

H. KANONENBERG.  
 TRANSPORT CARRIAGE FOR BARRELS OF PORTABLE RECOIL GUNS.

APPLICATION FILED MAY 20, 1908.

Patented July 13, 1909.

2 SHEETS—SHEET 1.

927,860.

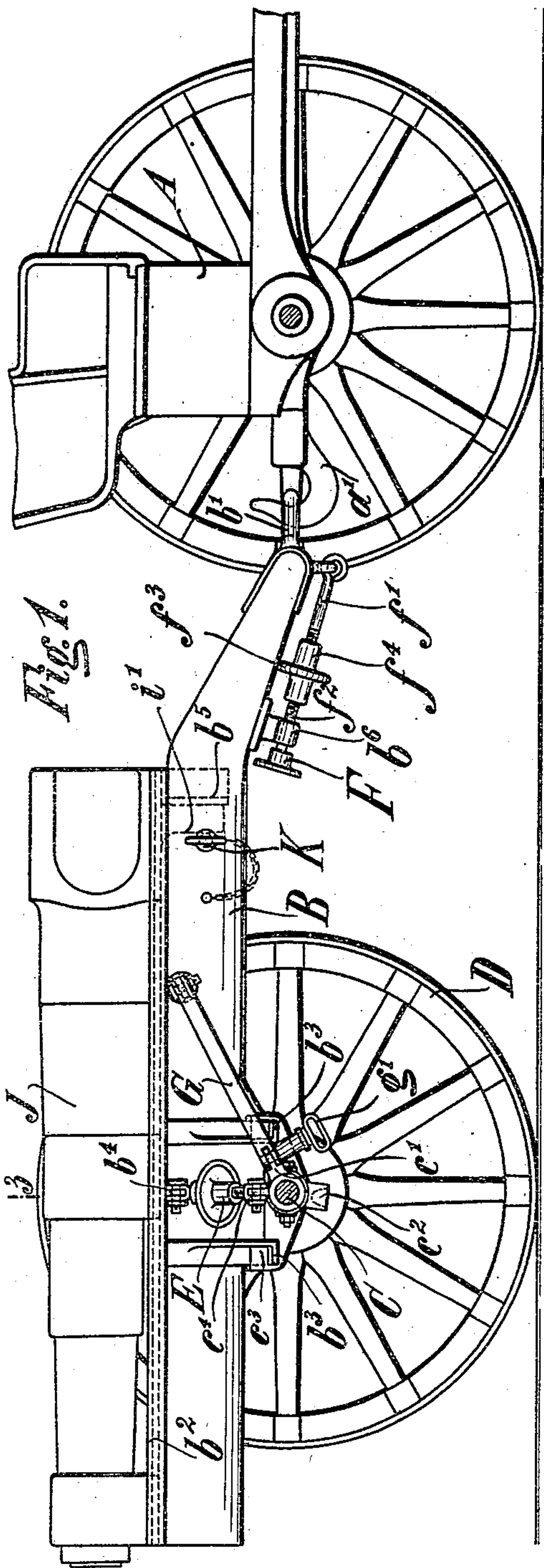


Fig. 1.

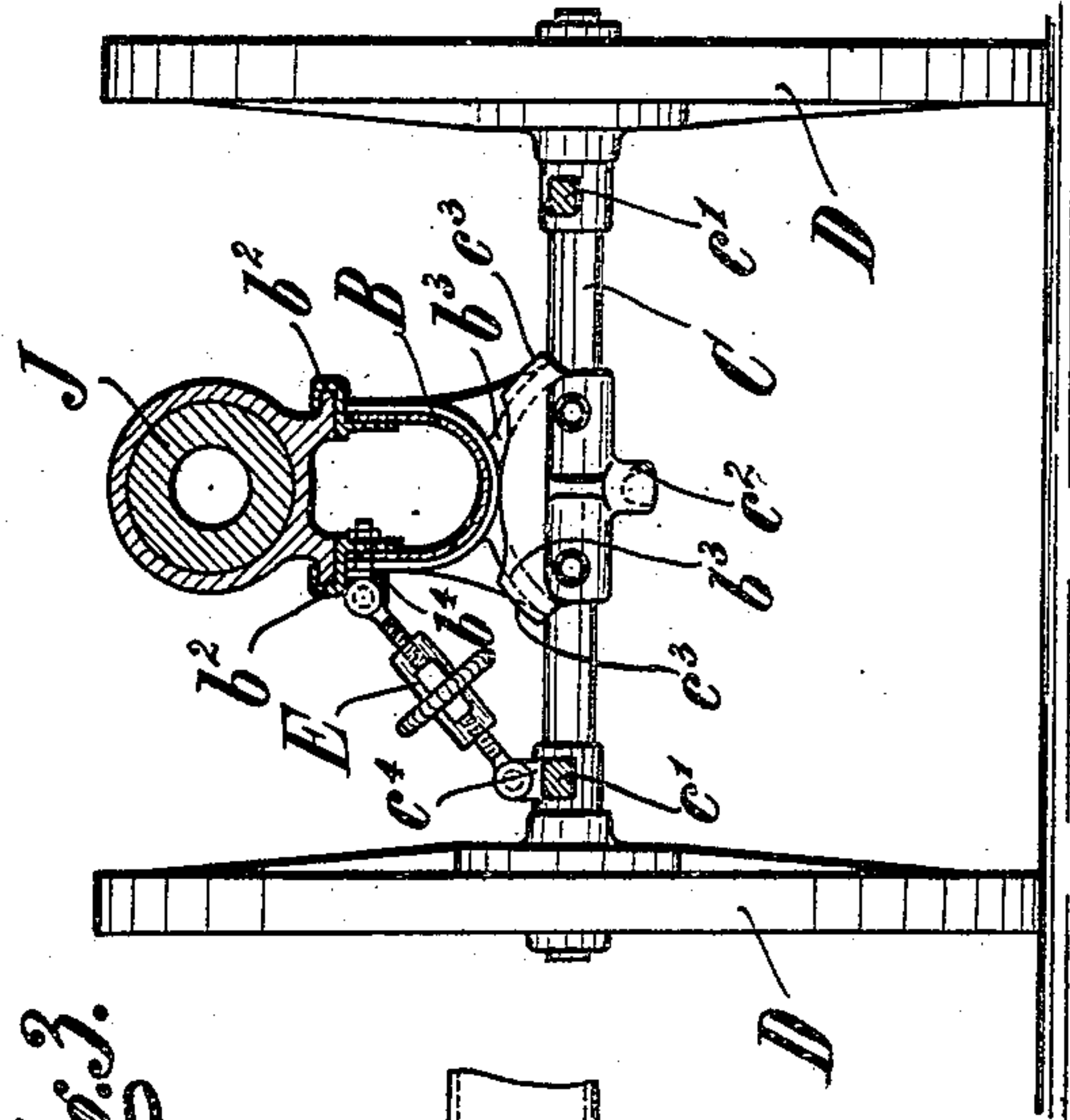


Fig. 2.

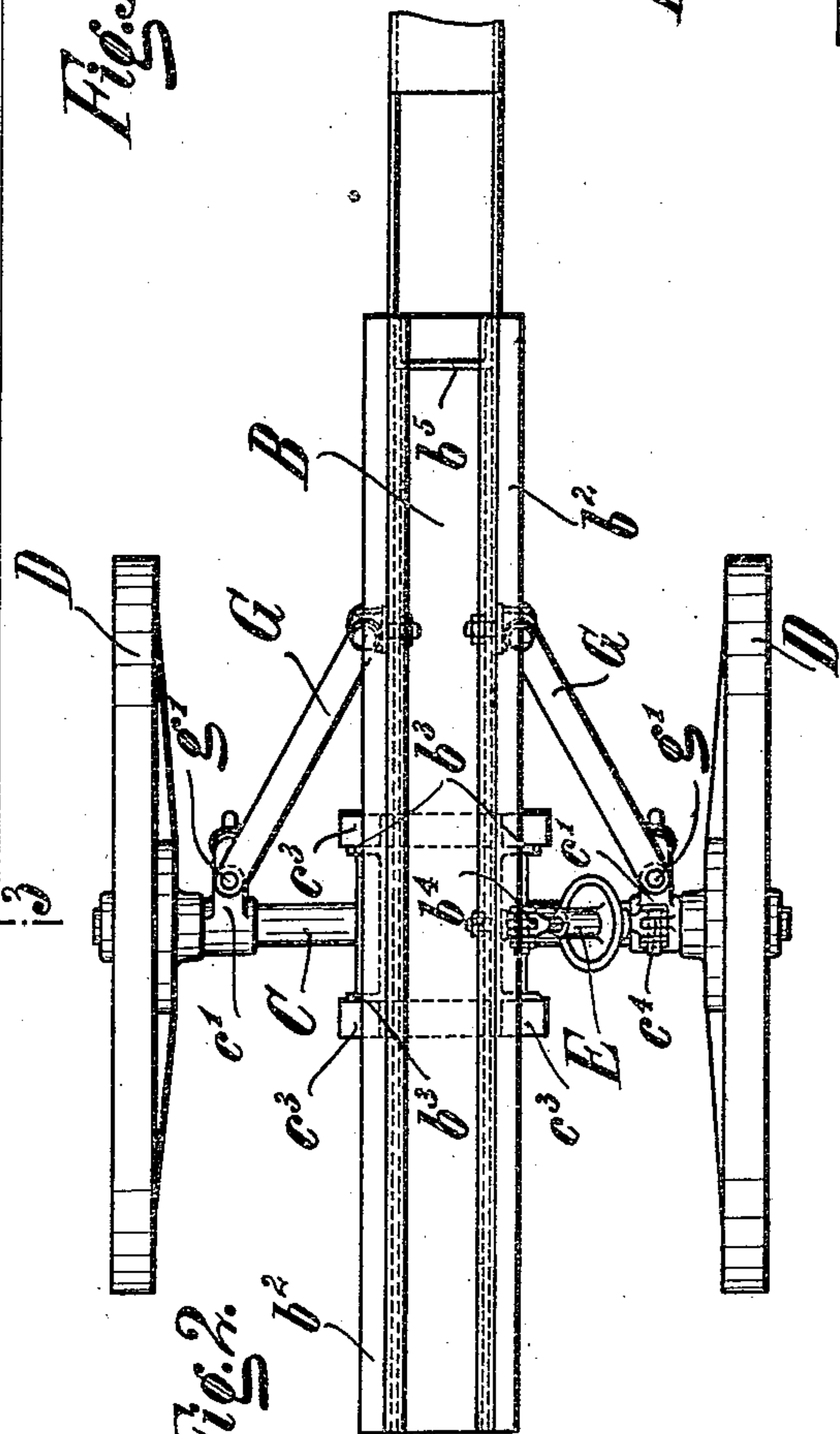


Fig. 3.

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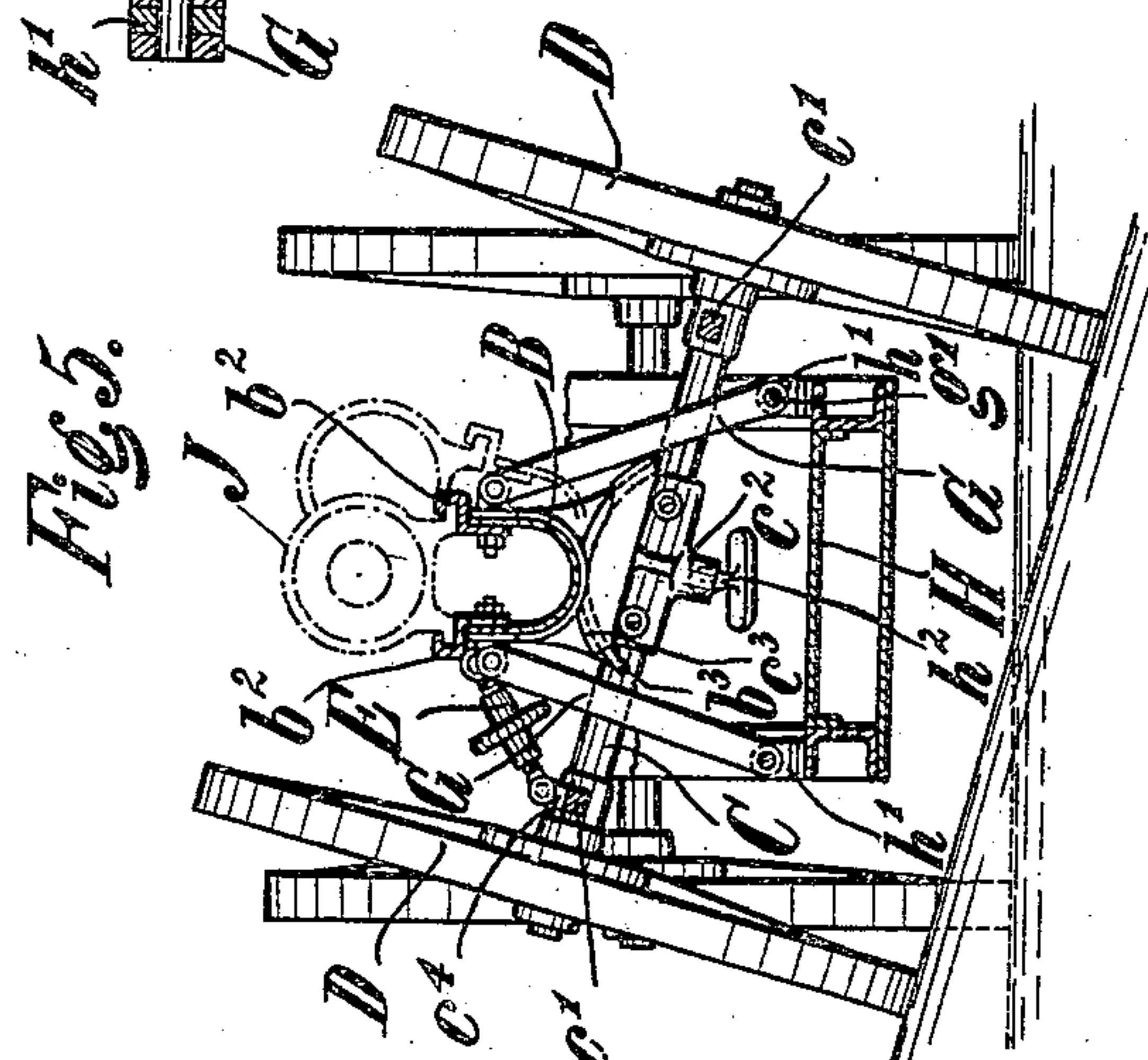
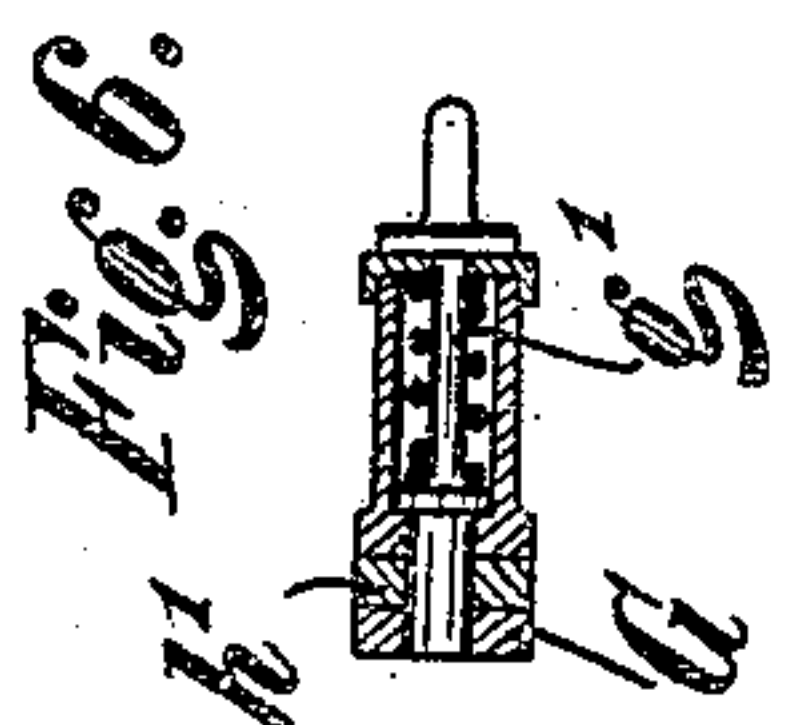
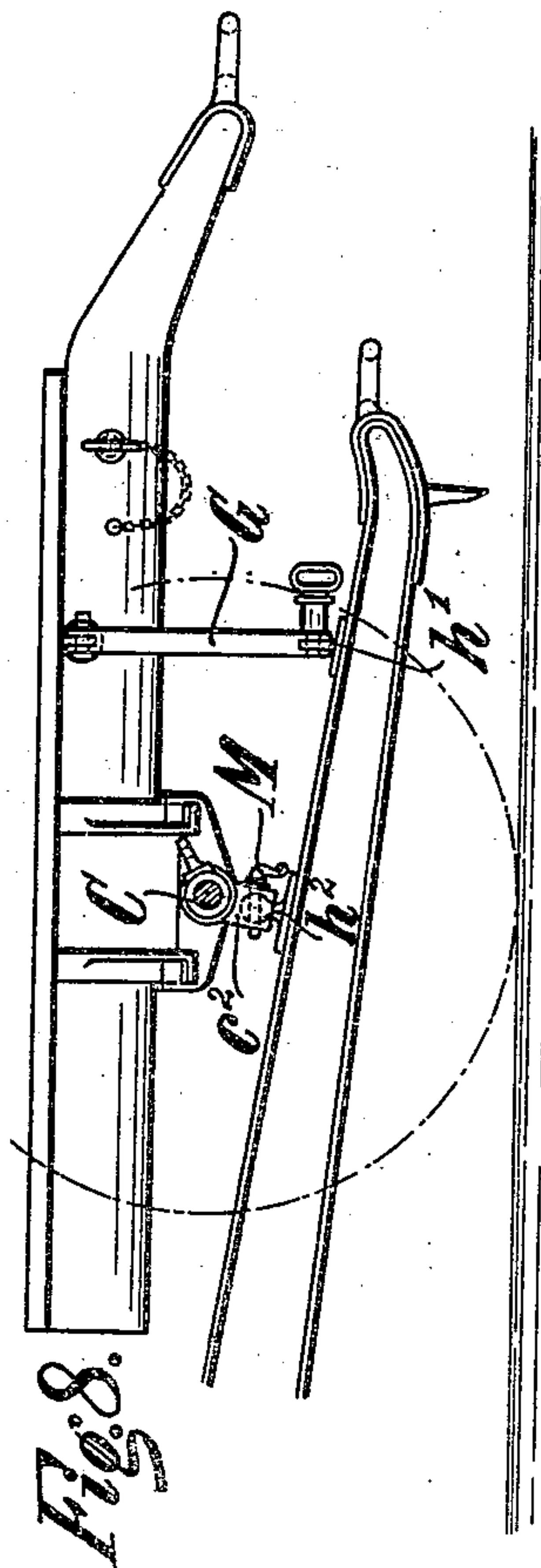
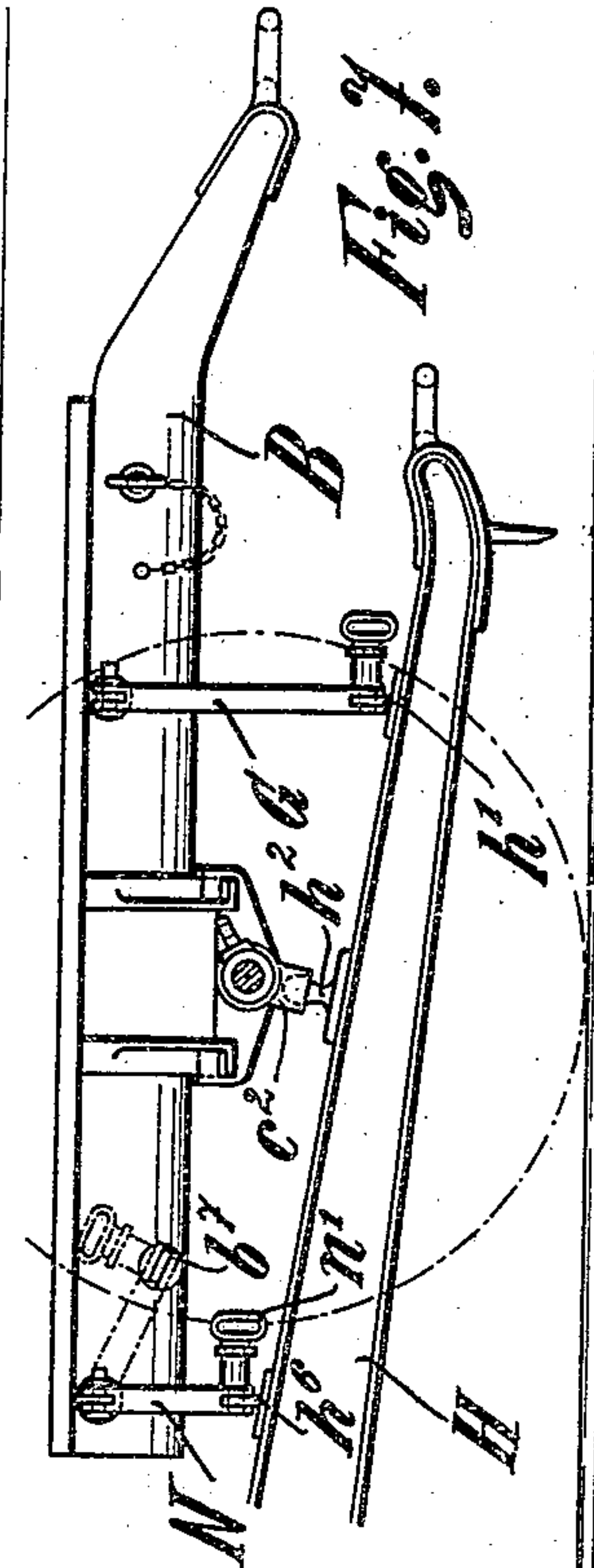
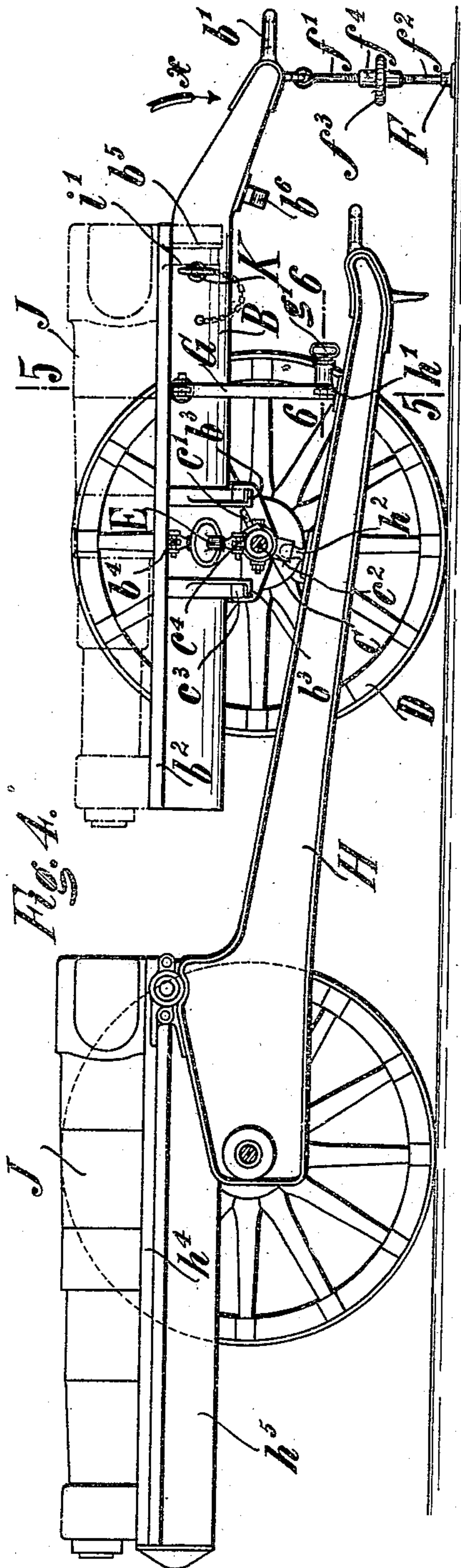
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

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## TRANSPORT-CARRIAGE FOR BARRELS OF PORTABLE RECOIL-GUNS.

No. 927,860.

Specification of Letters Patent.

Patented July 13, 1909.

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*To all whom it may concern:*

Be it known that I, HEINRICH KANONENBERG, a subject of the Emperor of Germany, and a resident of Essen-on-the-Ruhr, Germany, have invented certain new and useful Improvements in Transport-Carriages for Barrels of Portable Recoil-Guns, of which the following is a specification.

This invention relates to that type of transport carriages for the barrels of portable recoil guns which have arranged upon the longitudinal beam of the rear carriage, a slide track corresponding in form to that of the gun barrel, and adapted to be so connected with the service carriage of the gun, that the gun barrel can be drawn over, from the slide-track carrier of the gun, upon the slide track of the transport carriage. In known transport carriages of this kind, in order to be able to bring the latter into proper position relatively to the service carriage, to permit running the barrel on and off, when on uneven ground, the arrangement is so designed, that in making the aforesaid connection, the rear wheels of the transport carriage are raised from the ground. This arrangement has the disadvantage that for raising the rear wheels of the transport carriage from the ground, when the gun barrel rests upon it a considerable power windlass is required.

The present invention has for its purpose to provide a transport carriage of the type under discussion, which can be brought into the proper position relatively to the gun, for running the gun-barrel off and on, without necessitating the raising of the rear wheels. This purpose is attained according to the present invention by having the perch of the transport carriage movably connected with the wheel axle of the rear-carriage in such a manner that it can rotate about an axis at least approximately in line with the length of the rear carriage.

In the accompanying drawings: Figure 1 is a side elevation, partly in section, of one embodiment of the transport carriage. Fig. 2 is a corresponding plan view showing the rear parts of the transport carriage. Fig. 3 is a section on the line 3—3— seen from the right. Fig. 4 is a side elevation, partly in section, on a somewhat smaller scale, of a gun and the rear portion of the transport carriage opposed in proper relation for running the gun-barrel off and on and standing

upon even ground. Fig. 5 is a section on the line 5—5 of Fig. 4 seen from the right. Fig. 6 is an enlarged detail view in section on the line 6—6— Fig. 4. Fig. 7 is a view corresponding to Fig. 4, of a portion of a second embodiment, and Fig. 8 is a view likewise corresponding to Fig. 4 showing a portion of a third embodiment.

The transport carriage comprises a two-wheeled fore-carriage A constructed as a limber (Fig. 1) and a rear-carriage, likewise two-wheeled and consisting essentially of a perch B, the wheel axle C, and the wheels D.

The perch B which has an upwardly opening trough-shaped section (compare Figs. 3 and 5) is provided with two slide-rails  $b^2$  arranged parallel to its longitudinal axis and constructed to conform with the sliding surfaces of the gun-barrel J. This arrangement permits the gun-barrel, after it has been detached from the recoil brake and the recuperator, and after proper relative positioning of the slide-track carrier  $h^5$  (Fig. 4) of the gun and the perch B of the transport carriage, to be slid from the slide-track  $h^4$  on the slide-track carrier  $h^5$ , over upon the slide rails  $b^2$  of the perch B. The perch is provided with a transverse wall  $b^5$  against which the horn  $i'$  on the breech of the gun lies when the barrel has been fully slid upon the perch (compare Figs. 1 and 4). The side walls of the perch B are provided in the vicinity of the cross-wall  $b^5$ , with bores for a locking bolt K, so arranged that when the gun barrel is in position last referred to, the locking bolt K may lie against that face of the horn  $i'$  which is presented toward the muzzle. On the forward end of the perch is arranged an eye  $b'$  which can be engaged over the limber hook  $a'$  of the fore-carriage (Fig. 1). Furthermore, there is joined to the forward end of the perch B, a prop F, the free end of which rests in a hook-shaped seat  $b^6$  beneath the perch, when the carriage is in the marching position shown in Fig. 1. The prop F consists of two rods  $f', f^2$  whose opposed ends are oppositely threaded, and connected together by a sleeve correspondingly threaded, internally. The prop F may, by this arrangement, be lengthened or shortened by turning the sleeve  $f^4$  through means of a hand wheel  $f^3$  secured thereon for the purpose.

The perch B is movably connected with the wheel-axle C in such a manner that it can be rotated about an axis lying beneath the



wheel axle C and parallel to the length of the perch. For this purpose the perch B is provided with curved slide shoes  $b^3$  (see especially Figs. 3 and 5) for which correspondingly curved guides  $c^3$  are provided on the wheel-axle. For swinging the perch B about the aforesaid axis, a strut E is employed whose ends are jointed, the one to a bearing eye  $b^4$  provided on one of the side walls of the perch B, and the other to a bearing eye  $c^4$  located upon the axle C. Strut E is constructed like the prop F hereinbefore described, that is, of two members joined by an oppositely threaded union, so that the strut may be extended or shortened at will. By lengthening the strut E, the perch is rocked in one direction and by shortening the strut rocking is caused in the opposite direction.

At about the middle of that portion of the perch B lying between the slide shoes  $b^3$  and the transverse wall  $b^5$ , and to either side of said perch, are secured through the medium of gimbal joints, struts G, at the free ends of which are slidingly mounted spring pressed bolts  $g'$  (see especially Fig. 6). Through means of the bolts  $g'$ , the struts G, when the perch B is in the middle position with respect to its guide as shown in Fig. 3, can be connected with bearing eyes  $c'$  on the wheel axle C (Figs. 1 and 2). There are also provided bearing eyes  $h'$  on the trail of the gun (Figs. 4 and 5) for the free ends of struts G and with which the struts may be connected through the medium of the bolts  $g'$ , when the gun and transport carriage are in proper position with respect to each other.

On the underside of the wheel axle C is secured a downwardly opening ball joint socket  $c^2$ , designed for the reception of a ball pin  $h^2$  on the carriage H of the gun. The middle point of the ball surface of the bearing  $c^2$ , lies in the center of curvature of the guide  $c^3$ . The arrangement is so designed that, when the pin  $h^2$  rests in the bearing  $c^2$  of the wheel axle, and the struts G are connected with the bearing eyes  $h'$  of the service carriage trail, the slide track  $b^2$  on the perch B lies in direct prolongation of the slide track  $h^4$  arranged upon the slide track carrier  $h^5$  of the gun carriage, when the slide track carrier  $h^5$  is brought into a determined position.

In order to transfer the gun barrel J from the slide track carrier  $h^5$  of the gun, over upon the transport carriage, the latter, with its several parts in the position shown in Fig. 1, is brought with the rear carriage end-on, so far over the gun trail that the bearing  $c^2$  is directly above the pin  $h^2$ . Care is now taken that the longitudinal axis of the perch B lies as nearly parallel to the longitudinal axis of the carriage H as possible. Thereupon the rear carriage is unlimbered and supported through means of the support F, after the latter has been removed from the bearing  $b^6$ ,

and caused to bear with its free end upon the ground. Then the connection between the struts G and the bearing eyes  $c'$  of the wheel axle is released. Then the carriage trail of the gun is elevated until ball pin  $h^2$  enters into engagement with the bearing  $c^2$  and is there secured. The struts G are now to be connected with the bearing eye  $h'$ . If the gun and the transport carriage stand on perfectly even ground as is assumed in Fig. 4, it is only necessary, in accomplishing this purpose, to raise or lower the forward end of the perch B by turning the hand wheel  $f^3$  of the support F until the free ends of the struts G attain the same height as the bearing eye  $h'$ . If, however, the surface is uneven, as is usually the case, so that the rear wheels of the transport carriage stand inclined to the wheels of the service carriage, as illustrated in Fig. 5, it becomes necessary, in order to be able to connect the struts G with the bearing eyes  $h'$ , to perform the further step of swinging the perch B by lengthening or shortening the strut E, from the dotted position shown in Fig. 5 to the full line position shown therein, in which the symmetrical planes of the perch and the service carriage coincide.

After establishing the connection between the struts G and the bearing eyes  $h'$  the service carriage trail is released. The transport carriage is now coupled with the service carriage. Any back lash between the ball pin  $h^2$  and its bearing  $c^2$  which might result from the rotation of the perch B about the wheel axle C in the direction of the arrow  $x$  (Fig. 4) will be prevented by the support F. Instead of bringing the transport carriage into position to permit connection of the struts G with the bearing eyes  $h'$ , by the turning of the hand wheel  $f^3$ , it can be likewise so adjusted by hand. In the latter case, however, then the support F is to be adjusted to such length that it prevents displacement of the pin  $h^2$  from its bearing  $c^2$ .

Next the slide track carrier  $h^5$  of the gun, is brought into such position through the medium of the elevating mechanism that its slide track  $h^4$  lies in prolongation of the slide track  $b^2$  of the perch B. Then, as soon as the connection between the gun barrel J and the recoil brake and recuperator is released, the gun barrel is moved by hand or through the medium of a pulley or the like over upon the slide track  $b^2$  of the rear carriage of the transport carriage until the horns  $i'$  of the gun barrel impinges against the transverse wall  $b^5$  of the perch. In this position the gun barrel is secured by means of the locking bolt K which, of course, has been withdrawn from the bores provided for it in the perch. Then the connection of the struts G with the bearing eyes  $h'$  is released and the carriage trail is lowered to the ground. The struts G are now reconnected with the bearing eyes  $c'$  of the wheel axle, the perch having been first



rocked, if necessary, from its position shown in Fig. 3 and by dotted lines in Fig. 5, by lengthening or shortening the strut E. Then after the rear carriage is reconnected with the fore-carriage A by engaging the eye  $b'$  in the limber hook  $a'$ , and the prop F has been returned to the bearing  $h^6$  the transport carriage, as shown in Fig. 1, is ready for the march.

The steps required for returning the gun barrel from the transport carriage to the service carriage, will be obvious from the foregoing description and therefore require no further explanation.

The embodiment shown in Fig. 7 differs from that already described only in having the prop F omitted and in lieu thereof two struts N jointed to the rear end of the perch, on the free ends of which struts, are slidingly mounted spring pressed bolts  $n'$  in the same manner as described with reference to the bolts  $g'$  on the struts G. Through the medium of the bolts  $n'$ , the struts N can be connected, as shown by dotted lines in Fig. 7, on the one hand, with bearing eyes  $b'$  on the perch B, and on the other hand with the bearing eyes  $h^6$  on the service carriage H. The arrangement is so designed that the connection of the struts N with the bearing eyes  $h^6$  is only possible with that relative position between the service carriage and the perch at which the struts G can be connected with the bearing eyes  $h'$ . Displacement of the ball pin  $h^2$  from its bearing  $c^2$  is thus impracticable so long as the pairs of struts G and N are connected with their bearing eyes  $h'$  and  $h^6$ . The coupling of the transport carriage with the service carriage H is in this instance effected as follows: First the ball pin  $h^2$  is introduced into this bearing  $c^2$  and thereafter, in any desired sequence, the pairs of struts G and N are connected with their bearing eyes  $h'$  and  $h^6$ .

With the embodiment shown in Fig. 8, the ball pin  $h^2$  and the bearing  $c^2$  may be connected together through the medium of a locking bolt M, in which case, the axis of the locking bolt M, while connecting the parts  $c^2$  and  $h^2$  coincides with the axis of revolution of the perch B. In consequence of this arrangement, after securing the struts G to the bearing eyes  $h^8$ , the two ball joint members  $c^2$  and  $h^2$  can be connected together through the medium of the locking bolt M, even when the gun and transport carriage stand upon uneven surfaces.

By coupling the transport carriage with the service carriage H, ball pin  $h^2$  is first introduced into its bearing  $c^2$ . Then the struts G are secured to the bearing eyes  $h'$ , and finally the ball joint members  $c^2$  and  $h^2$  are connected together through means of the locking bolt M. In this case the locking bolt M prevents displacement of the pin  $h^2$  from its bearing  $c^2$ . It is thus unnecessary

in this embodiment, to provide either the prop F as in the first embodiment, or a pair of struts N as in the second embodiment.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. A transport carriage for the barrels of portable recoil guns having a longitudinal member upon which the gun barrel is transferred from the service carriage, mounted through means which permits it to move relatively to the wheel axle of the carriage about an axis substantially longitudinal to the transport carriage.

2. A transport carriage for portable recoil guns having a perch provided with a slide track to receive the gun barrel, and mounted upon sliding bearings which permit it to swing or rock about an axis transverse to the wheel axle upon which it is supported.

3. In a transport carriage for the barrels of portable recoil guns, the combination of the carriage wheels, the axle, the perch mounted upon said axle with freedom to swing relatively thereto about an axis substantially parallel to the length of the perch, and means to facilitate the connection of the transport carriage with the service carriage of the gun at the time of effecting the transfer of the barrel, consisting of a flexible joint, the members of which turn relatively about a center which lies in the turning axis of the perch.

4. In a transport carriage for portable recoil guns, the combination of a perch, a rear carriage upon which said perch is supported, sliding bearings through which the perch is mounted on said rear carriage, and a member through which to connect the rear carriage with the service carriage from which the gun barrel is to be transferred, embodying a ball and socket joint, the turning center of which coincides with the axis about which the perch rotates.

5. In a transport carriage for the barrels of portable recoil guns, the combination of the wheels of the rear carriage and the axle therefor, the perch having sliding bearings through which it is mounted on said axle, said bearings being curved in the arc of a circle about the center of which the perch swings, a service carriage, and means to facilitate the connection of the service carriage with the transport carriage at time of transfer of the barrel, consisting of two parts mounted respectively on the carriages to be connected and fitted together by a ball and socket joint, the center of which, when the parts are assembled, lies in the swinging axis of the perch.

6. The combination of transport carriage having a barrel-receiving perch mounted to rock about a substantially longitudinal axis, a service carriage adapted to be connected to the transport carriage at time of



transfer of the barrel, and struts adapted to extend between and releasably connect the carriages, and having their points of connection selected to insure alinement of the barrel-receiving means on the two carriages.

7. The combination of transport carriage having a barrel-receiving perch mounted to rock about a substantially longitudinal axis, a service carriage adapted to be connected to the transport carriage at time of transfer of the barrel, and struts adapted to extend between and releasably connect the carriages, and having their points of connection selected to insure alinement of the barrel-receiving means on the two carriages; said struts being carried by the barrel-receiving member of the transport carriage and releasable from the service carriage, and being adapted to connect with the axle of the transport carriage.

8. In combination with the barrel-receiving perch; the struts swingingly secured thereto, the free ends of said struts being provided with bearing eyes; and the spring-pressed bolts mounted to slide transversely in the free ends of said struts to releasably engage the trail of a gun carriage.

9. In combination with a transport carriage comprising a fore-carriage and a rear-carriage with a trail, means through which to connect the transport carriage with a service carriage at time of transfer of the barrel, and a support pivotally connected with the rear carriage, said support being adjustable in length and provided with a foot for ground support.

10. In a transport carriage having a two-wheeled rear carriage with a barrel-receiving member mounted thereon through means which permits it to rock upon a substantially longitudinal axis, the ball and socket stop facilitating the connection of the said rear-carriage to a service carriage at time of transferring the barrel, struts through which to aline the barrel-receiving members of the respective carriages, and a support for the transport carriage adjustable in length and adapted to secure the engagement of the members of the ball and socket stop.

11. In combination, a transport carriage, having a barrel-receiving member rotatable about a substantially longitudinal axis, a service carriage having a trail, a flexible joint comprising ball and socket members connected to the respective carriages and turning relatively about an axis coinciding with the axis on which the barrel-receiving member rotates, means for connecting the carriages to aline the barrel-receiving portions, and a pair of struts affording further connection between the carriages.

12. In combination, a transport carriage,

having a barrel-receiving member mounted to swing about a substantially longitudinal axis, a service carriage having a trail, a ball and socket stop between the trail of the service carriage and the transport carriage, the members of which are connected to said parts respectively, a pair of struts carried by the transport carriage and adapted for connection with the service carriage trail at points to assist in alining the barrel-receiving portions of the carriages, and a second pair of struts carried by the transport carriage and adapted to be connected with the trail of the service carriage.

13. In combination, the transport carriage having a perch rotatable upon a substantially longitudinal axis, a service carriage having a trail, a ball and socket joint, the members of which are carried by the trail of the service carriage, and the perch of the transport carriage, respectively, and the center of which coincides with the axis of rotation of said perch, struts through which to aline the perch with the barrel-receiving portion of the service carriage, and means for securing the engagement of the members of the ball and socket joint while said struts are being adjusted.

14. In combination, the transport carriage having a perch rotatable upon a substantially longitudinal axis, a service carriage having a trail, a ball and socket joint, the members of which are carried by the trail of the service carriage, and the perch of the transport carriage, respectively, and the center of which coincides with the axis of rotation of said perch, struts through which to aline the perch with the barrel-receiving portion of the service carriage, and means for securing the engagement of the members of the ball and socket joint while said struts are being adjusted, comprising a bolt extending through said ball and socket members and locking them together.

15. In a transport carriage, the combination of the wheeled axis, the perch mounted thereon through means which permits it to swing about a substantially longitudinal axis, means through which to connect it to a service carriage at time of transfer of the gun barrel, and means for rotating it about the said longitudinal axis, consisting of a strut extending between the perch and the axle upon which it is mounted, and constructed to vary its length.

The foregoing specification signed at Dusseldorf, Germany, this 5th day of May, 1908.

HEINRICH KANONENBERG.

In presence of—

CARL GRUNWALD,  
WILHELM FLASCHE.