin i^3 . The member i^2 straddles a lever M which is pivoted to the plate D^2 , the thrust-member being connected to the lever by a bolt i^4 , which is guided in a slot m^1 in the lever M. Due to this arrangement, the shaft J and the pinion i^1 must move axially when the lever M is turned. The arrangement is selected in such a manner that the pinion i^1 meshes with the rack e^2 when the lever M is in the position indicated in dotted lines in Fig. 4. In this

position, the lever M projects into the space between the arms of a bifurcated lug d^6 on the housing d^5 , and the lever can be secured in this position through the medium of a key-bolt d^7 , for which bores are provided in the arms of the lug d^6 .

During the travel of the gun, the wheels E and E^1 are adjusted in such a manner that the bores d^3 in the plates D^2 register with the bores c^2 in the axle C. The key-bolts F are inserted in these bores and couple the plates D^2 to the axle C. The lever M is then in the position shown in full lines in Fig. 4, and due to the action of the spring K, the shaft J assumes such a position that the pinion i^1 is out of mesh with the circular rack e^2 . The wheel E is, therefore, free to turn during the travel of the gun. After the gun has reached firing position and has been unlimbered, the key-bolts F are withdrawn from the bores c^2 and d^3 ; thereupon the wheels E and E^1 are swung about the axis of the bolts d^1 in the direction of the arrow x (Figs. 2 and 4) until the bores d^4 in the plates D^2 register with the bores c^2 in the axle C and when the wheels assume this position, the key-bolts F are inserted in the bores d^4 and c^2 to lock the plates in position relatively to the axle. As the axes of rotation of the wheels E and E^1 now intersect the axis of the trunnion b^2 of the spade B, the carriage can be swung to any desired extent about the trunnion b^2 of the spade B. When it is desired to swing the carriage, the lever M is swung into the position shown in dotted lines in Fig. 4 and is secured in this position by means of the bolt d^7 . The shifting of the lever M causes the pinion i^1 to enter into mesh with the circular rack e^2 . Thereupon the hand-wheel h^1 is turned and the turning movement of the wheel h^1 is transmitted to the wheel E through the medium of the worm-gear H G and the toothed gear $i^1 e^2$. The driving of the wheel E causes the entire carriage to swing about the axis of the trunnion b^2 of the spade B. If the pinion i^1 is out of mesh with the rack e^2 , the operator may swing the carriage about the axis of the trunnion b^2 by taking hold of the spokes of the carriage-wheels and turn the wheels. This is preferably done when great changes in the lateral direction have to be imparted to the carriage.

As will readily be understood from the foregoing, it is not necessary to lift the carriage-trail during the swinging movement of the carriage, even when very great changes in the lateral direction have to be imparted to the carriage. The lifting of the trail is particularly difficult when the spade, after the first shots have been fired, has penetrated into the ground. The ribs b^1 on the spade B cause the spade to effectively prevent recoil of the carriage, also in case the shock on recoil acts at an angle to the spade, which is always the case when the carriage

has been swung a great angle in one direction or the other from its intermediate position.

In the embodiment shown in Figs. 5 and 6, the worm-gear G H is journaled in a housing a^1 which is secured on the carriage-wall A adjacent to the wheel E. To simplify the construction, it is assumed, in this embodiment, that the shaft J, which carries the pinion i^1 and which passes through the axle C, is non-slidably journaled in the housing a^1 . The shaft J is arranged in such a manner that the pinion i^1 meshes with the rack e^2 only in that position of the wheel E in which the axis of rotation of the wheel E intersects the axis of the trunnion b^2 of the spade B (Fig. 6). As the shaft J is non-slidably arranged, the change in the lateral direction of the carriage can in this instance only be effected through the employment of the hand-wheel h^1 .

I am aware that it is known to provide gun-carriages in which the wheels can be swung about vertical axes and can be secured in a suitable angular position. However, in these known guns, the feature of having the wheels mounted to swing about vertical axes is for the purpose of making it possible to use the wheels as protecting shields for the serving crew, the wheels in such case being formed as disk-wheels.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. A gun-carriage having a spade mounted to rotate about a vertical axis, carriage-wheels, means permitting the wheels to be swung about vertical axes, and means for securing the wheels in an angular position in which the axes of rotation of the wheels intersect the axis of rotation of the spade.

2. A gun-carriage having a spade mounted to rotate about a vertical axis, carriage-wheels, means permitting the wheels to be swung about vertical axes, means for securing the wheels in an angular position in which the axes of rotation of the wheels intersect the axis of rotation of the spade, and means for imparting rotation to the wheels when in said angular position.

3. A gun-carriage having a spade mounted to rotate about a vertical axis, carriage-wheels, means permitting the wheels to be swung about vertical axes, means for securing the wheels in an angular position in which the axes of rotation of the wheels intersect the axis of rotation of the spade, and a gear for rotating one of said wheels when the wheel is in the said angular position.

4. A gun-carriage having a spade mounted to rotate about a vertical axis, carriage-wheels, means permitting the wheels to be swung about vertical axes, means for securing the wheels in an angular position in which the axes of rotation of the wheels intersect the axis of rotation of the spade, a

gear for rotating one of said wheels when the wheel is in the said angular position, and a driving member for said gear mounted to partake of the swinging movement of the wheels.

5 5. A gun-carriage having a spade mounted to rotate about a vertical axis, carriage-wheels, means permitting the wheels to be swung about vertical axes, means for securing the wheels in an angular position in which
10 the axes of rotation of the wheels intersect the axis of rotation of the spade, a gear for rotating one of said wheels when the wheel is in the said angular position, and means whereby said gear may be coupled to and
15 uncoupled from the wheel.

6. In a gun-carriage, the combination with the carriage-body having a trail, the axle

and the wheels, of spindles upon which the wheels are rotatably mounted, a spade mounted in the trail and rotatable about a
20 vertical axis, a connection between each spindle and the axle permitting the spindle and its wheel to be swung about a vertical axis and means for securing the spindle and the wheel in a position in which the axis of
25 the spindle intersects the axis of rotation of the spade.

The foregoing specification signed at Dusseldorf, Germany, this 20th day of June, 1908.

NORBERT KOCH.

In presence of—

PETER LIEBER,

WILHELM FLASCHE.