

No. 713,718.

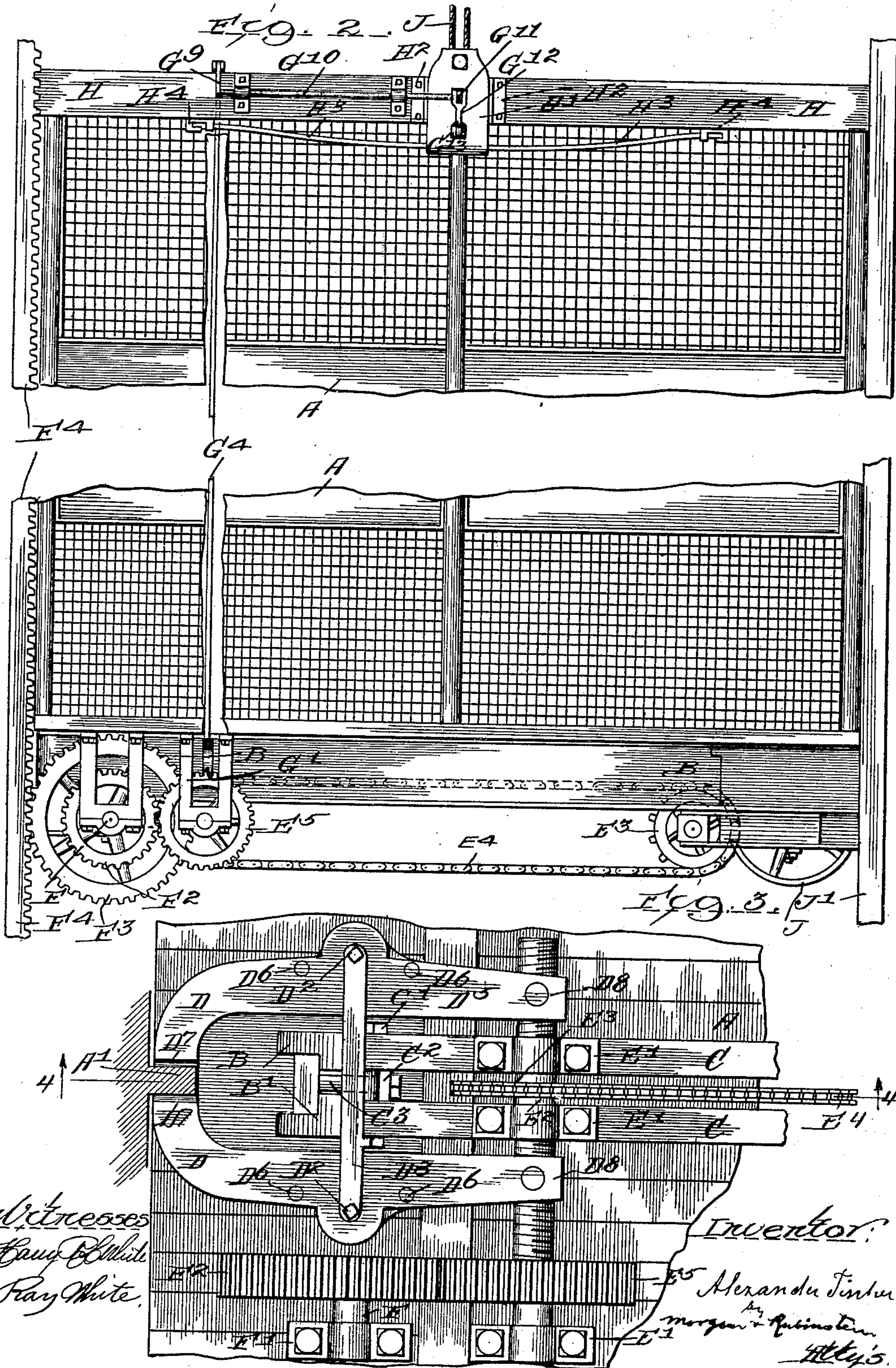
Patented Nov. 18, 1902.

A. TISCHER.
ELEVATOR SAFETY DEVICE.

(Application filed Feb. 26, 1902.)

(No Model.)

4 Sheets—Sheet 2.



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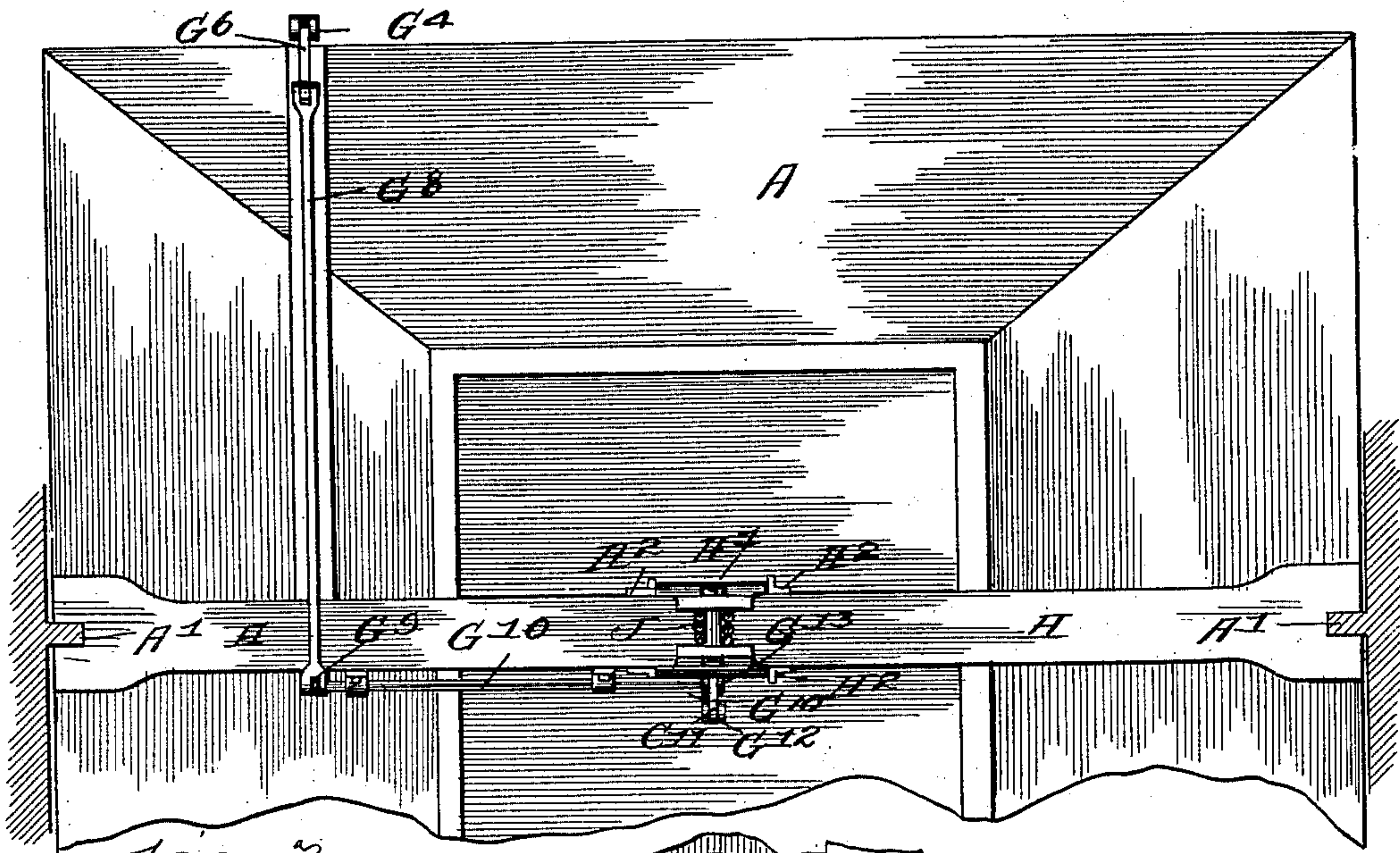


FIG. 5.

FIG. 6.

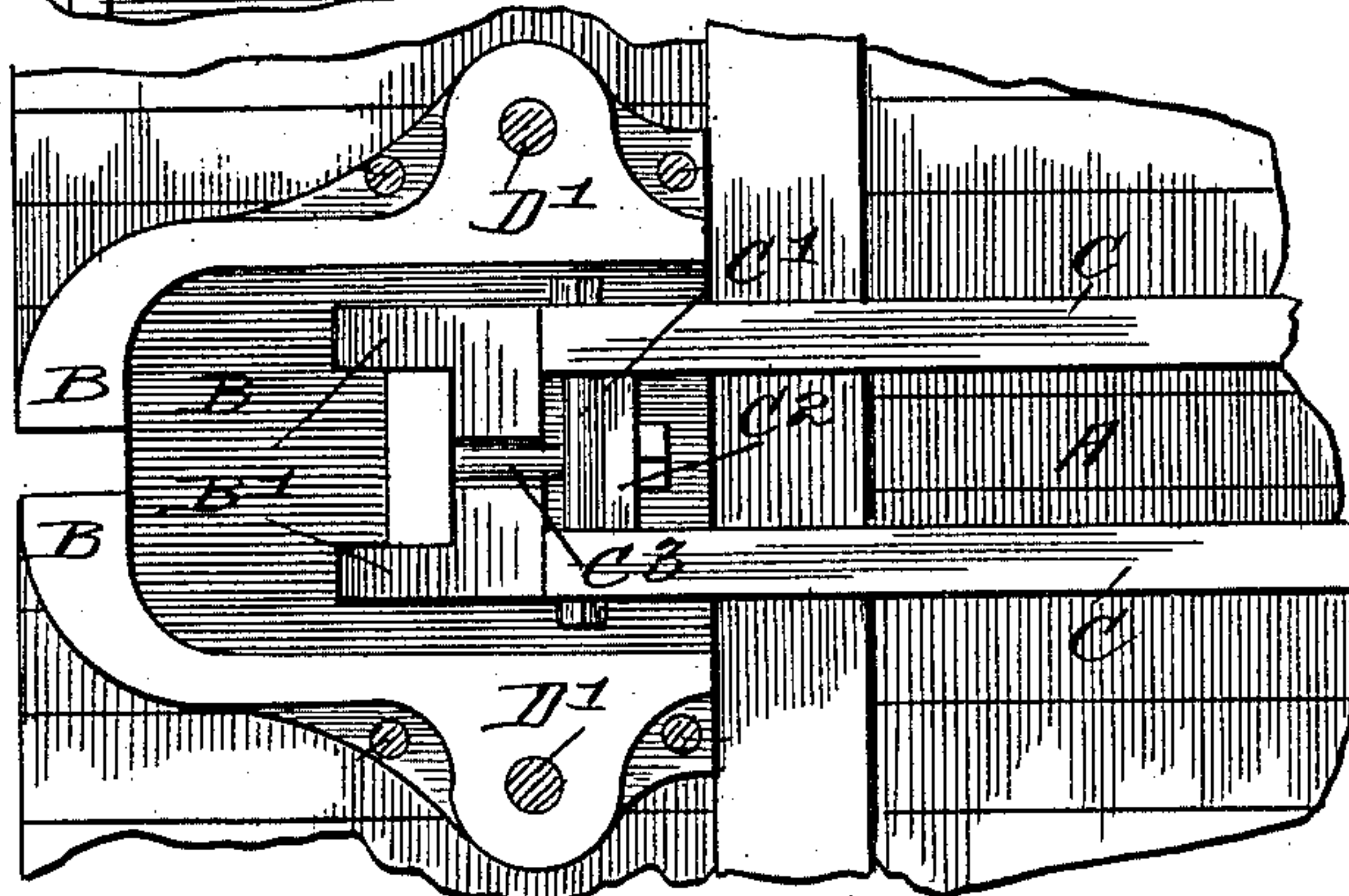
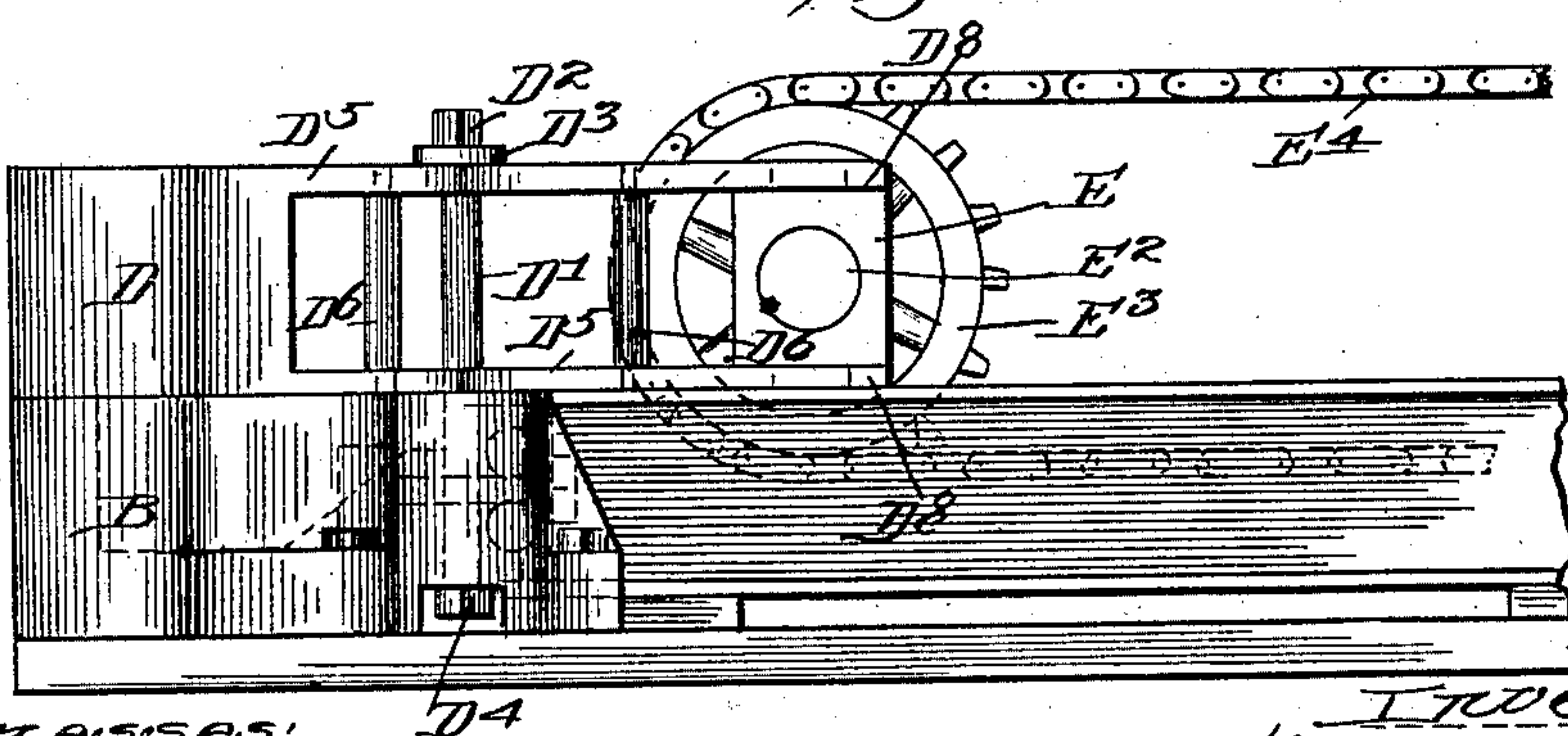


FIG. 7.



Witnesses:
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Ray White

Inventor:
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By Morgan & Amstein Attys.

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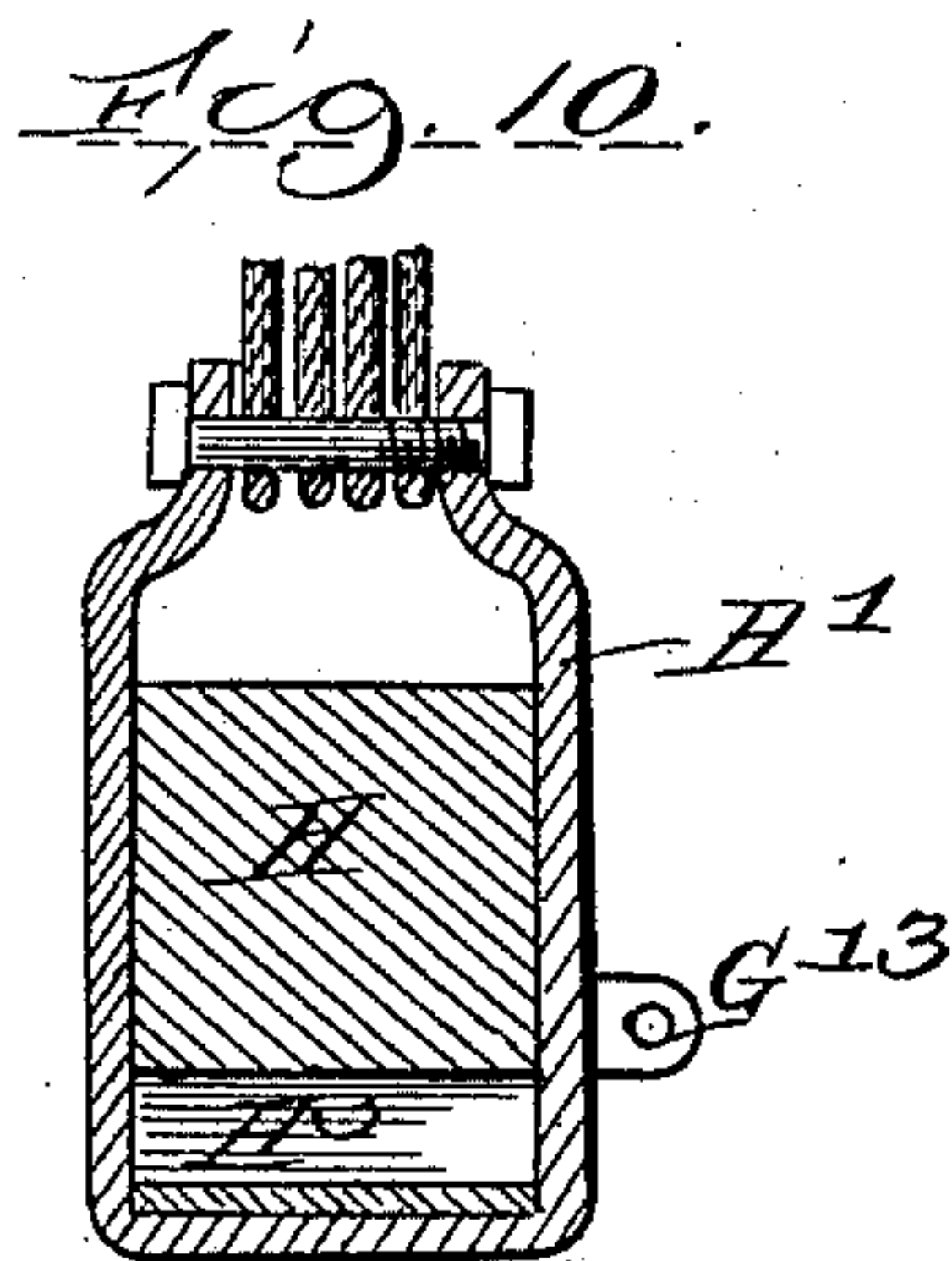
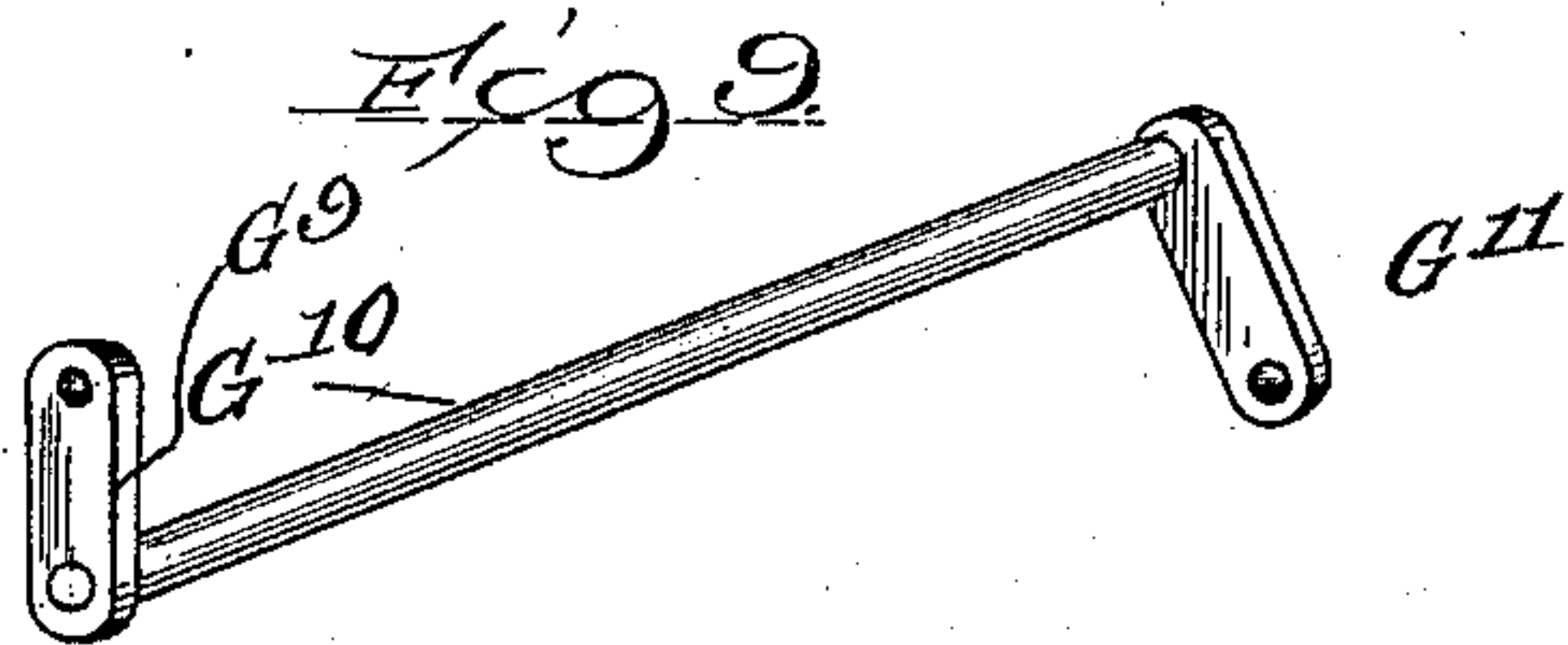
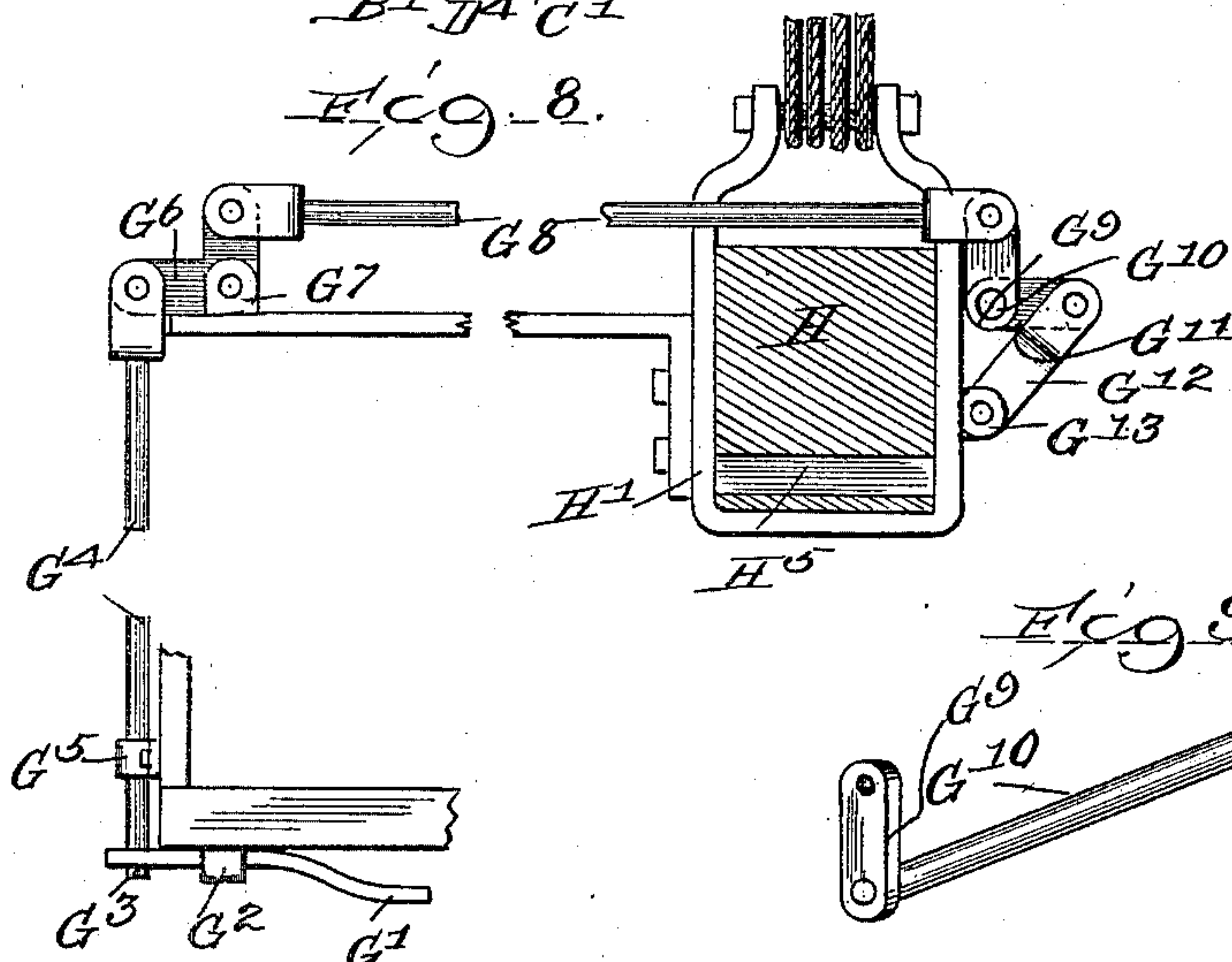
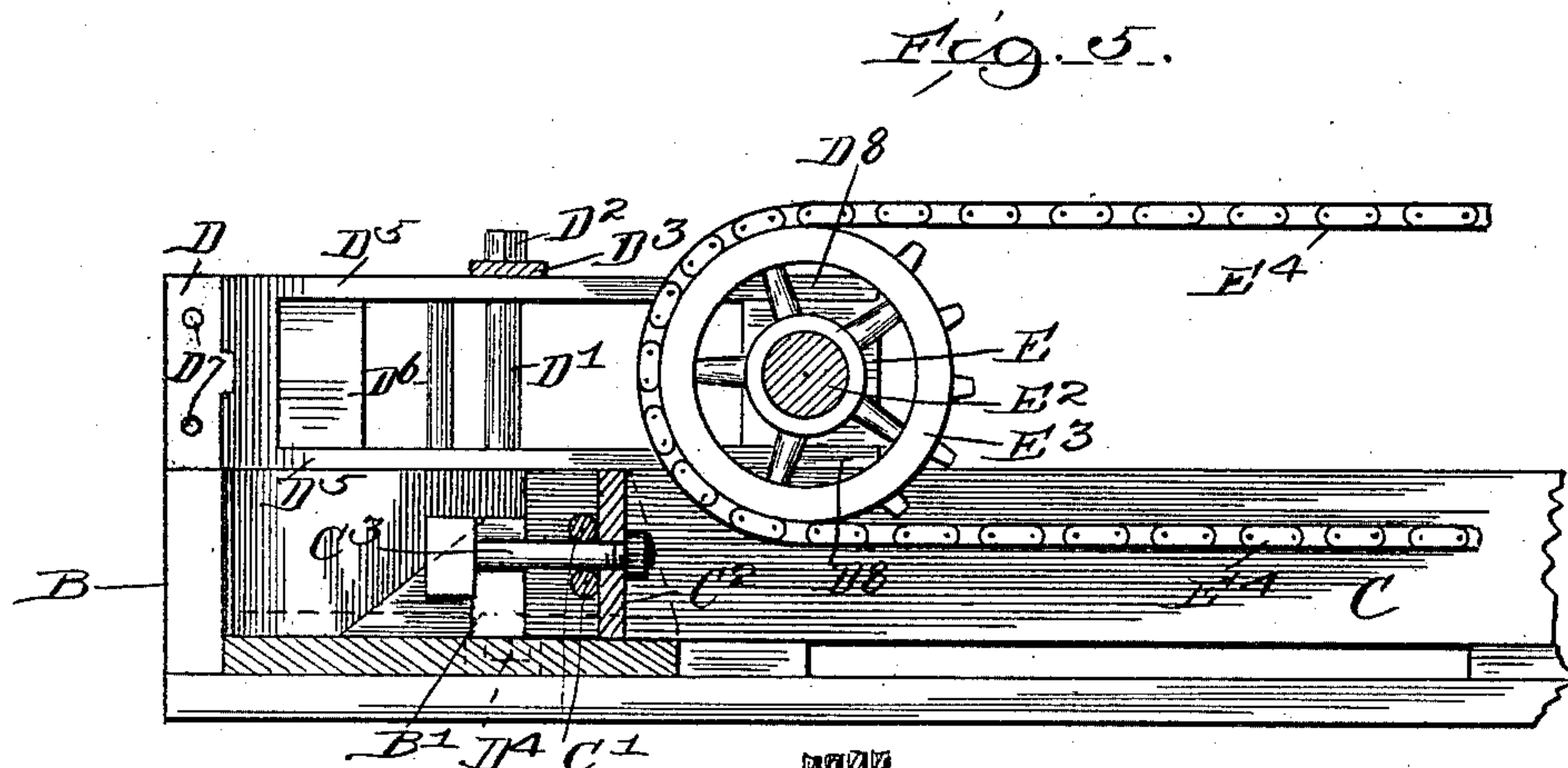
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Witnesses:
Camp & White
Ray White

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UNITED STATES PATENT OFFICE.

ALEXANDER TISCHER, OF CHICAGO, ILLINOIS.

ELEVATOR SAFETY DEVICE.

SPECIFICATION forming part of Letters Patent No. 713,718, dated November 18, 1902.

Application filed February 26, 1902. Serial No. 95,746. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER TISCHER, a citizen of the United States, residing at No. 497 South Hermitage avenue, in the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Elevator Safety Devices, of which the following is a specification.

My invention relates to devices applied to elevator-cars, which are designed to operate automatically whenever, by breakage or otherwise, the car is separated from its suspending power, and which by gripping the vertical guides of the hoistway stop the car at the moment of its separation from its normal support.

The object of my invention is to secure simplicity of construction with automatic action actuated directly by the mechanism from which the car is suspended, and thus secure the instant application of the whole weight of the car to the gripping devices before the car can acquire abnormal speed and stop the descent of the car at any point without shock or possible breakage or disarrangement of the mechanism. I attain these objects by the gripping and tripping mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the mechanism attached to the under side of the floor of the car. Fig. 2 is a side elevation of the car, the lower part of which shows the position and relation of the mechanism under the floor of the car and to those parts which form part of the fixed structure of the hoistway, the upper part showing part of the tripping mechanism attached to and connected with the suspension-beam of the car. Fig. 3 is an enlarged plan view of the gripping mechanism. Fig. 4 is a side view of the gripping mechanism and of the fixed guide on which the gripping mechanism is mounted. Fig. 5 is a sectional elevation of the gripping mechanism and fixed guides through the lines 4-4, Fig. 3. Fig. 6 is a plan view of the fixed guides, showing the manner of their connection to the car and to each other by the channel-beams. Fig. 7 is a plan view of the top of the car, showing the position of the tripping mechanism. Figs. 8, 9, and 10 are detail views of several parts of the tripping mechanism.

Similar letters refer to similar parts throughout the several views.

On the under side of the floor of the car A a pair of guides B are firmly secured by bolts and by the channel-beams C, which extend across the under side of the floor of the car and are secured thereto. Through the end of these channel-bars the two bolts C' form a transverse connection between said channel-beams and are arranged to form a bearing for the plates C², each of which has an aperture in the center, through which the bolts C³ extend in a line central between the channel-beams. Each of said bolts has a head adapted to fit against the bearing projection B', forming parts of the guide B, the other end of each of said bolts being threaded and provided with nuts adapted to bear against said plates C², and thus forming an adjustable connection between said channel-beams and the guides B.

Pivotaly attached to each of the guides B are the movable gripping-jaws D, which are held securely in connection with said guides by the pivotal bolts D', Figs. 4 and 5, which pass through said jaws and guides and form the fulcrums of said jaws, the ends D² of said bolts being connected by the connecting-bar D³, the other ends being secured in the guides B at D⁴, Figs. 4 and 5. These movable jaws are constructed of two main plates D⁵, firmly joined by the studs D⁶ and to the solid part of the jaws D⁷, which are adapted to engage and grip the vertical guideways S', which form part of the hoistway. Between the main plates D⁵ at their ends D⁸ and pivotaly connected thereto are the great threaded nuts E, Figs. 4 and 5. Each pair of the nuts E in the movable jaws are constructed, respectively, with right and left hand threads. Supported in the bearings E', affixed to the floor of the car A and to the channel-beams C, are the shafts E², each shaft having right and left hand threads adapted to fit and rotate in the nuts E. Affixed on these shafts between the threaded portions thereof are the sprocket-wheels E³, carrying the sprocket-chain E⁴, which connects the said shafts together and secures a simultaneous movement of both jaws, as shown in Fig. 1. On one of said shafts the gear E⁵ is affixed. In a line paral-

5 lel with the shafts E^2 and at right angles to the central line of the jaws D is the shaft F, supported in the bearings F' , affixed to the floor of the car A. Affixed to one end of this shaft is a gear-wheel F^2 , adapted and arranged to engage the gear E^5 on the shaft E^2 . On the other end of this shaft F is the gear-wheel F^3 , which is arranged to revolve on the said shaft and to engage the vertical rack F^4 , affixed in the hoistway, the lateral movement of said gear on said shaft being limited by the bearing F' in contact with the hub of said gear and a shoulder on the shaft. The inner hub of said gear F^5 is adapted to form a clutch. On the shaft F is the sliding clutch F^6 , adapted to be engaged with the hub F^5 of the gear F^3 , said clutch being actuated by the coiled spring F^7 , arranged on shaft F and held in position by the collar F^8 , the clutch F^6 being prevented from rotating on said shaft by the spline F^9 , which is firmly affixed in said shaft and projects into the splineway in the interior of the sliding clutch. Engaged in the annular groove F^{10} in the clutch F^6 is the forked lever G, pivotally connected to the floor of the car A. At right angles to lever G and pivotally connected thereto is the connecting-bar G' , adapted to slide freely in the bearing G^2 , Fig. 8, and constructed with an aperture G^3 . Into this aperture G^3 the lower end of the pendent rod G^4 fits loosely and is free to be moved vertically in the bearing G^5 . The top end of said rod is pivotally connected with the horizontal arm of the bell-crank G^6 , the said bell-crank being pivotally supported on a suitable bearing on a top part of the car, as shown at G^7 , Figs. 7 and 8. Pivotally connected with the vertical arm of the bell-crank G^6 is the horizontal connecting-rod G^8 , the said rod being pivotally connected with the vertical crank G^9 on the shaft G^{10} , which is supported in bearings on the main suspension-beam H, as shown in Figs. 2 and 8. Connected with the horizontal crank G^{11} on shaft G^{10} is the link G^{12} , said link being pivotally connected with the bearing G^{13} on the stirrup H' , as shown in Figs. 2 and 8.

On the main suspension-beam H is the suspension-stirrup H' , which is constructed to be moved vertically in relation to said beam, the lateral movement of said stirrup on said beam being limited by the angle-irons H^2 , affixed to the beam, as shown in Figs. 2 and 7. In this stirrup rests the center of the great flat spring H^3 , which extends beneath the beam H and through the stirrup H' , as shown in Fig. 2, the ends of said spring resting in suitable bearings H^4 , affixed to said beam. Affixed to the under side of said beam and within the limits of said stirrup is a bearing-block H^5 , which is in contact with the center of the spring, which is drawn up to said bearing-block by the stirrup attached thereto when the car is suspended.

Supported in suitable bearings on the under side of the floor of the car is a bearing-wheel J, arranged to come in contact with

the vertical bearing-timber J' , affixed in the hoistway.

With the several parts of the mechanism constructed and arranged as described, with the operating-cables attached to the stirrup supporting the car and the operative mechanism under the car-floor in the position shown in Fig. 1, the car is free to be moved vertically and is guided by the fixed guides B, which slide freely on the vertical guideways A' . The movable jaws D, being open and entirely free from contact with the said guideways, the shafts E^2 and F remain stationary and the clutches F^5 and F^6 are separated and held apart by the tripping mechanism, the movements of which I will describe later. With the clutches thus separated the gear F^3 runs in the vertical rack F^4 and revolves freely on the shaft F, the whole weight of the car being supported by the stirrup H' , the great spring H^3 being compressed thereby against the bearing-block H^5 on the main suspension-beam H. In this position the tripping mechanism is in the position shown in Fig. 8, in which it remains, together with the movable jaws and operating mechanism, under the floor of the car as long as the car is suspended and the cables and hoisting machinery operate properly. When, however, the cables or other parts of the hoisting machinery break or in any way release the car, so that it would fall of its own weight, the instant the car is so released the great spring H^3 acts on the stirrup H' , forcing it down from the bearing-block H^5 . This change in the vertical relation of the stirrup and the beam acting through the link G^{12} draws down the horizontal crank G^{11} , rotates the shaft G^{10} and the vertical crank G^9 , actuating the connecting-rod G^8 and the bell-crank G^6 , which raises the pendent rod G^4 , draws its lower end from the aperture G^3 in the connecting-bar G' , releasing said bar and the forked lever G and the clutch F^6 , which, actuated by the coil-spring F^7 , is forced into engagement with the clutch F^5 on the gear F^3 , thus connecting the shaft F with said gear and the vertical rack F^4 , the descent of the car rotating the gear F^3 , shaft F, gear F^2 , gear E^5 , threaded shafts E^2 , sprocket-wheels E^3 , and chain E^4 . This rotation of the shafts E^2 in the nuts E opens the movable jaws at D^8 and closes them at D^7 , thus gripping the vertical guideways A' and stopping the descent of the car. The bearing-wheel J comes in contact with the vertical bearing J' and holds the gear F^3 in firm engagement with the vertical rack F^4 .

To release the movable gripping-jaws from the vertical guideways, the weight of the car must be removed from the gear F^3 and vertical rack F^4 and the shaft F be rotated in the reverse direction by a hand-bar inserted in the holes made for that purpose in the clutch F^6 .

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with an elevator-car and hoistway having guideways, of a gripping

mechanism, comprising a pair of fixed guides, a pair of channel-beams connecting said guides, a pair of gripping-jaws pivotally attached to the fixed guides, a pair of right and left hand threaded nuts pivotally attached to the interior ends of each of said jaws, a pair of threaded shafts adapted to fit and rotate in said nuts, a pair of sprocket-wheels affixed on said threaded shafts, a sprocket-chain adapted to engage said sprocket-wheels and to connect said threaded shafts and secure their simultaneous rotation, and a gear-wheel affixed to one of said threaded shafts, and means for rotating said gear and threaded shafts and closing said gripping-jaws, substantially as described.

2. The combination with an elevator-car, and hoistway having guideways, a gripping mechanism comprising a pair of fixed guides, and a pair of gripping-jaws having threaded nuts and threaded shafts adapted to rotate therein and thereby close said jaws, of a connecting mechanism, comprising a shaft, a gear-wheel affixed to one end of said shaft and adapted to engage the gear-wheel on one of the threaded shafts, a gear-wheel supported on the other end of said shaft and free to rotate thereon, the hub on the inside of said gear being adapted to form a clutch, a vertical rack affixed to the hoistway and adapted to engage the said gear and to rotate it on said shaft by the vertical movements of said car, a clutch supported on said shaft and adapted to slide thereon and to rotate with it, and to be engaged with the clutch of said gear-wheel, a spring coiled about said shaft and compressed between said sliding clutch and a collar affixed on said shaft, and a tripping mechanism adapted to control said spring-pressure and to hold said sliding clutch from contact with the clutch on said gear-wheel, and means for actuating said tripping mechanism and thereby releasing said spring-pressure and causing said sliding clutch to engage with the clutch on said gear, thereby causing the rotation of said shaft and said threaded shafts and the closing of said jaws

by the downward movement of the car which rotates the gear in contact with the vertical rack, substantially as described.

3. The combination of an elevator-car and hoistway having guideways, and a gripping mechanism consisting of a shaft having a gear connected with said gripping mechanism, and a gear having a hub formed as a clutch, said gear being free to rotate on said shaft and arranged to be engaged and rotated by a vertical rack and by the vertical movements of said car, and a clutch adapted to slide on said shaft, and a spring adapted to force said clutch into engagement with the clutch of said gear-wheel, and thereby to rotate said shaft by the vertical movement of said car, with a tripping mechanism comprising a forked lever adapted to engage said sliding clutch, a connecting-bar pivotally connected with said forked lever, a pendent rod adapted to engage said connecting-bar, and to hold said forked lever in position to hold said sliding clutch from engagement with the clutch on the gear-wheel, a bell-crank supported on the top of the car and pivotally attached to the pendent rod, a horizontal connecting-rod attached to said bell-crank, a crank-shaft supported on the main suspension-beam of said car and connected with said horizontal connecting-rod, a link connected with said crank-shaft, a stirrup to which said link is pivotally attached, said stirrup being attached to the hoisting-cables of said car, and a great spring arranged between said stirrup and the main suspension-beam of said car and adapted to move said stirrup, thereby actuating said crank-shaft, horizontal connecting-rod and bell-crank, thereby raising said pendent rod and releasing the forked lever and sliding clutch, which is thereupon forced into engagement with the gear-wheel clutch, substantially as described.

ALEXANDER TISCHER.

Witnesses:

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JOSEPH STAAB.