

No. 776,667.

PATENTED DEC. 6, 1904.

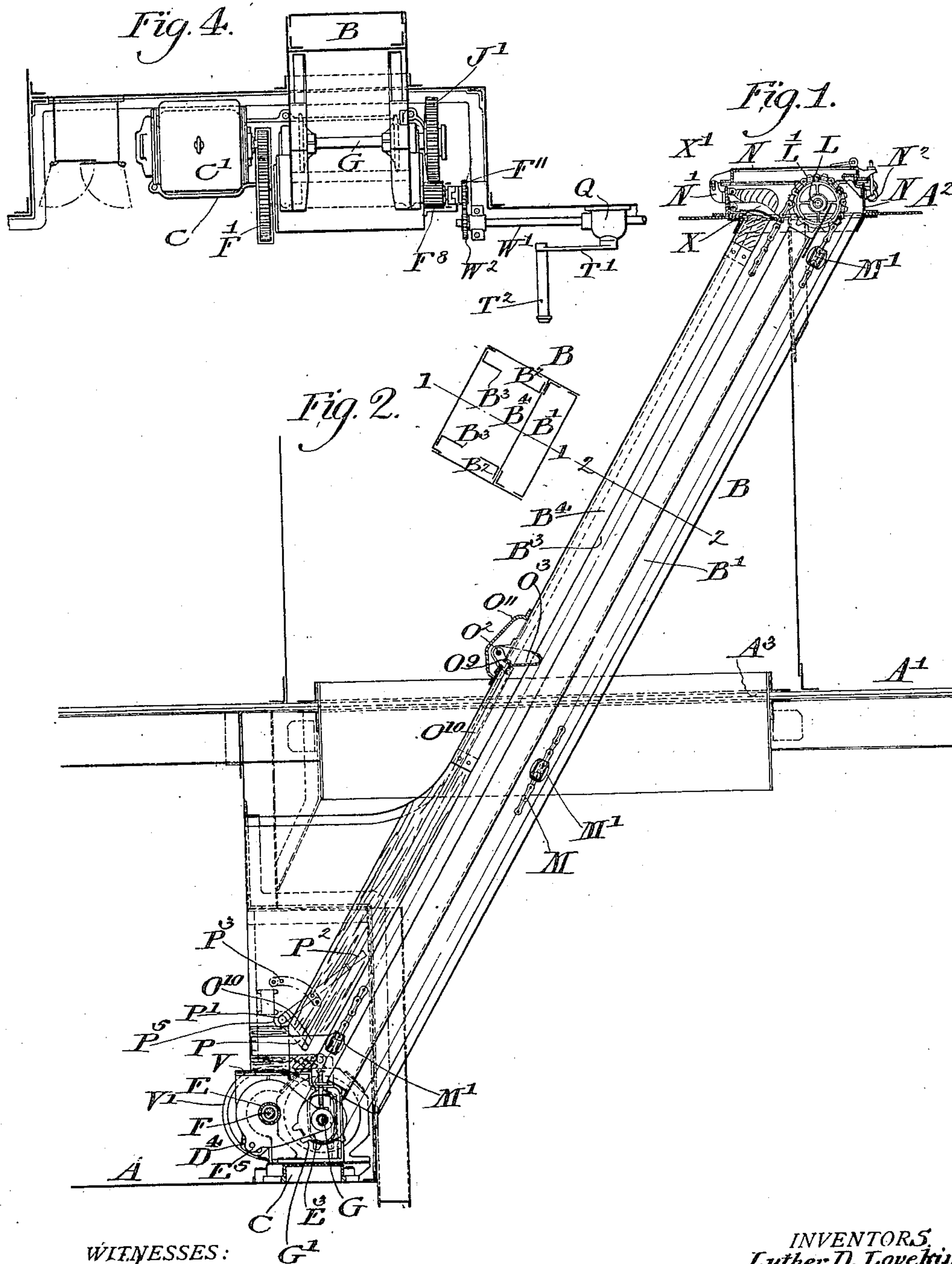
L. D. LOVEKIN, P. M. YOUNG & H. KRAPP.

AMMUNITION HOIST.

APPLICATION FILED JULY 25, 1904.

NO MODEL.

16 SHEETS—SHEET 1.



WITNESSES:

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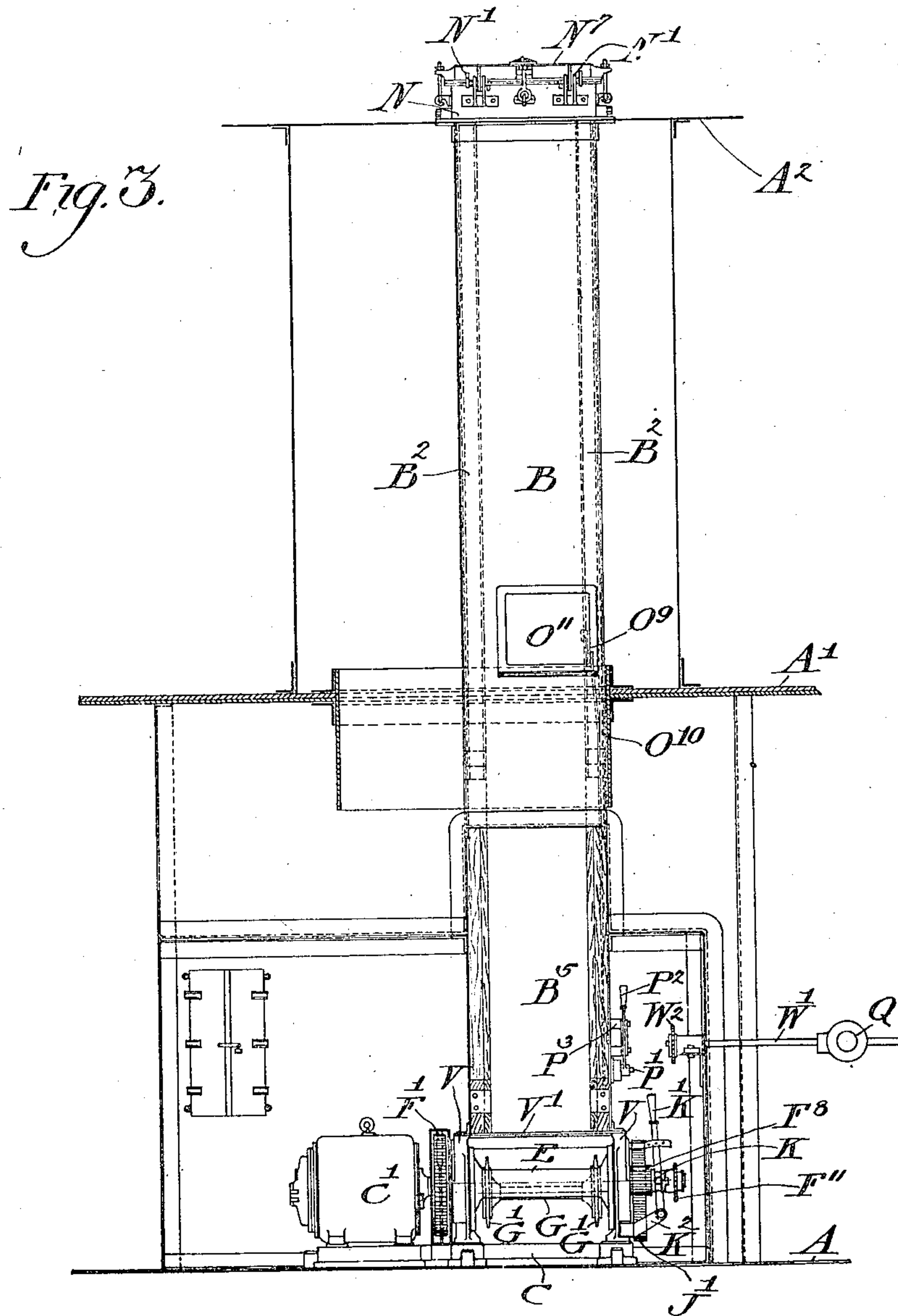
L. D. LOVEKIN, P. M. YOUNG & H. KRAPP.

AMMUNITION HOIST.

APPLICATION FILED JULY 25, 1904.

NO MODEL.

15 SHEETS—SHEET 2.



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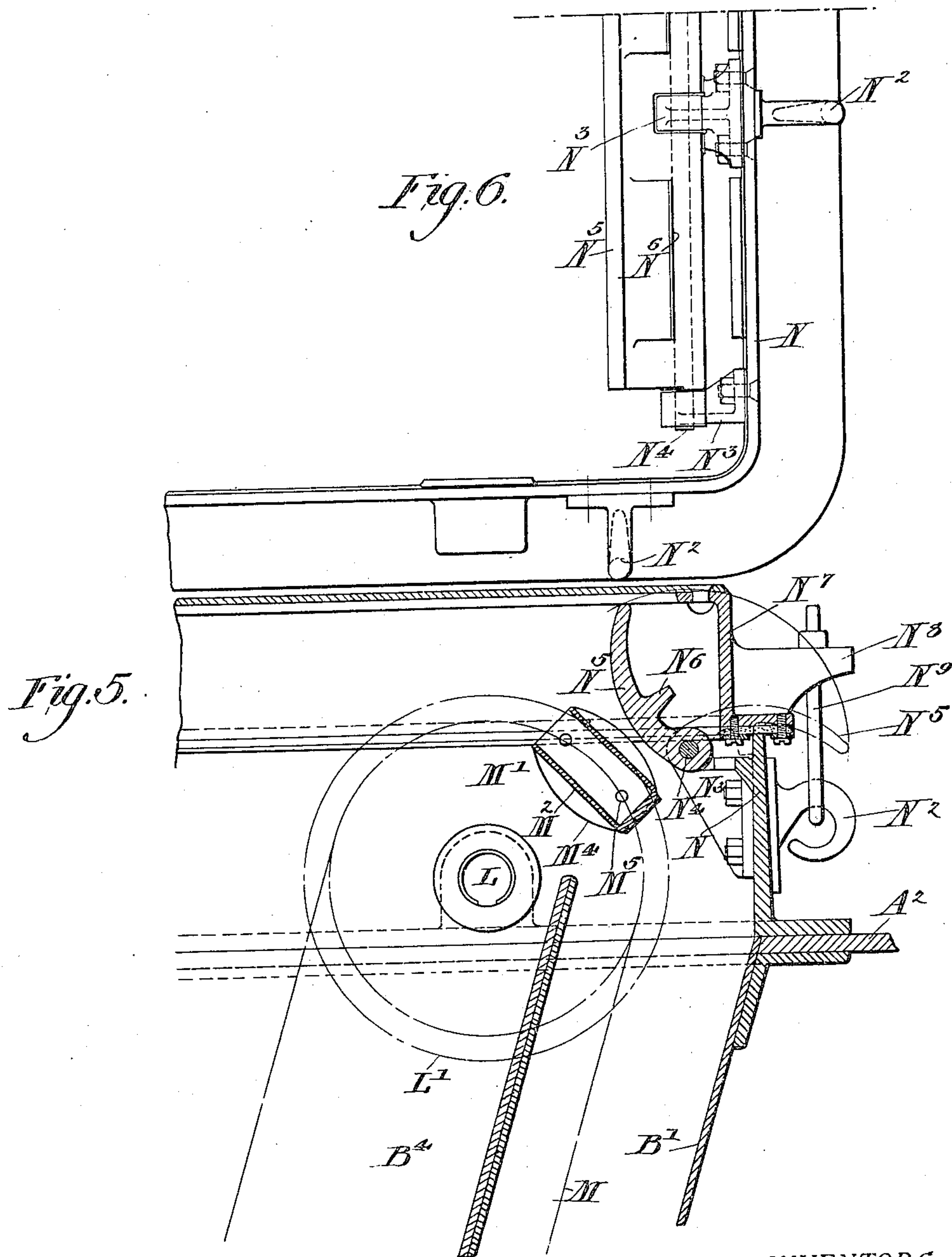
L. D. LOVEKIN, P. M. YOUNG & H. KRAPP.

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15 SHEETS—SHEET 3.

NO MODEL.



WITNESSES:

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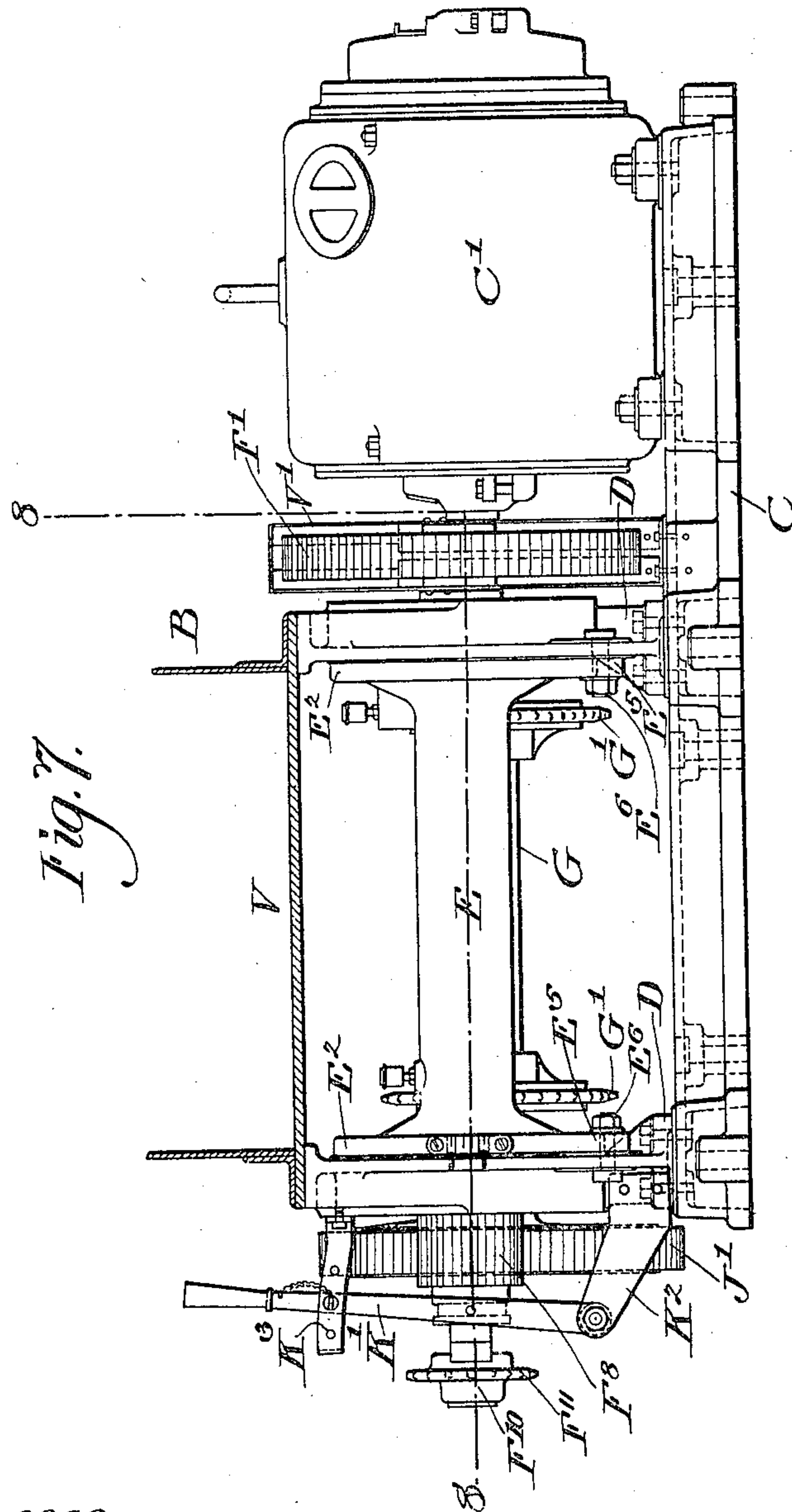
L. D. LOVEKIN, P. M. YOUNG & H. KRAPP.

AMMUNITION HOIST.

APPLICATION FILED JULY 25, 1904.

NO MODEL.

15 SHEETS—SHEET 4.



Witnesses:

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PATENTED DEC. 6, 1904.

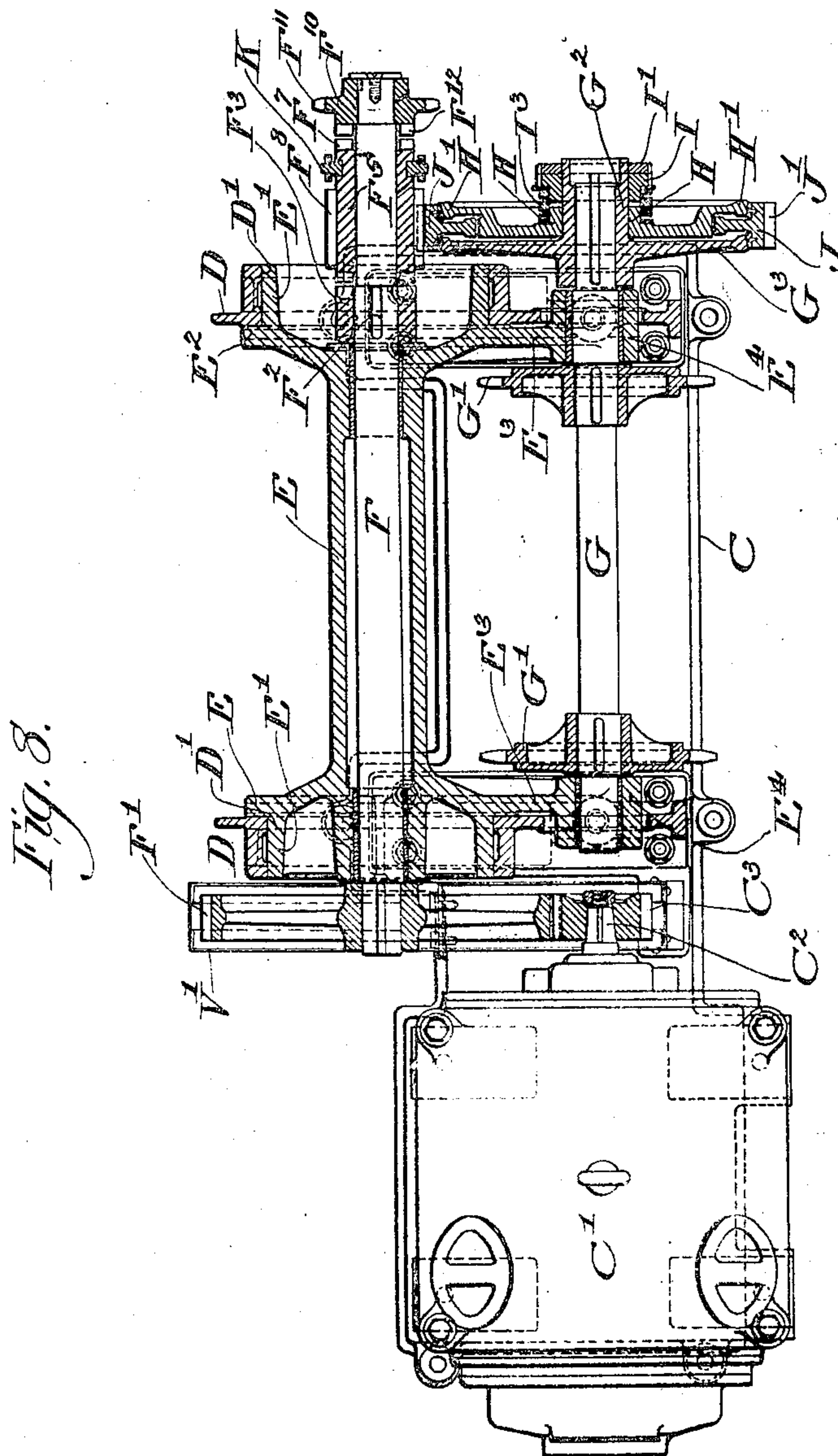
L. D. LOVEKIN, P. M. YOUNG & H. KRAPP.

AMMUNITION HOIST.

APPLICATION FILED JULY 26, 1904.

NO MODEL.

15 SHEETS--SHEET 5.



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L. D. LOVEKIN, P. M. YOUNG & H. KRAPP.

AMMUNITION HOIST.

APPLICATION FILED JULY 25, 1904.

NO MODEL.

16 SHEETS--SHEET 8.

Fig. 9.

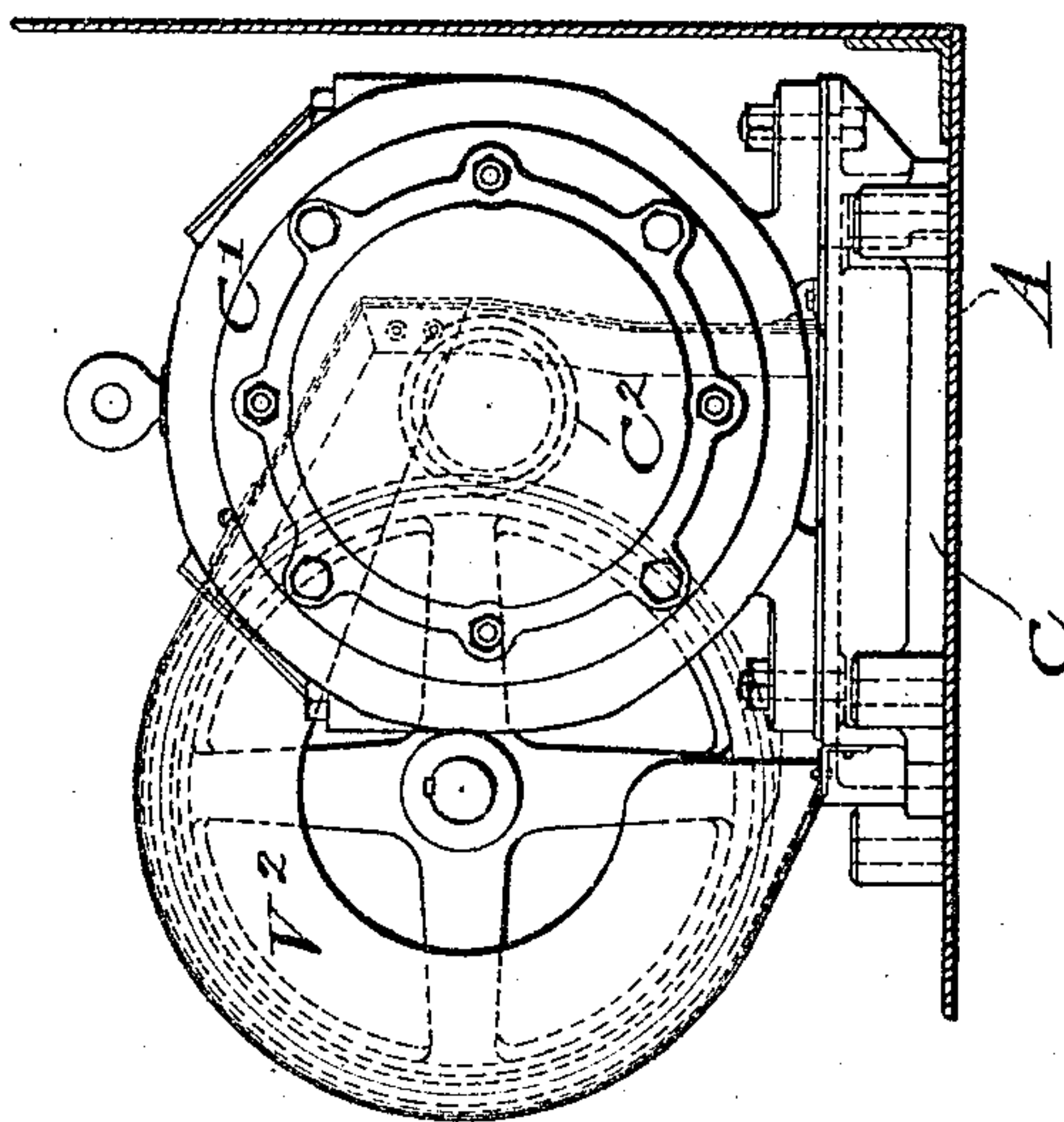


Fig. 11.

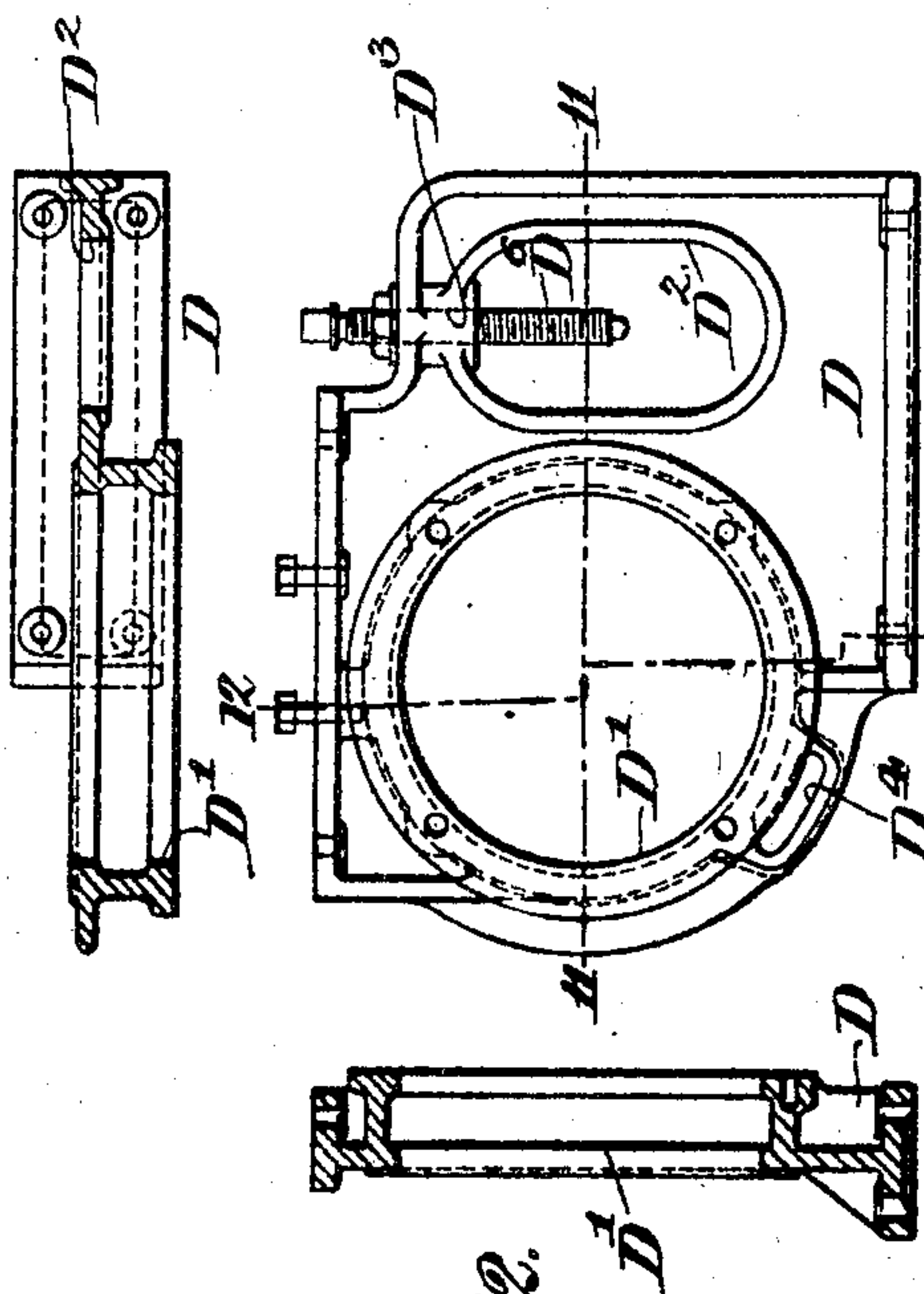
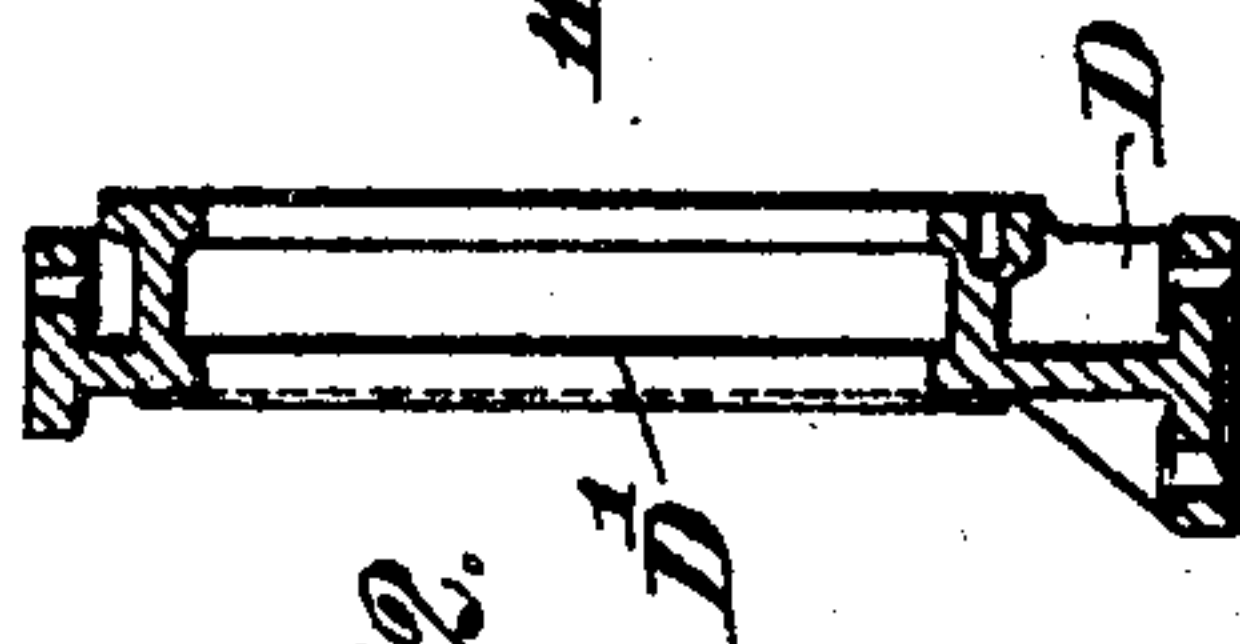


Fig. 10.

Fig. 12.



Witnesses:

Stewart

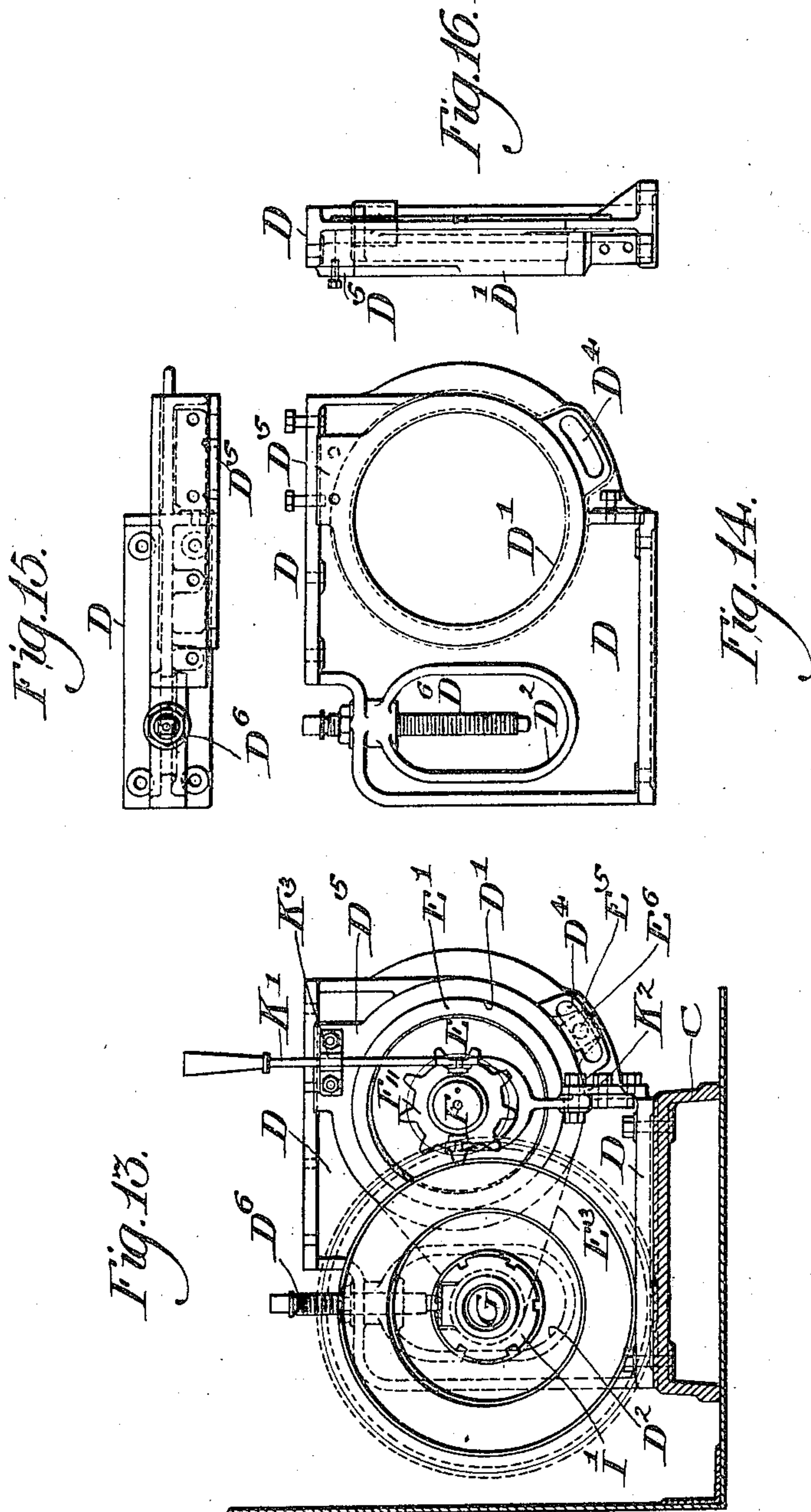
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Witnesses:

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Fig. 20.

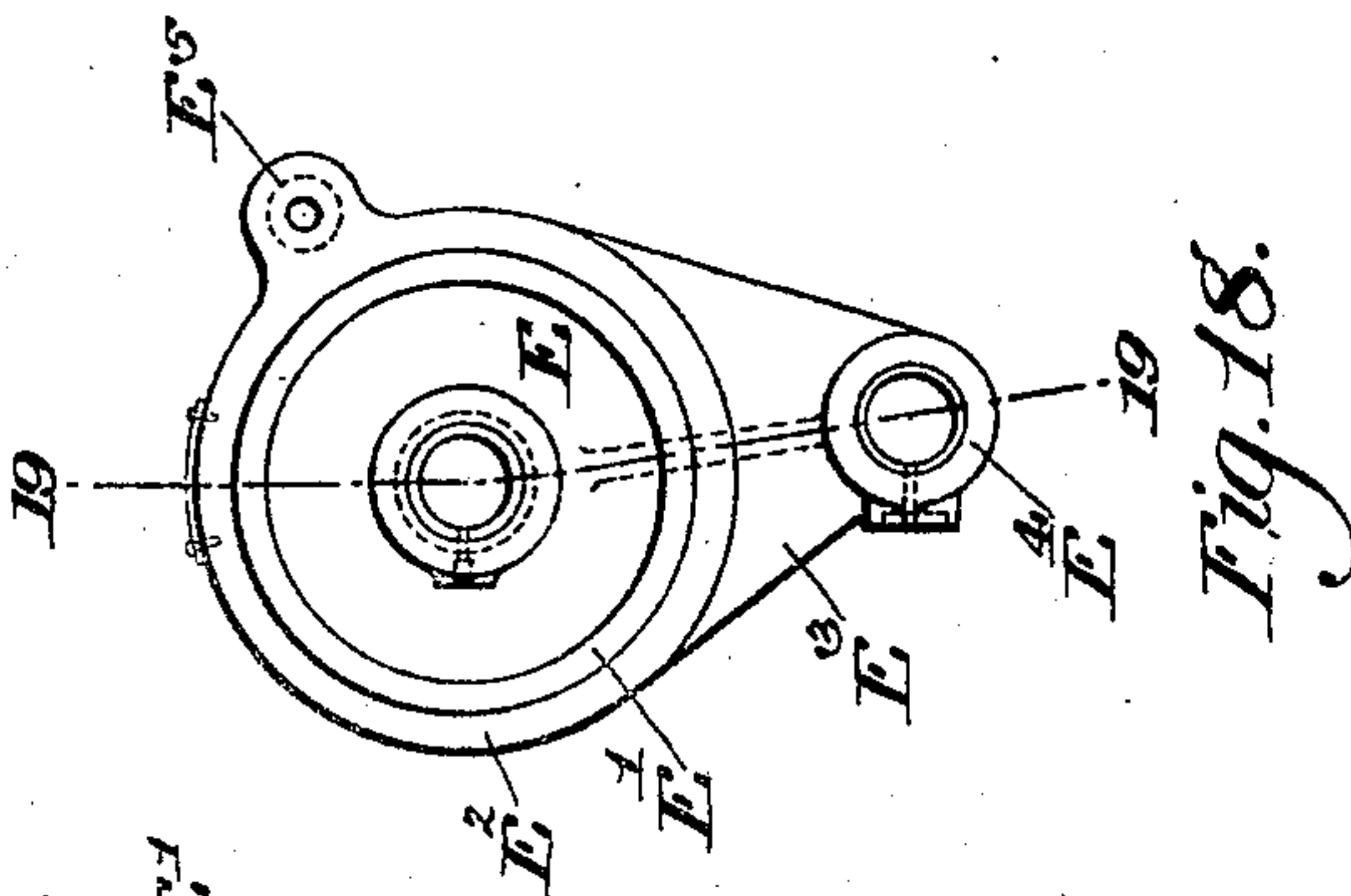


Fig. 18.

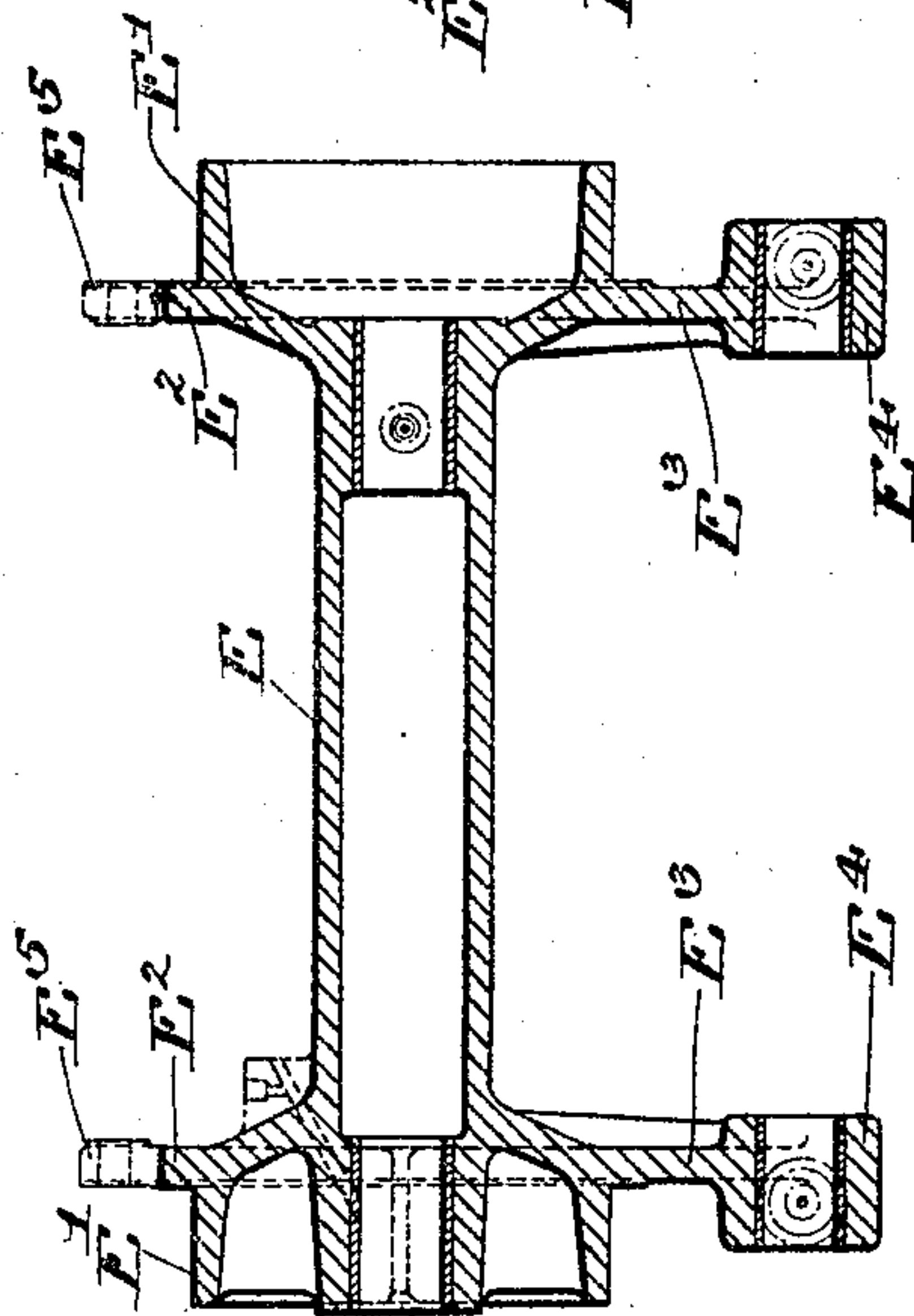


Fig. 19.

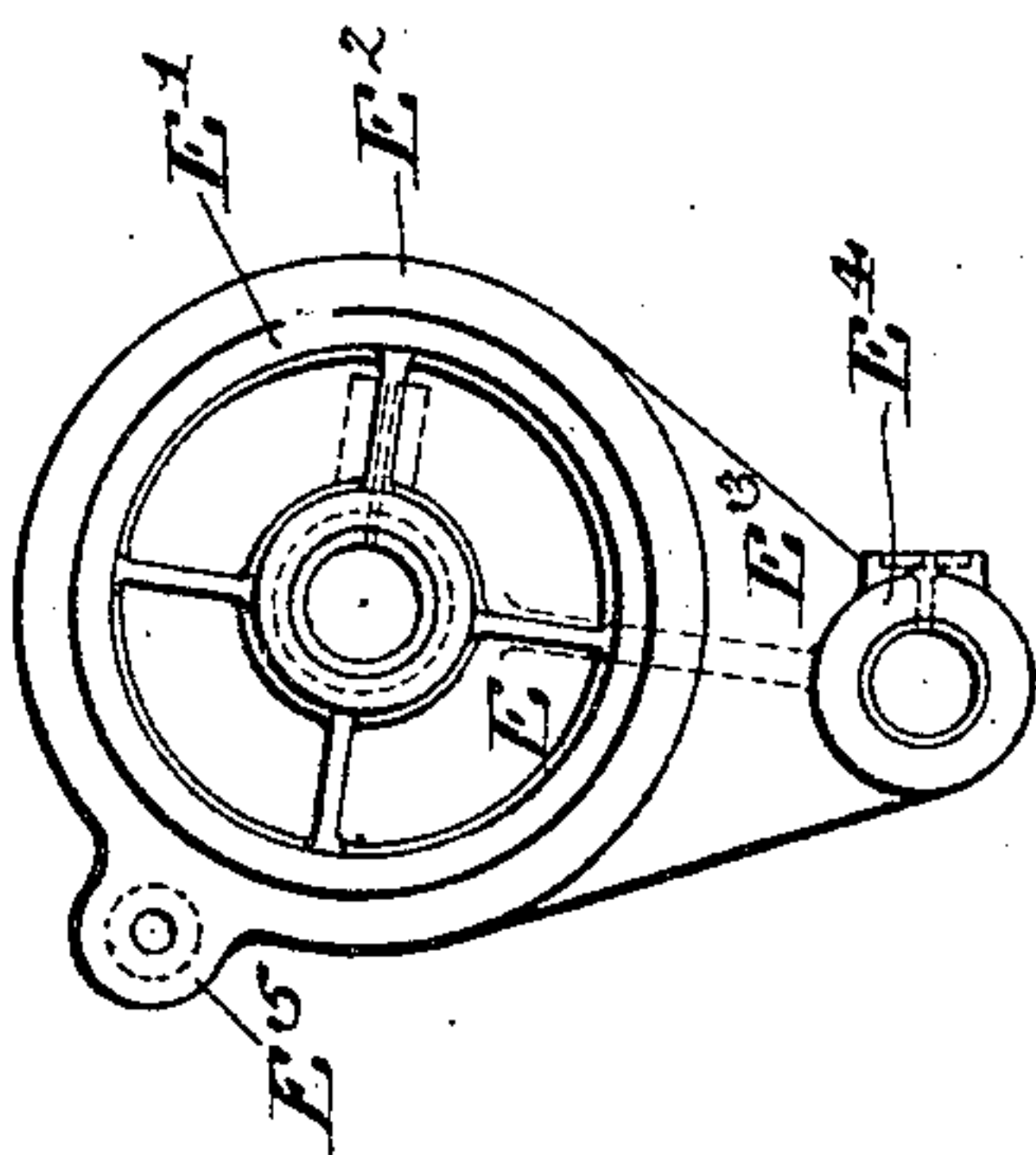


Fig. 17.

WITNESSES.

W. H. H. H. H.
W. H. H. H. H.
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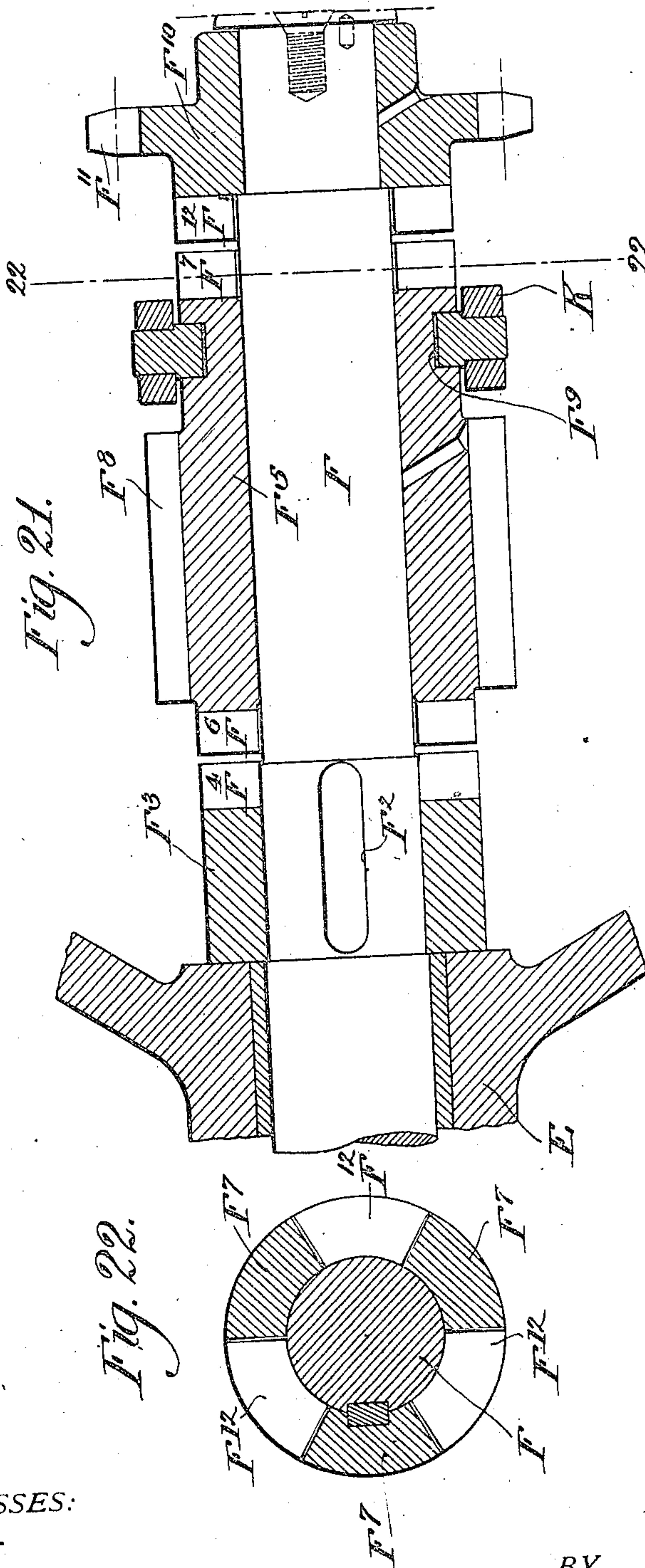
L. D. LOVEKIN, P. M. YOUNG & H. KRAPP.

AMMUNITION HOIST.

APPLICATION FILED JULY 25, 1904

15 SHEETS—SHEET 9.

NO MODEL.



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PATENTED DEC. 6, 1904.

L. D. LOVEKIN, P. M. YOUNG & H. KRAPP.
AMMUNITION HOIST.

APPLICATION FILED JULY 25, 1904.

15 SHEETS—SHEET 10.

NO MODEL.

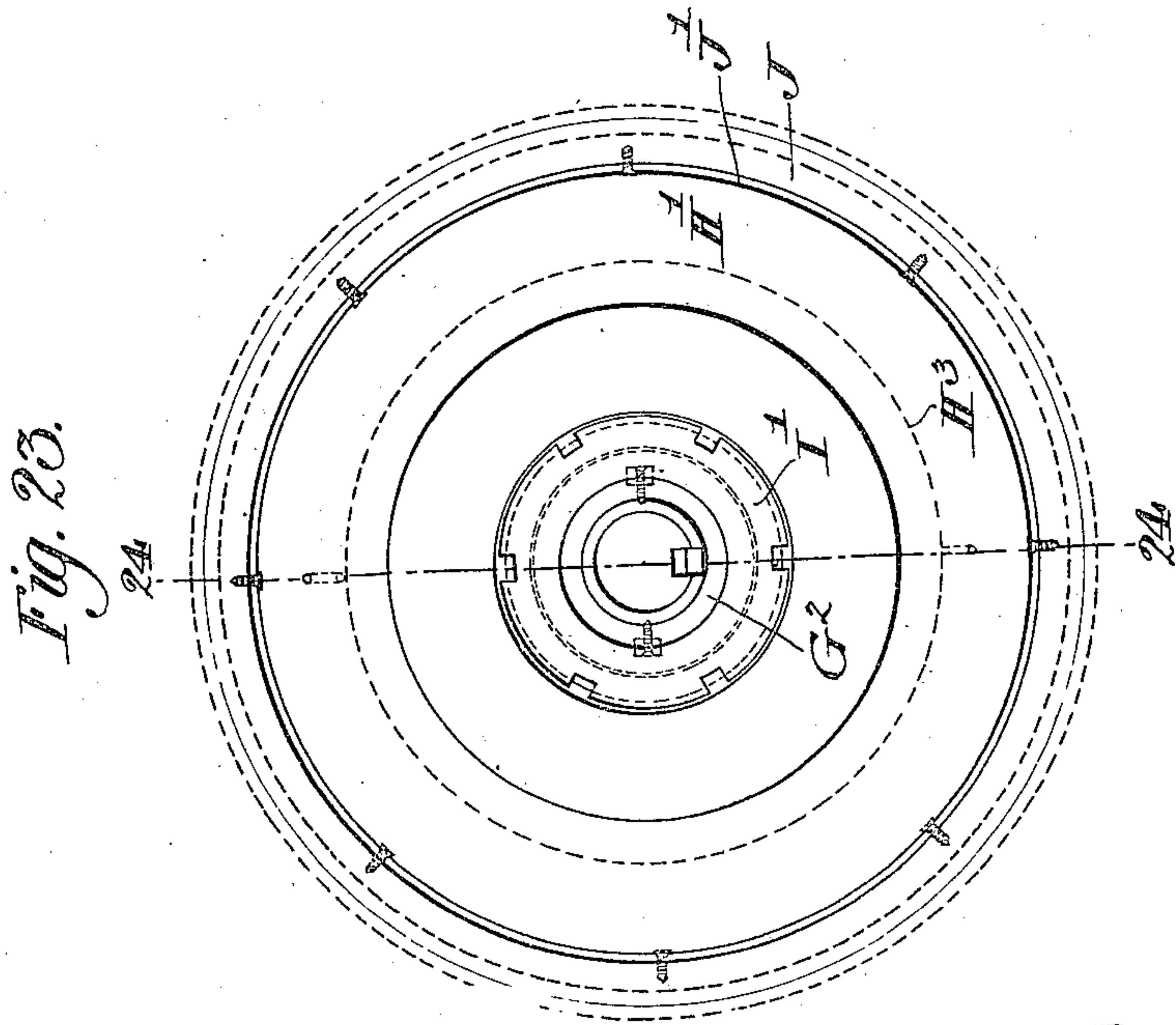
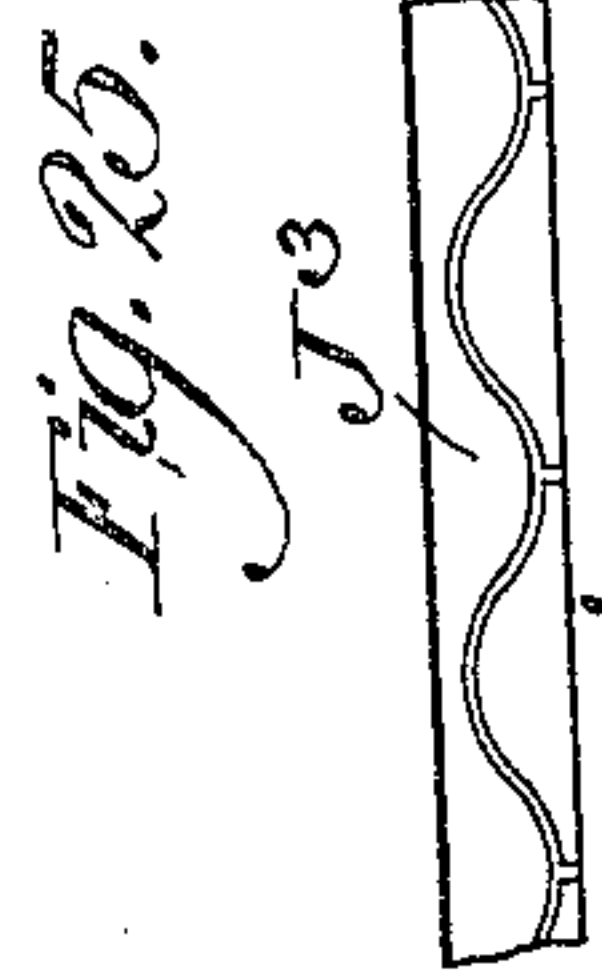
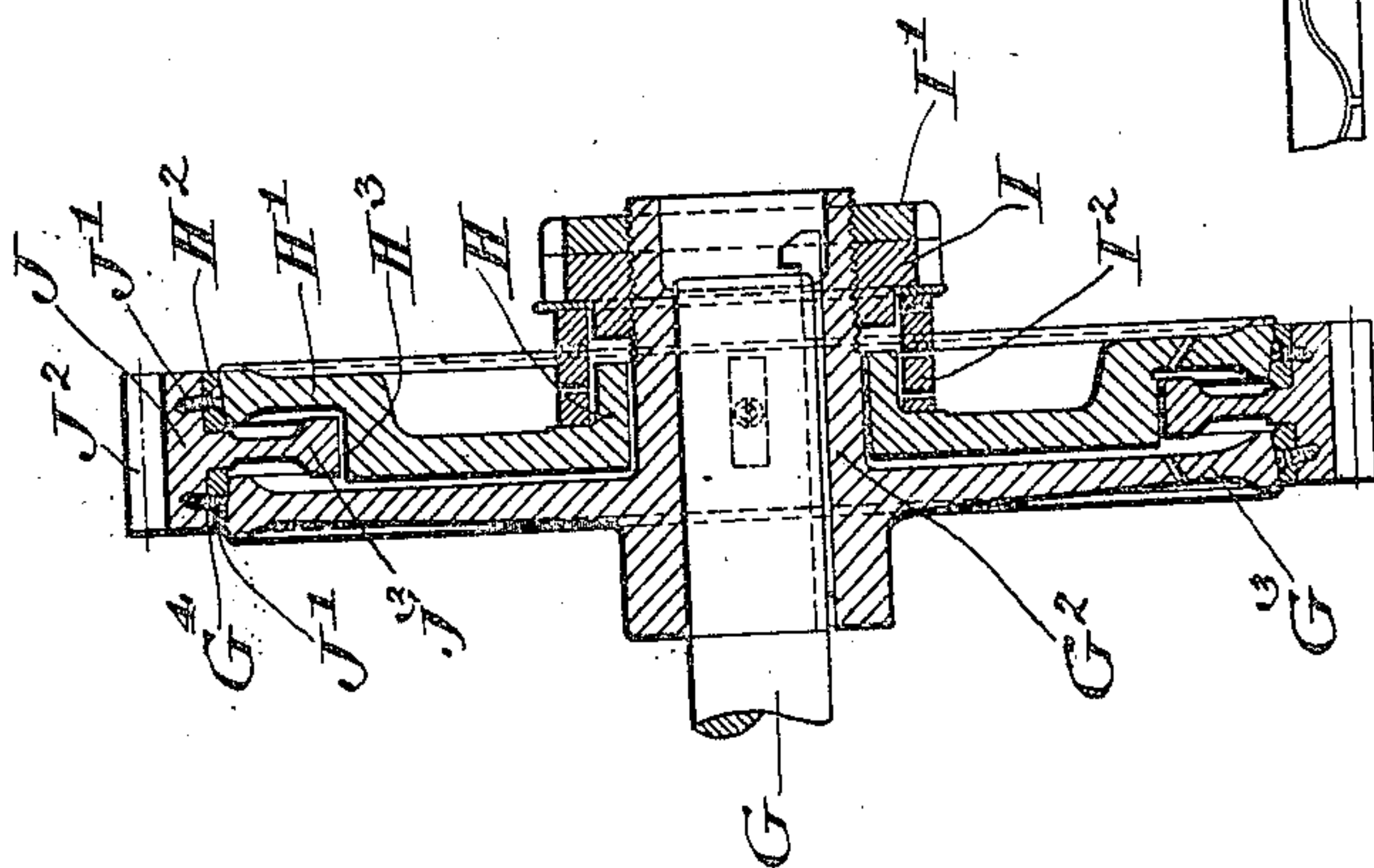


Fig. 24.



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AMMUNITION HOIST.

APPLICATION FILED JULY 25, 1904.

15 SHEETS—SHEET 11.

NO MODEL.

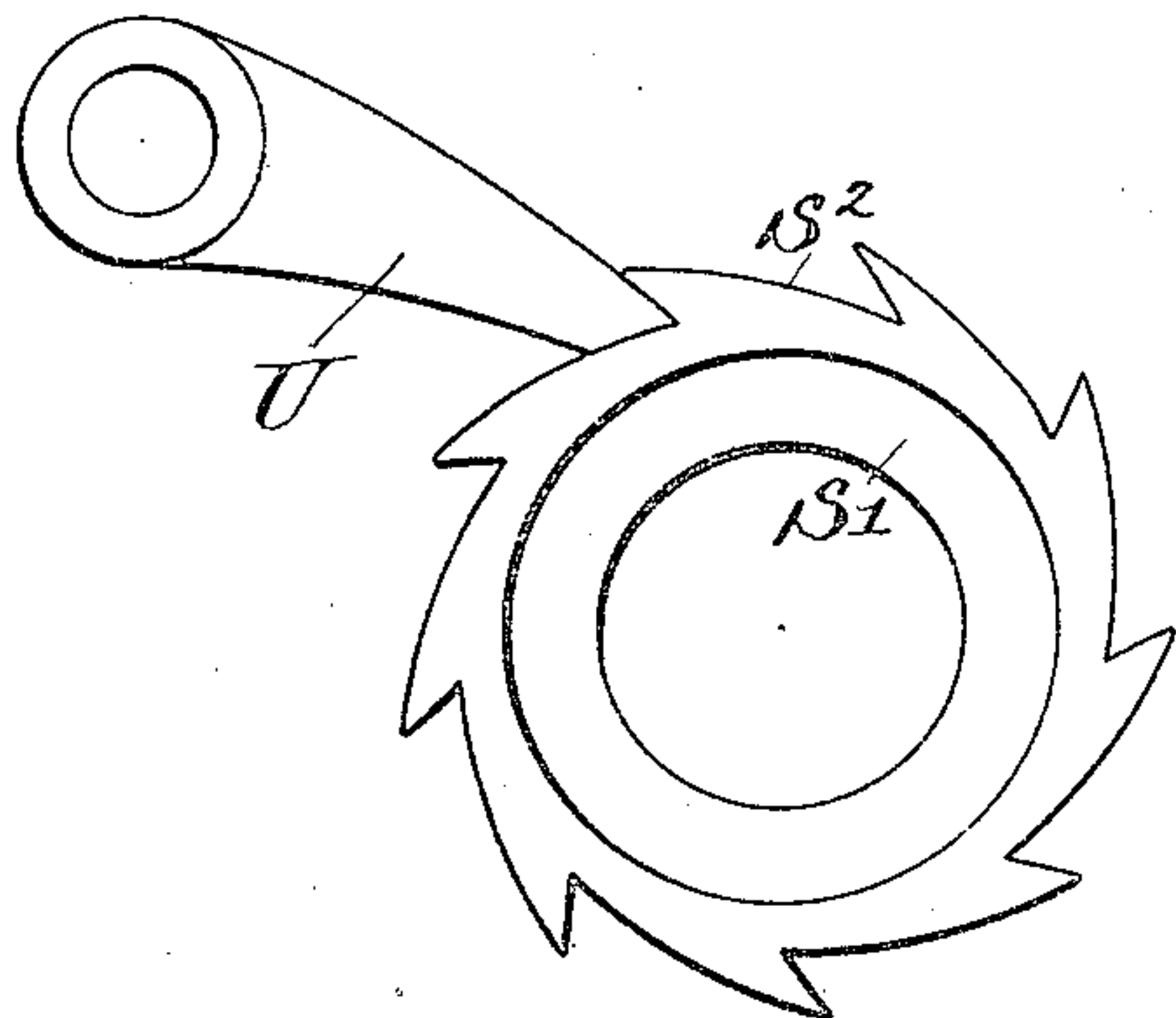
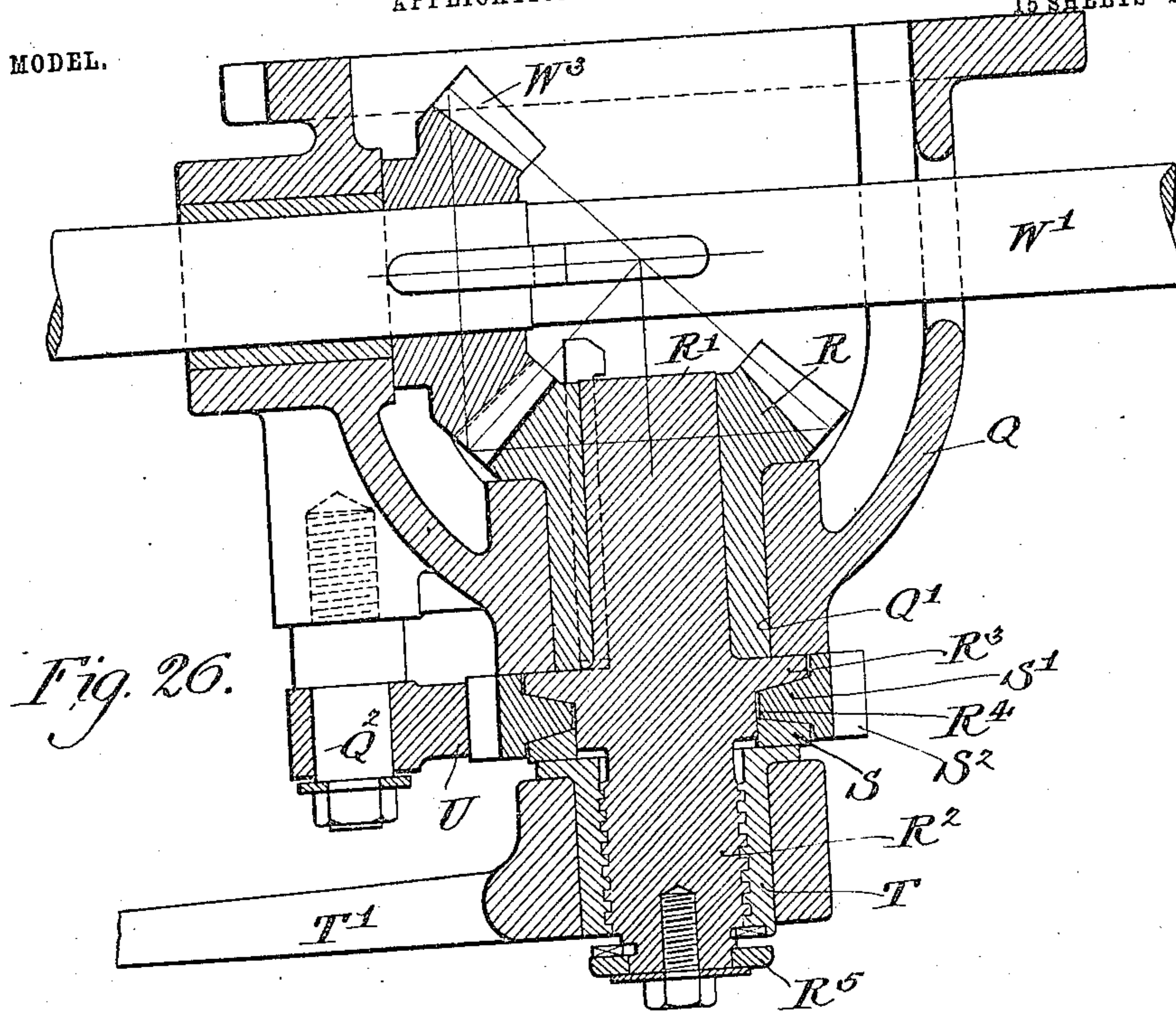


Fig. 27.

WITNESSES:

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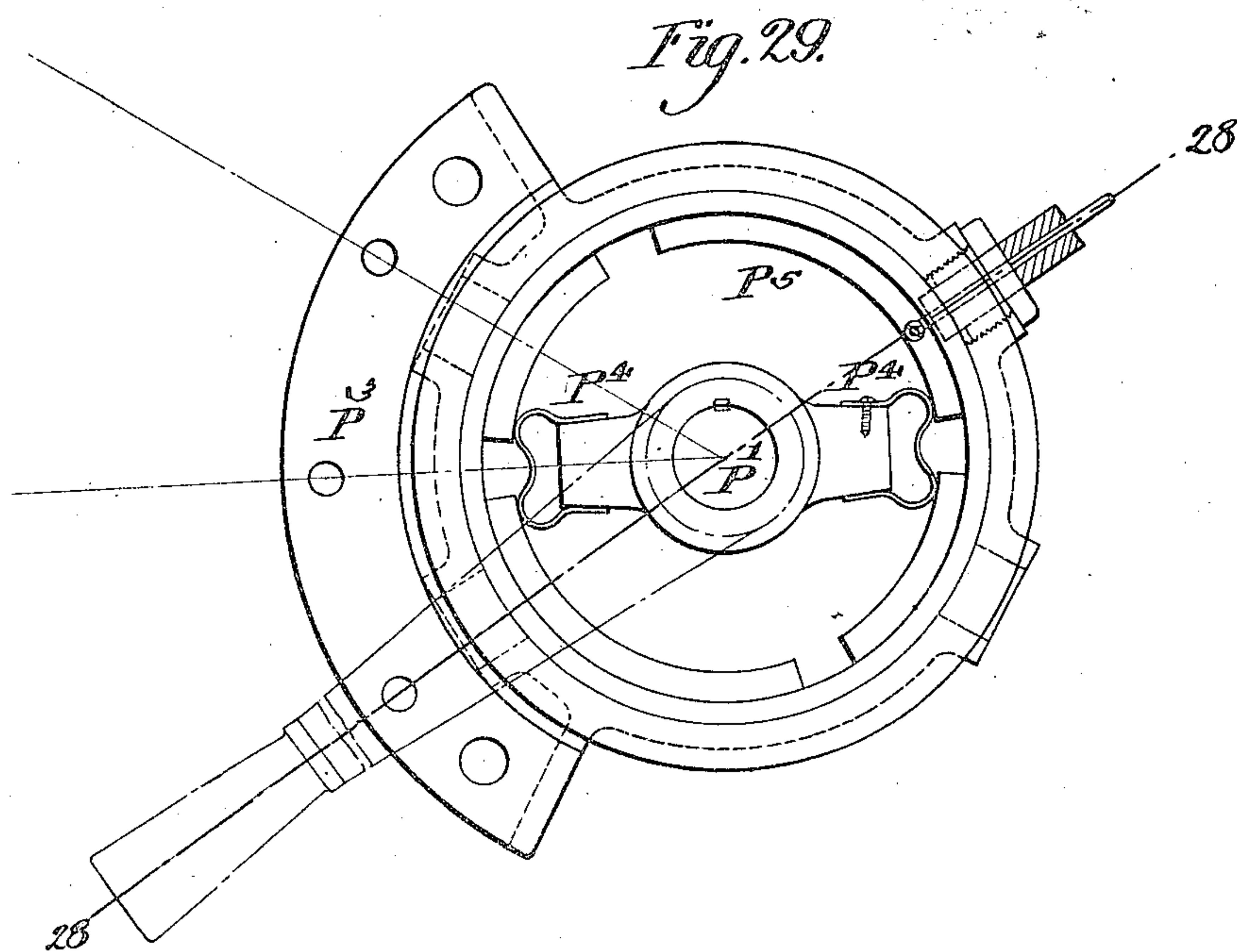
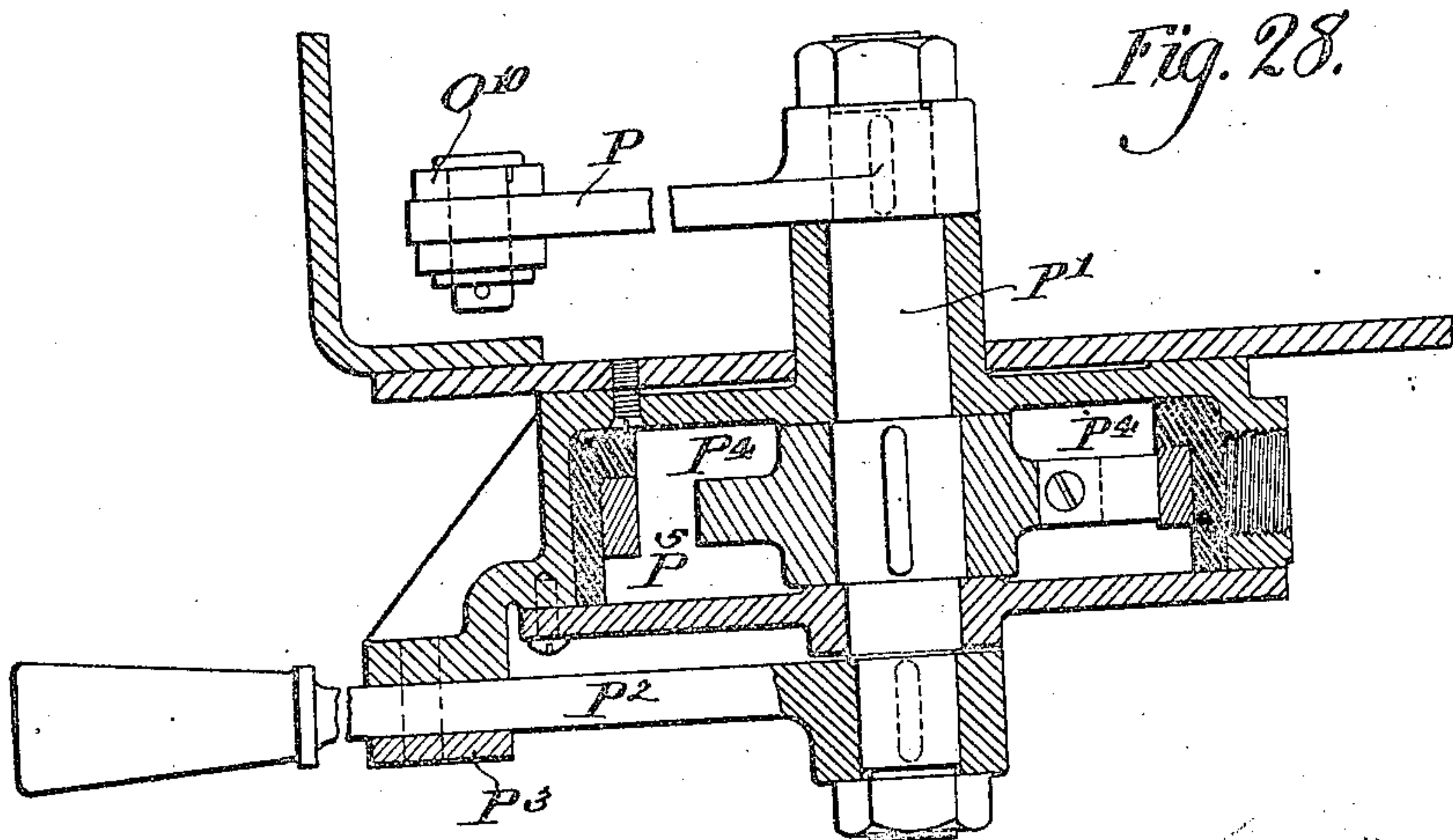
L. D. LOVEKIN, P. M. YOUNG & H. KRAPP.

AMMUNITION HOIST.

APPLICATION FILED JULY 25, 1904.

15 SHEETS—SHEET 12.

NO MODEL.



WITNESSES:

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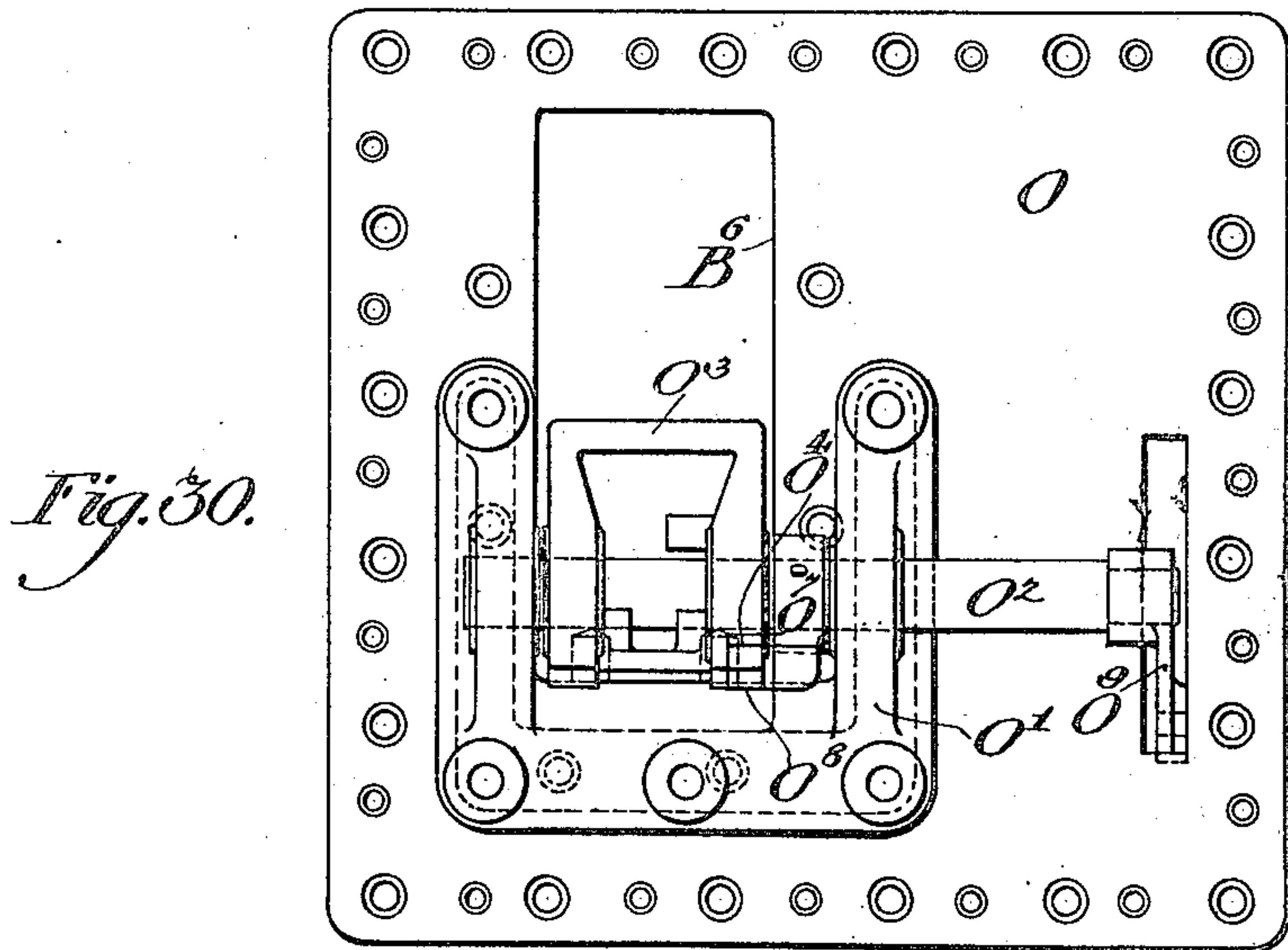
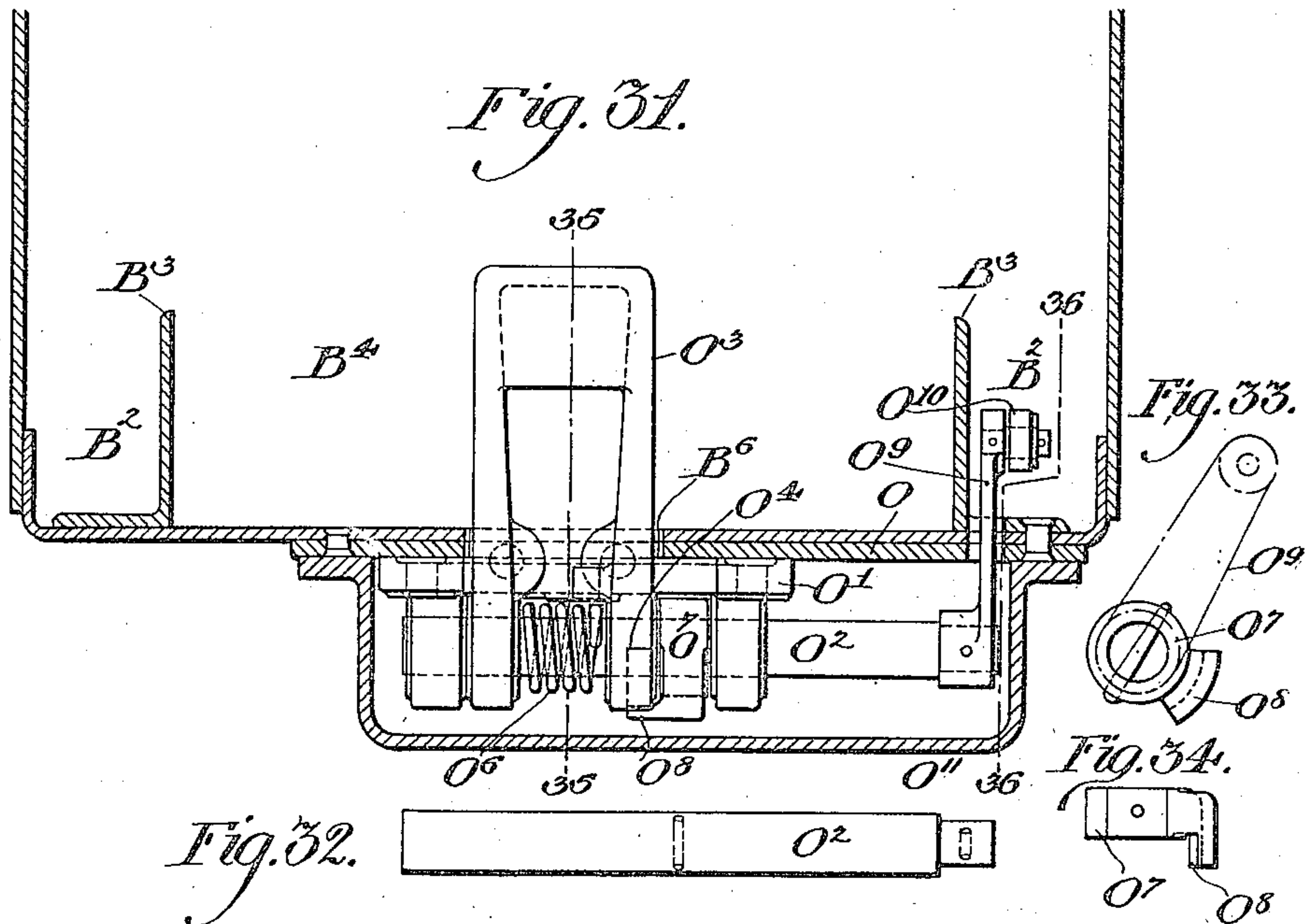
L. D. LOVEKIN, P. M. YOUNG & H. KRAPP.

AMMUNITION HOIST.

APPLICATION FILED JULY 25, 1904.

NO MODEL.

15 SHEETS—SHEET 13.



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PATENTED DEC. 6, 1904.

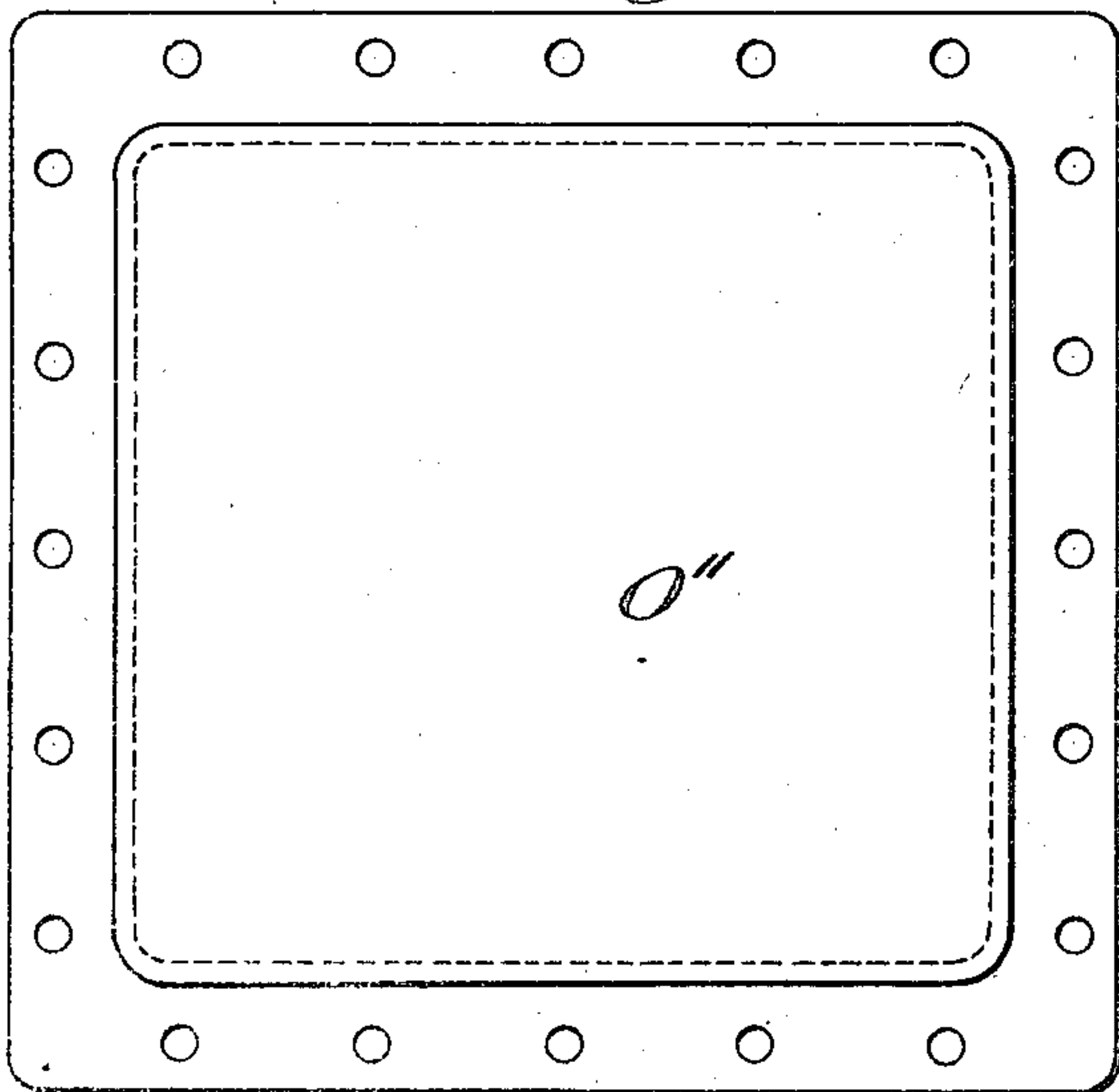
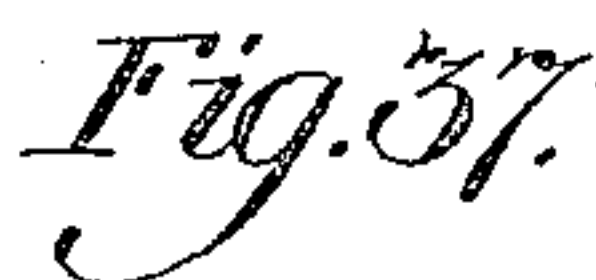
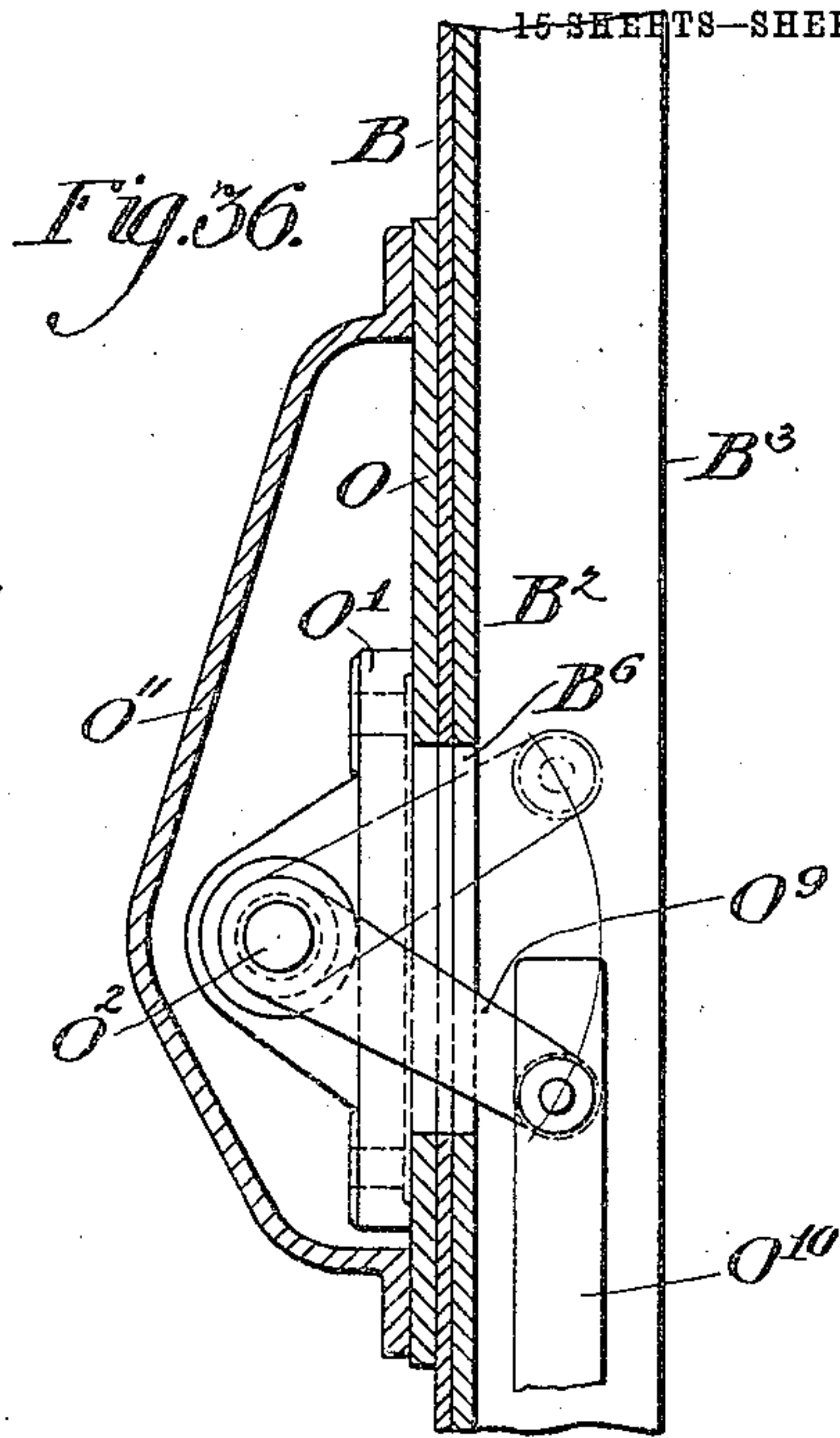
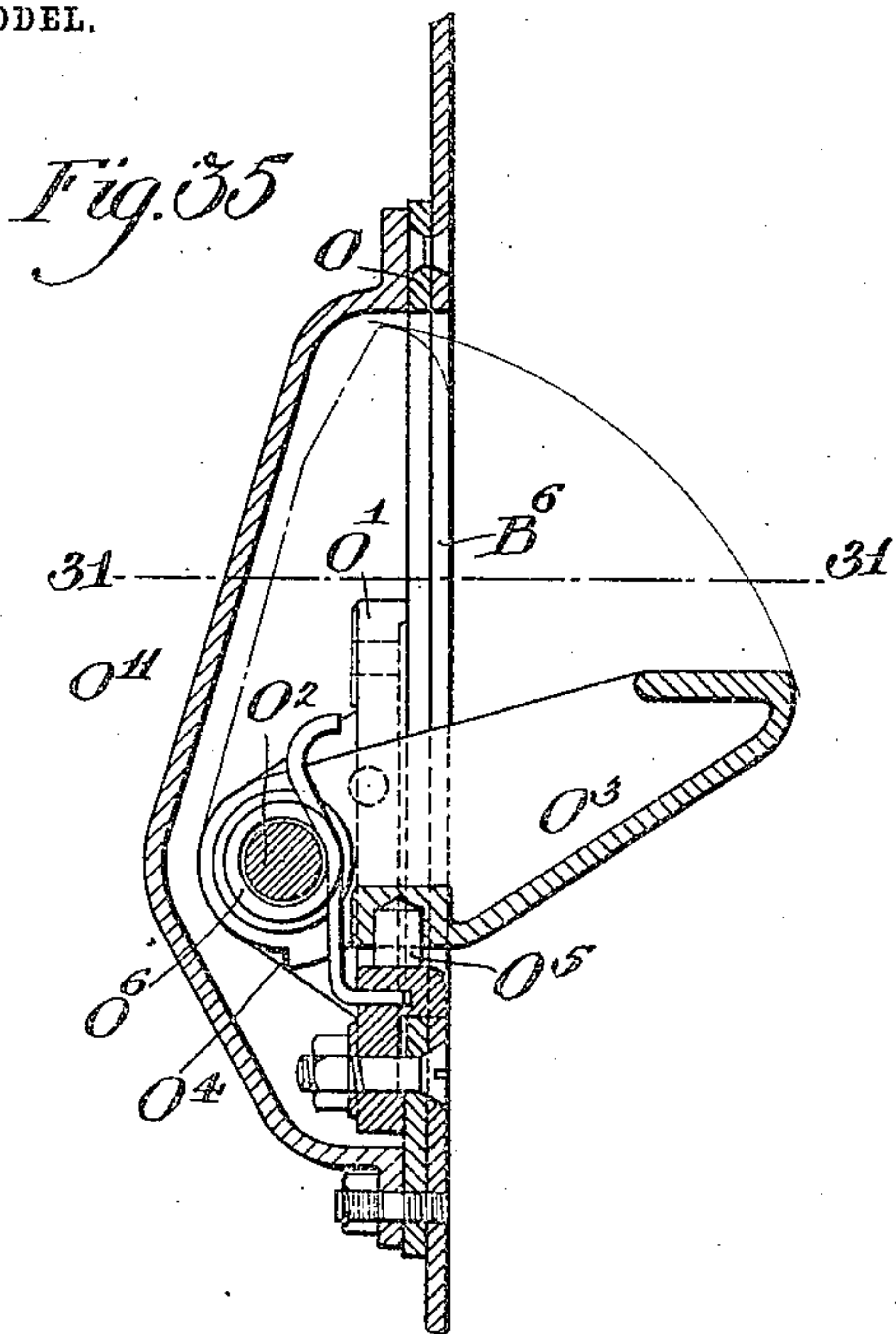
L. D. LOVEKIN, P. M. YOUNG & H. KRAPP.

AMMUNITION HOIST.

APPLICATION FILED JULY 25, 1904.

NO MODEL.

~~15 SHEETS~~—SHEET 14.



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Fig. 38.

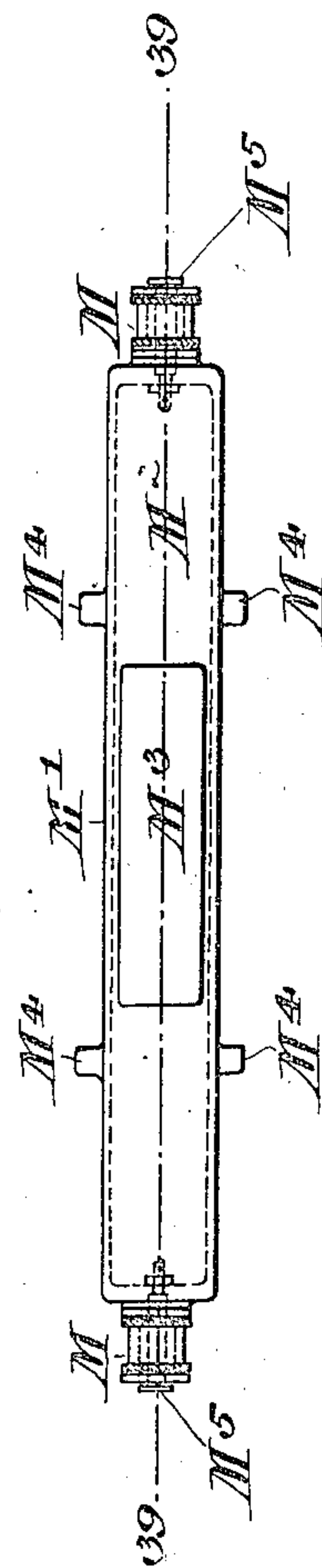


Fig. 39.

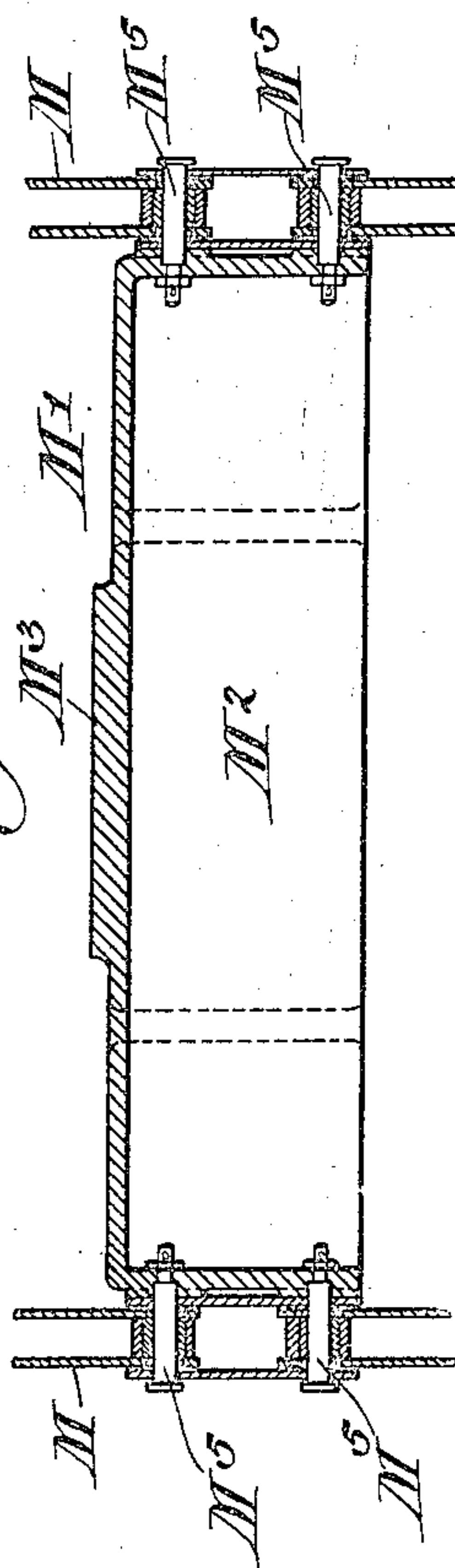
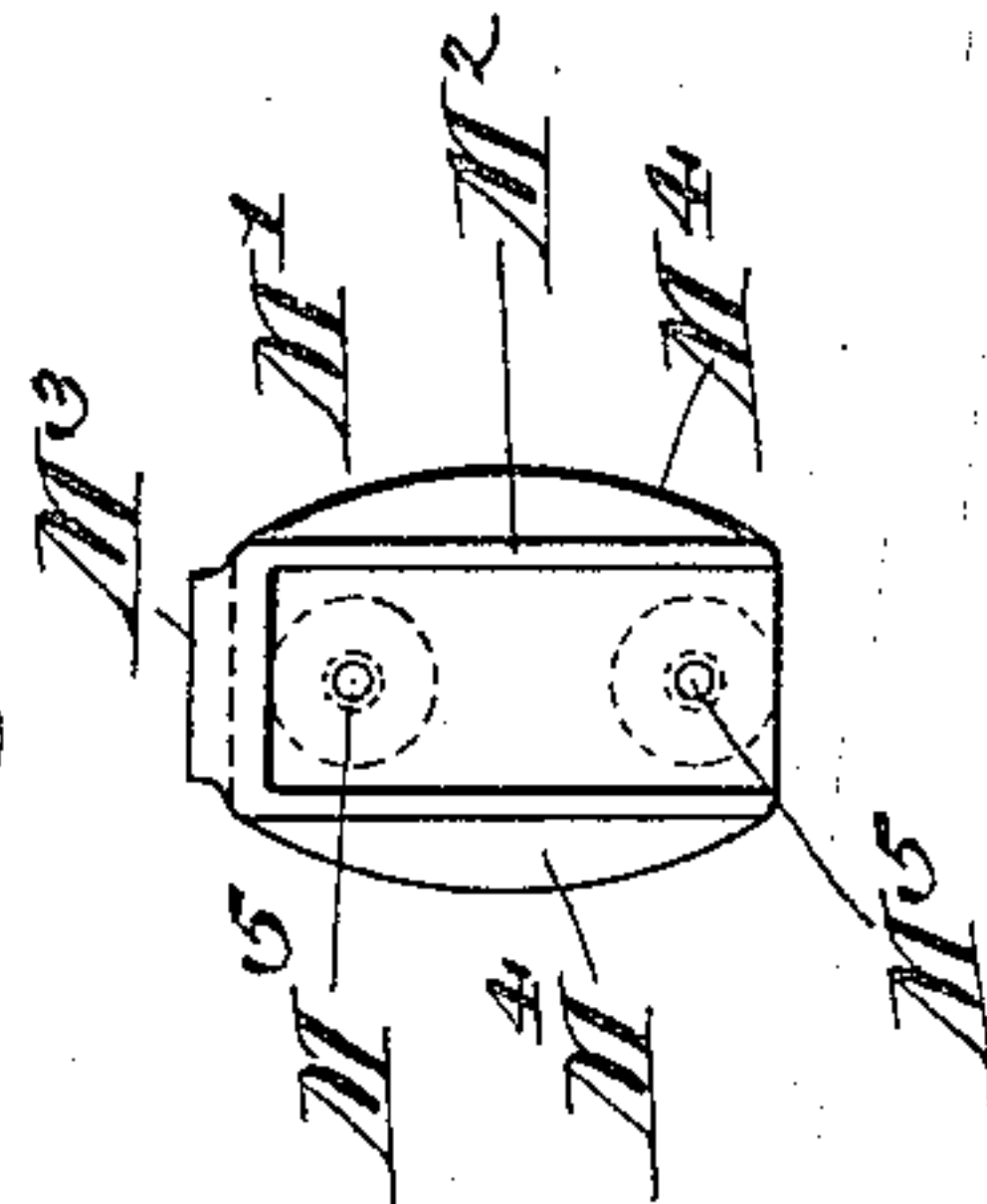


Fig. 40.



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UNITED STATES PATENT OFFICE.

LUTHER D. LOVEKIN AND PHILIP M. YOUNG, OF PHILADELPHIA,
PENNSYLVANIA, AND HUGO KRAPP, OF CAMDEN, NEW JERSEY.

AMMUNITION-HOIST.

SPECIFICATION forming part of Letters Patent No. 776,667, dated December 6, 1904.

Application filed July 25, 1904. Serial No. 217,986. (No model.)

To all whom it may concern:

Be it known that we, LUTHER D. LOVEKIN and PHILIP M. YOUNG, both citizens of the United States, and residents of the city and county of Philadelphia, in the State of Pennsylvania, and HUGO KRAPP, a subject of the Emperor of Germany, and a resident of the city and county of Camden, in the State of New Jersey, have invented a certain new and useful Improvement in Ammunition-Hoists, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

Our invention relates to ammunition-hoists, such as are used on war-ships, and has for its object to provide hoisting mechanism of simple and strong construction and in which are provided safety appliances both for preventing the breakdown of the mechanism under unusual strains and also for preventing an abrupt descent of the load, with consequent danger and damage, under conditions where such descent might be liable to take place.

A further object we have in view is to provide for the delivery of the ammunition at the top of the hoist without injury to the deck-casing or to the ammunition.

The nature of our improvements will be best understood as described in connection with the drawings, in which they are illustrated, and in which—

Figure 1 is a side elevation of the hoisting mechanism shown in central section on the line 1 1 of Fig. 2. Fig. 2 is a cross-section of the hoist on the line 2 2 of Fig. 1. Fig. 3 is a front elevation of the hoisting mechanism; Fig. 4, a plan view of the lower part of the hoist, showing the mechanism for actuating the sprocket-chains by hand as well as by power. Fig. 5 is an enlarged sectional view of the top of the hoist, showing an appliance which we prefer to use in connection therewith. Fig. 6 is a plan view of the deck-casing at the top of the hoist with the cover removed. Fig. 7 is a front elevation of the hoisting mechanism used for actuating the sprocket-chains by power. Fig. 8 is a plan view of the mechanism shown partly in sec-

tion on the line 8 8 of Fig. 7. Fig. 9 is an end elevation of the mechanism shown in Fig. 7, taken from the side of the motor. Fig. 10 is a side elevation of the housing used on this side of the hoisting appliances; Fig. 11, a horizontal section on the line 11 11 of Fig. 10; and Fig. 12, a vertical section on the irregular line 12 12 of Fig. 10. Fig. 13 is an end elevation of the hoisting mechanism, taken on the opposite side to that shown in Fig. 9. Fig. 14 is a side elevation of the housing on the side shown in Fig. 13. Fig. 15 is a plan of the housing; Fig. 16, an end view thereof. Figs. 17 and 18 are end elevations of the double-armed shaft-bearing, taken from opposite sides thereof. Fig. 19 is a section approximately on the line 19 19 of Fig. 18, with the lug E^s shown in dotted lines and somewhat out of position. Fig. 20 is a plan view of the power driving-shaft. Fig. 21 is a plan view of the end of the driving-shaft, to which the clutches and clutch-actuated pinion are attached, the said clutches and pinion being shown in section, as well as the portion of the shaft-bearing shown in the drawings. Fig. 22 is a cross-sectional view on the line 22 22 of Fig. 21. Fig. 23 is a side view of the slip-clutch gear used in transmitting motion from the driving-shaft to the sprocket-sheave. Fig. 24 is a section thereof on the line 24 24 of Fig. 23. Fig. 25 is a fragmentary detail showing an oil-groove in the rib portion J^s of the clutch-gear J. Fig. 26 is a sectional view of the hand elevating mechanism used in connection with the driving-shaft; Fig. 27, a detail of the bolt and ratchet-clutch used as a part thereof. Fig. 28 is a sectional view of the devices for reversing the motor and shifting the safety-catches out of operative position, the section being as on the line 28 28 of Fig. 29, which is a front view of the same device. Fig. 30 is an elevation of the safety-catch mechanism shown in connection with the reinforcing-plate, which is secured on the trunk of the hoist. Fig. 31 is a sectional view of the safety-catch mechanism, taken as on the line 31 31 of Fig. 35. Fig. 32 is a plan of the shaft used in connection with the safety-

catch fingers; Fig. 33, an end view of the shaft with catch-finger attached thereto and connecting-lever indicated in dotted lines. Fig. 34 is a side elevation of the catch-finger. Fig. 35 is a sectional view taken as on the line 35 35 of Fig. 31. Fig. 36 is a sectional view taken as on the line 36 36 of Fig. 31. Fig. 37 is an elevation of the cover protecting the safety appliances. Fig. 38 is a plan view of the carrier used in connection with the sprocket-chains; Fig. 39, a sectional elevation thereof on the line 39 39 of Fig. 38, and Fig. 40 an end view of the carrier.

A, A', and A" (see Figs. 1, 3, and 5) indicate decks of the ship; B, the trunk of the ammunition-hoist, which extends through opening A' in deck A' to the upper deck A". The trunk (see Fig. 2) is divided by a longitudinally-extending partition into chambers B' and B", and the chamber B' has its sides divided off by slotted partitions B³ B³ into chambers B² B². As shown in Fig. 1, the upper members of the slotted partitions B³ are at the top and bottom of the trunk formed or lined with wood, as indicated by shading. For the rest the trunk and partitions are preferably made of steel.

C indicates the bed-plate, preferably made of a single casting, on which are supported the motor C' and the frames or housings D D' of the hoisting apparatus.

The housing on the motor side of the apparatus is shown in Figs. 10, 11, and 12, and the housing farther away from the motor is shown in Figs. 14, 15, and 16. They are, as will be seen, practically alike, except that in the housing shown in Figs. 14, 15, and 16 a flattened portion D⁵ is provided in addition to the parts shown in the other housings. The housings D are formed with circular bearings D' and preferably elongated openings, (indicated at D²), into which extend from above the threaded perforations D³. (See Fig. 10.) At one side of the circular bearing D' is formed a segmental slot D⁴.

D⁶ indicates an adjusting-bolt screwing into the threaded perforations D³.

E (see Figs. 7, 8, and 17 to 20, inclusive) is a double-armed shaft-bearing having circular portions E' E', which are journaled in the circular bearings D' D' of the housings, flanges E² E² fitting against the sides of these circular openings. Extending out from the main portion of the double-arm bearing E are the arms E³ E³, supporting at their ends the shaft-bearings, (indicated at E⁴ E⁴.)

E⁵ E⁵ indicate perforated brackets extending out from the flanges E² over the segmental slots D⁴. Bolts E⁶ (see Fig. 13) extend through the lugs or brackets E⁵ and the slots D⁴ and serve as one means of clamping the double-armed shaft-bearing in place on the housings.

F is the driving-shaft, geared through gear-

wheel F' with a gear C³, secured on the shaft C² of the motor.

F² is a keyway in the shaft F, and F³ (best shown in Fig. 21) a clutch-annulus secured to the shaft through the keyway F² and having projecting clutch-teeth, (indicated at F⁴.)

F⁵ is the hub of a gear-wheel, the teeth being indicated at F⁶, which is free to slide longitudinally on the shaft F and is provided with clutch-teeth F⁶ and F⁷ at both ends and is also equipped, as shown, with an annular recess F⁸.

F¹⁰ is a hub secured on the end of the shaft F and provided with sprocket-teeth F¹¹ and with inwardly-extending clutch-teeth F¹².

G (best shown in Fig. 8) is a shaft journaled in the shaft-bearings E', which bearings, it will be noticed, extend into the openings D² of the housings, the shaft supporting sprocket-wheels G' G' and having secured to its end a hub G², from which extends an annular clutch-arm G³, the hub G² also serving as a bearing for the hub H of a longitudinally-movable clutch-disk H', the outer end of which is set off from the clutch-disk G³, as shown in Fig. 24, forming an annular face H³. The outer edges G⁴ H³ of the disks G³ and H' are inclined inward toward each other, as is well shown in Fig. 24.

I is an adjusting-nut and spring-abutment screwing on the end of the hub G², I indicating a binding-nut and I' a spiral spring which abuts against the disk H', forcing it with regulated pressure toward the disk G³.

J is an annular ring having gear-teeth J² formed on its outer face and friction-pads J' secured on its inner face and abutting against the faces G⁴ and H³ of the friction-disks. The ring J is also formed, as shown, with an inwardly-projecting annular rim J³, which extends between the friction-disks and nearly into contact with the annular face H³ of the disk H'. As shown in Fig. 25, an oil-groove is preferably formed on this disk to insure constant lubrication at this point.

K is a shifting annulus connected by pins with the annular ring K' on the gear-hub F⁵ and actuated by a lever K', pivoted on a bracket K² and adjustable in segment K³, which segment is, as shown, secured on the flattened portion D⁵ of the housing which is most remote from the motor.

L (see Figs. 1 and 5) is a sprocket-wheel shaft at the top of the trunk B, to which are secured sprocket-wheels L', over which and the sprocket-wheels G', secured on the shaft G, extend the carrier-chains M, these chains passing through the trunk, through the outer sides of the compartments B', and through the lateral chambers B² B². The carrier-chains at proper intervals are secured to the carriers M', which carriers of course extend through the chamber B' of the trunk and are preferably constructed, as shown in Figs. 38

to 40—that is to say, of practically rectangular metallic boxes M^2 —having their upper faces reinforced, as indicated at M^3 , where the ammunition rests upon them and having curved flanges $M^4 M^4$ at their sides $M^5 M^5$, &c., indicating the bolts by which the carrier-boxes are secured to the chains M , as well shown in Figs. 38 and 39.

N (see Figs. 1, 5, and 6) is a rectangular framing secured to the deck A^2 at the top of the hoist-trunk, the framing having hinge members (indicated at N') by which the cover is in part secured and having outwardly-extending hooks N^2 around it to aid in securing the cover in place. The casing N is also, as shown, provided with inwardly-extending brackets $N^3 N^3$, &c., which support a pivot pin or shaft N^4 , on or to which is secured the curved-face apron N^5 , preferably provided on its concave side with the lugs N^6 , which when the apron is turned outward to the position shown in dotted lines in Fig. 5 rests on the brackets N^3 .

N^7 indicates the cover, which is hinged on the hinge-brackets N^2 and provided with outwardly-extending lugs N^8 , corresponding in position to the hooks N^2 and to which, in addition to said hooks, bolts N^8 are connected to hold the cover in place.

At one or more points openings B^6 are formed in the top of the trunk B , (see Figs. 30, 31, and 35 to 37, inclusive,) and the upper part of the trunk is here shown, preferably, reinforced by a reinforcing-plate O , similarly slotted, on which is secured the U-shaped bracket O' , which furnishes bearings for a transversely-extending shaft O^2 , on which is pivoted a safety catch-finger O^3 , said finger having near its pivot connection with the shaft O^2 a shoulder O^4 (best shown in Fig. 35) and being preferably provided with a rubber cushion O^5 , which when the catch-finger is in operative position rests against the bracket O' , as shown. A spring O^6 normally holds the catch-finger in extended position, as shown in Fig. 35.

O^7 , Figs. 30 to 34, is an annular collar secured on the shaft O^2 and formed with an outwardly-extending finger O^8 , which extends over the pawl of the safety-catch, in which the shoulder O^4 is formed.

O^9 is a lever secured in the end of the shaft O^2 and extending into one of the side chambers B^2 of the trunk, where it is connected to a longitudinally-running rod O^{10} .

O^{11} is a cover secured over the bracket O' and parts connected thereto, as shown.

The lower end of the rod O^{10} (see Fig. 1) is connected to a lever-arm P , pivoted at P' and connected to the handle-lever P^2 , and by preference this lever P^2 is used not only for actuating the rod O^{10} , but also as a reversing-lever for the motor C' , which, as shown, is an electric motor, a reversing mechanism suitable

for use in this connection being shown in Figs. 28 and 29.

P^3 indicates the segment through which the reversing-lever P^2 moves, and the pivot-shaft P' is provided with a double-armed hub P^4 , having contact-springs secured to its arms, which work in connection with the annularly-distributed contact-bars P^5 of the switch, the general character of which is indicated in the drawings, but which may of course be of any convenient construction.

Referring now particularly to Figs. 3, 4, 26, and 27, it will be seen (see Fig. 24) that the sprocket-wheel F^{11} is connected through a sprocket-chain W with a sprocket-wheel W^2 on the end of a shaft W' , which (see Fig. 26) has a bearing in the casting Q and through a miter-gear W^3 and engaged miter-gear R has engaged with a shaft R' , also supported in the casting Q , this shaft having its outer end R^2 , threaded, as shown, and a clutch-disk R^3 formed on an intermediate portion, as is also a bearing-shoulder R^4 , which supports the annular clutch-ring S . Annular ring S' extends between the clutch-rings R^3 and S and is formed on its outer surface with ratchet-teeth, as indicated at S^2 . T is a threaded hub screwing on the threaded portion R^2 of the shaft R' and having attached to it the crank-arm T' , this hub and crank-arm being prevented from screwing off of the shaft by the stop-collar R^5 . U indicates a ratchet-pawl pivoted on a bolt Q^2 , extending out from a casing Q .

V is a loading-platform at the bottom of the trunk, which is, as shown, secured to the top of the housings $D D V'$, indicating simply a casing thrown over the gear F' .

X , Fig. 1, indicates a safety-pawl or catch at the top of the trunk, with a pivoted buffer X' resting upon it.

With regard to the operation of our apparatus it will be understood that the chain and carriers move upward through the chamber B^1 of the trunk B , receiving the ammunition from the platform B' and carrying it up to the deck A^2 , the ammunition and carrier raising the pawl X and buffer X' and the carrier finally depositing the ammunition on the apron N^5 , which is turned out in the position shown in dotted lines in Fig. 5, in which position it protects the casing N and also insures that the ammunition shall be turned out from the carrier and from the hoist in proper direction without too abrupt shock.

In our device the hoist can be run either by power or by hand, and we provide means for lowering ammunition to the magazine-deck as well as for hoisting it to the gun-deck. The power mechanism of course derives its power from the motor C' , which, as described, is connected through gear C^3 and F' with a power-shaft F , having the gear-wheel F^8 journaled on it between the fixed

clutch F^2 and the loosely-running clutch-hub F^{10} and so that by shifting the gear-hub F^5 it can be operatively connected with either clutch at will. The gear F^3 is in operative engagement with the gear-teeth of the friction-annulus J , which, through the friction-disks G^3 and H' , is connected with the shaft G , on which are situated the sprocket-chains G' (G'). The friction-clutch device constitutes what we call a "slip-clutch gearing," and by the nice adjustment of the screw-abutting nut I a slip in the gearing can be provided for at any desired power, so as to relieve the machine of breaking strains which might readily come into existence if positive gearing were employed. The proper tension in the sprocket-chains is provided for by the adjustment of the double-armed shaft-bearing E , which turns in the bearings D' of the housings D , so that the bearings E^4 of the shaft E can be raised or lowered at will, this adjustment being accomplished by the adjusting-screws E^6 acting on the bearings E^4 and by preference the double-armed bearing E further clamped in position by the bolts E^6 passing through the lugs E^5 and slots D^4 .

When the hoist is to be actuated by hand, power is applied through one or more cranks T' , connected, as shown in Fig. 26, with the shaft N' , this shaft being coupled, as already described, with the sprocket-wheel F^{11} on the clutch-hub F^{10} , and in connection with the hand hoisting mechanism we provide appliances which insure that the shaft and its connections shall be turned only by the application of power to the crank. Thus, as shown in Fig. 26, the shaft R' , through its fast and loose friction-disks R^3 and S , and through the friction ratchet-disk S' is held from backward rotation by the pawl U so long as the friction devices are in strong engagement with each other. The threads of the end R^4 of the shaft and of the nut T are cut in such a way that in rotating the crank to hoist the ammunition the hub is screwed up against the disk S , and of course the ratchet-disk S' then turns with the shaft, which it is free to do from the direction of its teeth S^2 . When it is desired to lower the ammunition, the crank T' is turned in the opposite direction, with, of course, the result of screwing the hub T outward on the shaft end R^4 , releasing the pressure on the clutch device and permitting the weight on the hoist to move the carrier downward, or, if the weight is not sufficient, then the lowering is accomplished by the direct pull of the crank T' when it is screwed out against the stop R^5 . It will be seen, however, that where the weight is sufficient to move the hoist downward the rotation thereby imparted to the shaft R' is always tending to screw the hub T down against the friction-disk S , and whenever this takes place the downward motion is arrested by the pawl U , so that it is necessary

for the operators to keep turning the crank backward in order to effect the lowering of the ammunition, while in case they lost hold of the crank its own weight is sufficient to insure that the rotation of the shaft will screw the crank end down against the friction-clutch and arrest the descent of the hoist. This safety device, while especially designed and intended for ammunition-hoists, is capable of more general application and is intended to form the subject-matter of another application for Letters Patent, the device being claimed in this application only in its combination with the ammunition-hoist.

It will of course be understood that the engagement of the gear F^5 F^8 with either the power-driven clutch F^3 F^4 or the hand-driven clutch F^{10} F^{12} is effected by the lever K' .

Referring next to the safety-catch in the trunk, it will be obvious that the lever P^2 being in the position shown in Fig. 1 the safety-catch O^3 will be held in the position shown in Fig. 1 or Fig. 35 by the action of the spring O^6 , while at the same time it is free to move up out of the way of the ammunition and carrier when they impinge against it and moving out after they have passed to provide a stop which in case of breakage in the mechanism controlling the carrier will arrest the fall of the load onto the magazine-deck. When it is desired to reverse the motion of the carriers and to convey the ammunition to the magazine-deck, it is only necessary to shift the lever P^2 , which through its connection with the lever P moves the rod O^{10} from its normal position to that shown in dotted lines in Fig. 36. The shaft O^2 , turning with the lever and the finger S^5 , impinging on the shoulder O^4 of the safety-finger pushes it up through the opening B^6 , so that the ammunition can pass freely downward to the magazine-deck.

It is, as we have pointed out, desirable that the shifting of the safety-finger should take place whenever the direction of rotation of the motor and carriers are reversed, and therefore we prefer to utilize the lever P^2 not only as a means for shifting the safety-finger out of the path of the ammunition, but also as a means for reversing the direction of the motor, which can be readily done—as, for instance, by the reversing device illustrated in Figs. 28 and 29, or indeed by any other convenient mechanism for reversing an electric or other motor.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. An ammunition-hoist having in combination with a trunk and guides and sprocket-chains with carriers running through the trunk, a sprocket-shaft, a driving-shaft and slip-clutch gears connecting the sprocket and driving shaft as described and so that in case

of obstruction or excessive resistance the sprocket-shaft can remain stationary.

2. An ammunition-hoist having in combination with a trunk and guides and sprocket-chains with carriers running through the trunk, a power-driven driving-shaft, a clutch turning with said shaft, manual driving mechanism including a clutch journaled on the shaft, a gear-wheel journaled on the shaft and longitudinally movable thereon, said gear being situated between the clutches and adapted to engage with either of them, a sprocket-shaft and slip-clutch gear connecting said shaft with the gear on the driving-shaft.

3. An ammunition-hoist having in combination with a trunk and guides and sprocket-chains with carriers running through the trunk, a power-driven driving-shaft, a double-arm bearing pivotally supported on an axis concentric with the driving-shaft, means for shifting and securing in place said double-arm bearing, a sprocket-shaft journaled in the double-arm bearing and slip-clutch gear adapted to couple the driving and sprocket shafts.

4. An ammunition-hoist having in combination with a trunk and guides and sprocket-chains with carriers running through the trunk, housings D, D, formed with circular bearings D', and elongated openings D², a double-arm shaft-bearing E, journaled in the bearings D', and having bearings E¹, E¹, in its arms which extend into openings D², adjusting-screws D³, D³, working in openings D², to adjust and support bearings E¹, a power-driven shaft F, journaled in shaft-bearing E, concentrically with the bearings D', a sprocket-shaft journaled in bearings E¹, and slip-clutch gear adapted to couple shaft F, and the sprocket-shaft.

5. An ammunition-hoist having in combination with a trunk and guides and sprocket-chains with carriers running through the trunk, housings D, D, formed with circular bearings D', and elongated openings D², and segmental slots D⁴, a double-arm shaft-bearing E, journaled in the bearings D', and having bearings E¹, E¹, in its arms which extend into openings D², said shaft-bearing having also lugs E², E², adapted to register with slots D⁴, D⁴, adjusting-screws D³, D³, working in openings D², to adjust said support-bearings E¹, clamping-bolts E³, E³, passing through slots D⁴, and E², a power-driven shaft F, journaled in shaft-bearing E, concentrically with the bearings D', a sprocket-shaft journaled in bearings E¹, and slip-clutch gear adapted to couple shaft F, and the sprocket-shaft.

6. An ammunition-hoist having in combination with a trunk and guides and sprocket-chains with carriers running through the trunk, a power-driven driving-shaft, a clutch turning with said shaft, a second clutch journaled on the shaft between the fast and loose clutches, means whereby said gear-wheel is

adapted to engage with either clutch, a sprocket-shaft connected with the gear on the driving-shaft by slip-clutch gearing, a shaft connected to the loose clutch on the power-driven shaft, a crank for actuating the shaft connected to the loose clutch and clutch mechanism connecting said shaft and crank as described and whereby the shaft is locked in position and movable in both directions only when the crank is turned in a corresponding direction.

7. An ammunition-hoist having in combination with a trunk and guides and sprocket-chains with carriers running through the trunk, a power-driven driving-shaft, a clutch turning with said shaft, a second clutch journaled on the shaft, a gear-wheel journaled on the shaft between the fast and loose clutches, means whereby said gear-wheel is adapted to engage with either clutch, a sprocket-shaft connected with the gear on the driving-shaft by slip-clutch gearing, a shaft connected to the loose clutch on the power-driven shaft and means for actuating said shaft consisting of a shaft R', having a threaded end R², and a clutch member R³, secured to it, a loose clutch member S, journaled on it and a nut T, screwing on its threaded end and connected to a crank T', a ratchet-toothed clutch member S', situated between clutch members R³, and S, and a pawl U, arranged to prevent rotation of the member S', in a backward direction.

8. An ammunition-hoist having in combination with a trunk with guides and sprocket-chains with carriers running through the trunk and means for actuating said chains in either direction, a safety-catch O¹, normally projecting into the path of the ascending carriers, and free to move out of the way of the ascending carriers on being pushed up thereby, and means for retracting said safety-catches to permit the carriers to descend when the direction of movement of the sprocket-chains is reversed.

9. An ammunition-hoist having in combination with a trunk with guides and sprocket-chains with carriers running through the trunk and means, including a motor, for actuating said chains in either direction, a safety-catch O¹, normally projecting into the path of the ascending carriers and free to move out of the way of the ascending carriers on being pushed up thereby, and means for retracting said safety-catches to permit the carriers to descend when the direction of movement of the sprocket-chains is reversed, said means being arranged to also effect the reversal of the motor.

10. An ammunition-hoist having in combination with a trunk with guides and sprocket-chains with carriers running through the trunk and means for actuating said chains in either direction, a shaft O¹, having a laterally-

projecting finger O^3 , secured thereto, a safety-catch finger O^4 , journaled on shaft O^2 , and having a shoulder O^5 , lying in position to be engaged by finger O^3 , a spring normally holding the safety-catch in the path of the carriers while permitting it to yield to the impact of ascending carriers and means for turning the shaft O^2 , to engage finger O^3 , with the catch and lift it out of operative position.

11. In an ammunition-hoist having a trunk with sprocket-chains and carriers moving

therein and a deck-casing secured at the top of the trunk B , a hinged curved receiving-apron N^5 , secured to the deck-casing and adapted to be turned out over the edge thereof when the hoist is in use.

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Witnesses:

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