

No. 709,543.

Patented Sept. 23, 1902.

T. A. HILL.

GATE.

(Application filed Oct. 24, 1901.)

(No Model.)

2 Sheets—Sheet 1.

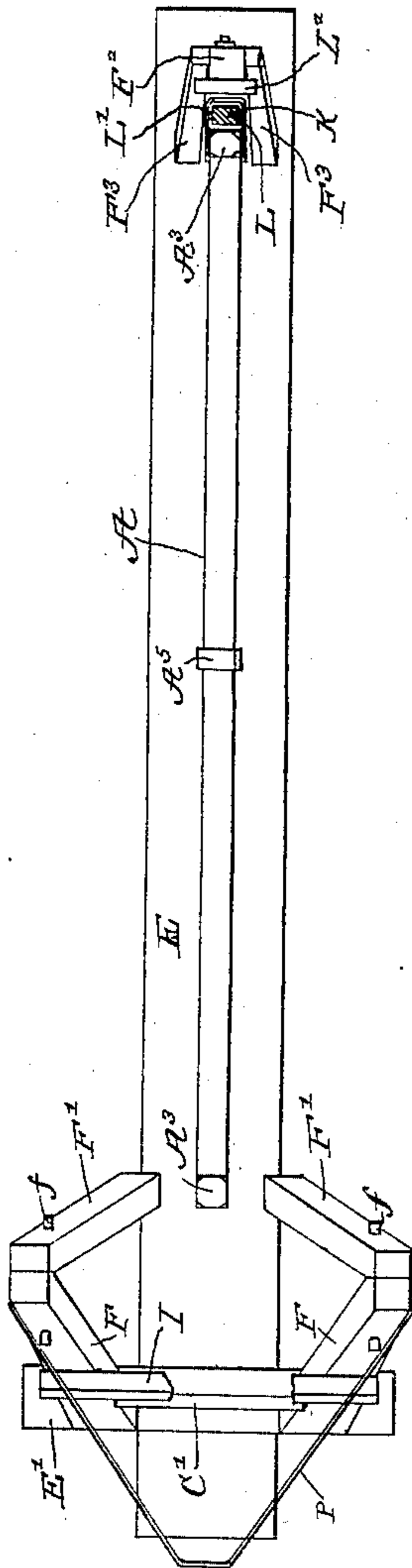


Fig. 2.

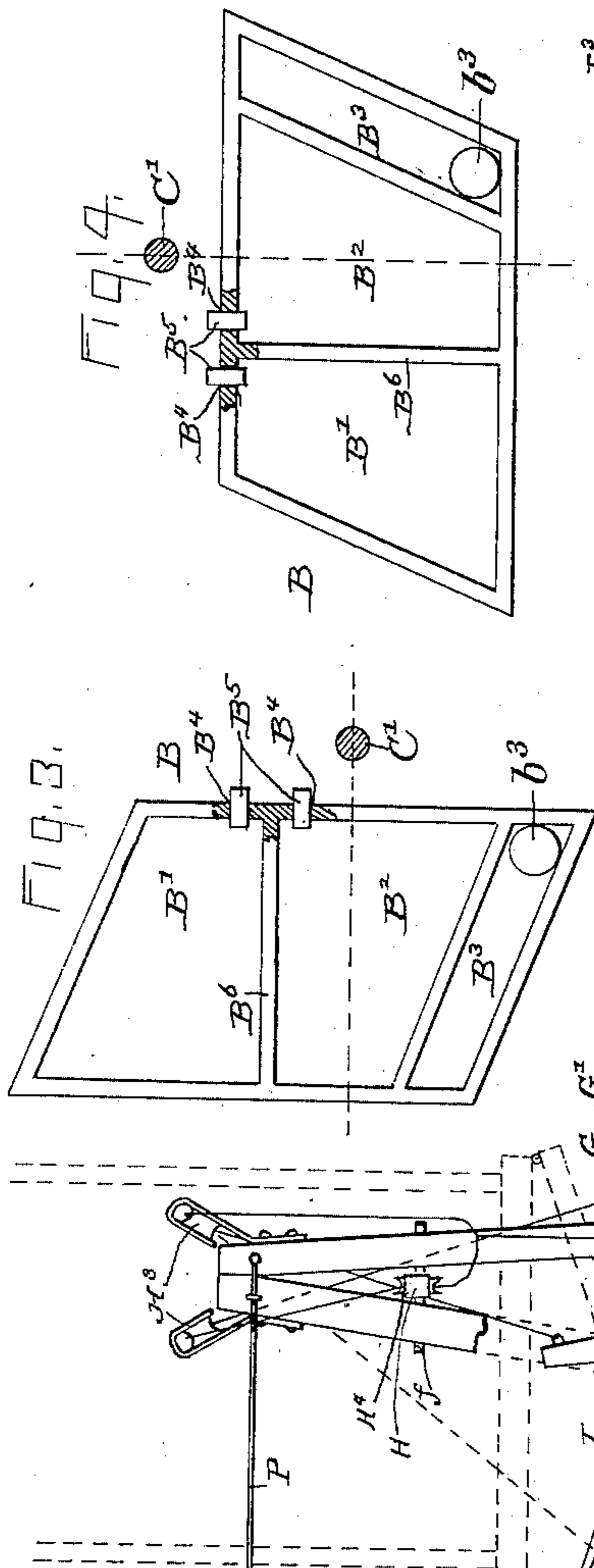


Fig. 3.

Fig. 4.

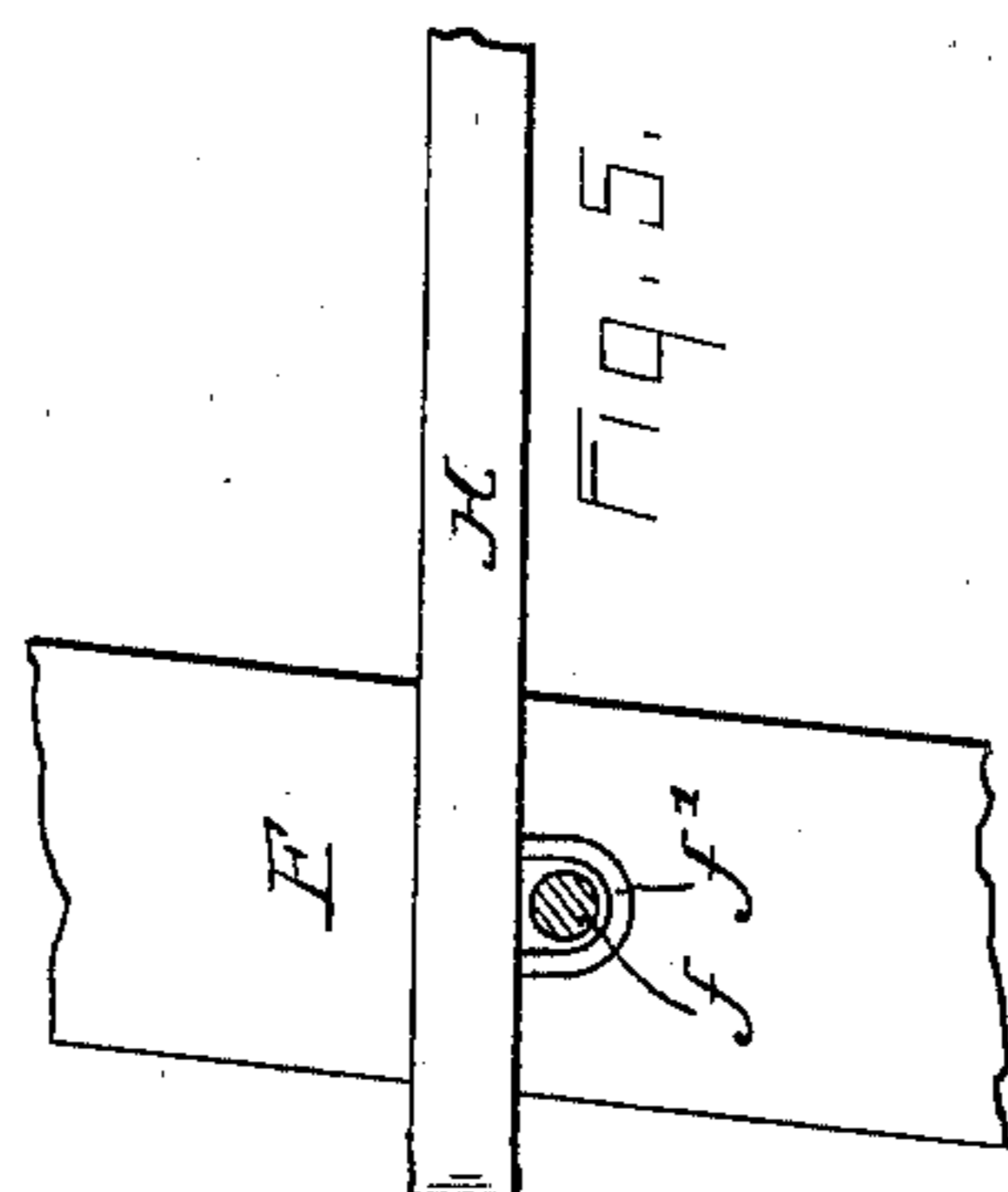


Fig. 5.

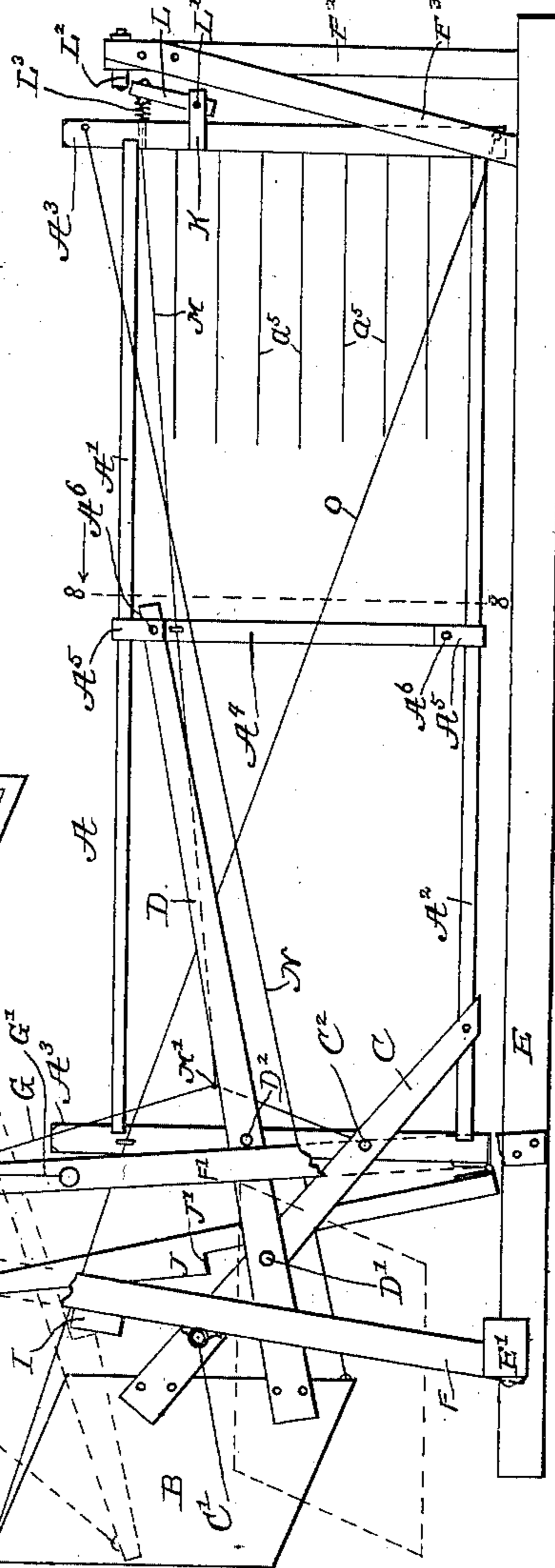


Fig. 1.

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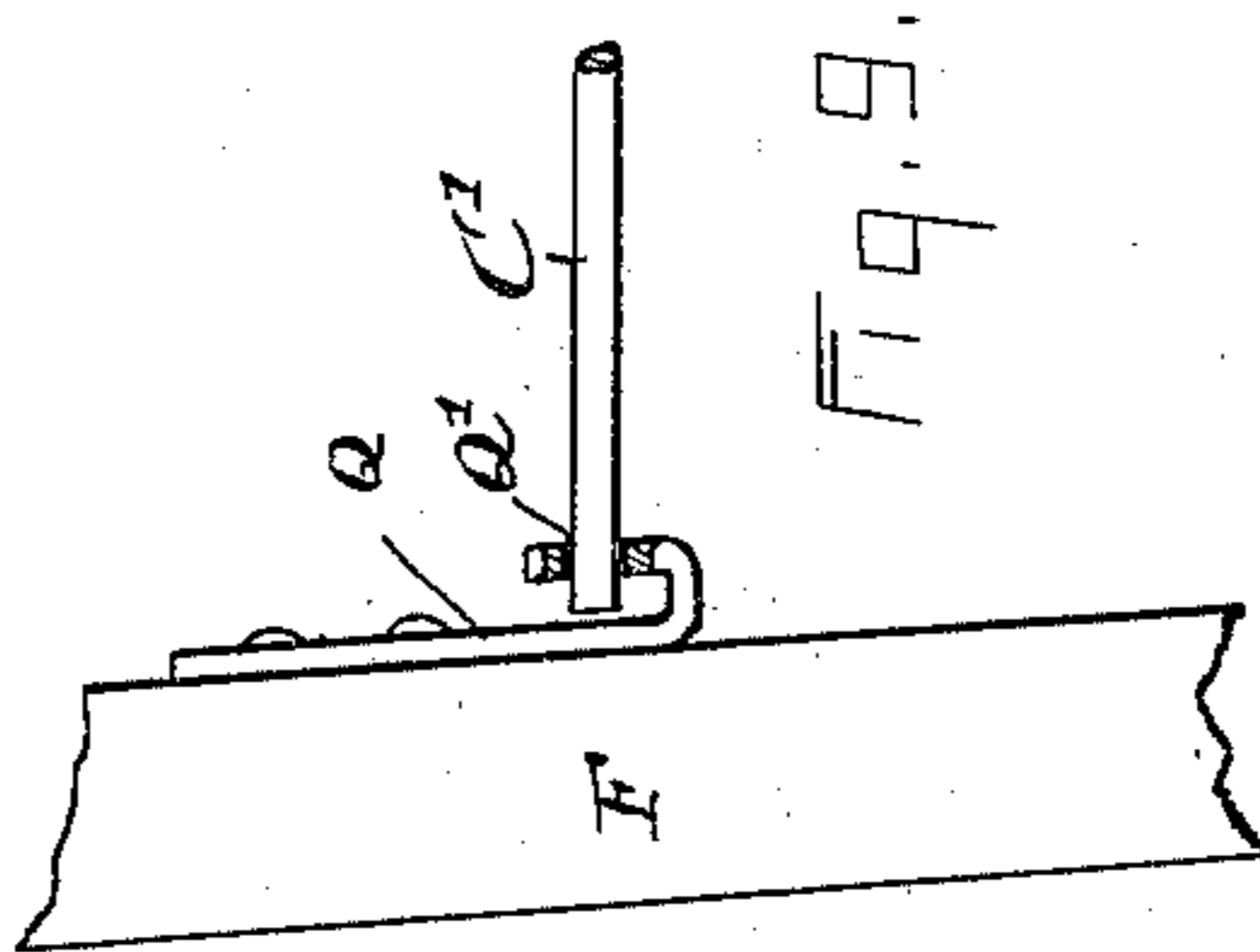
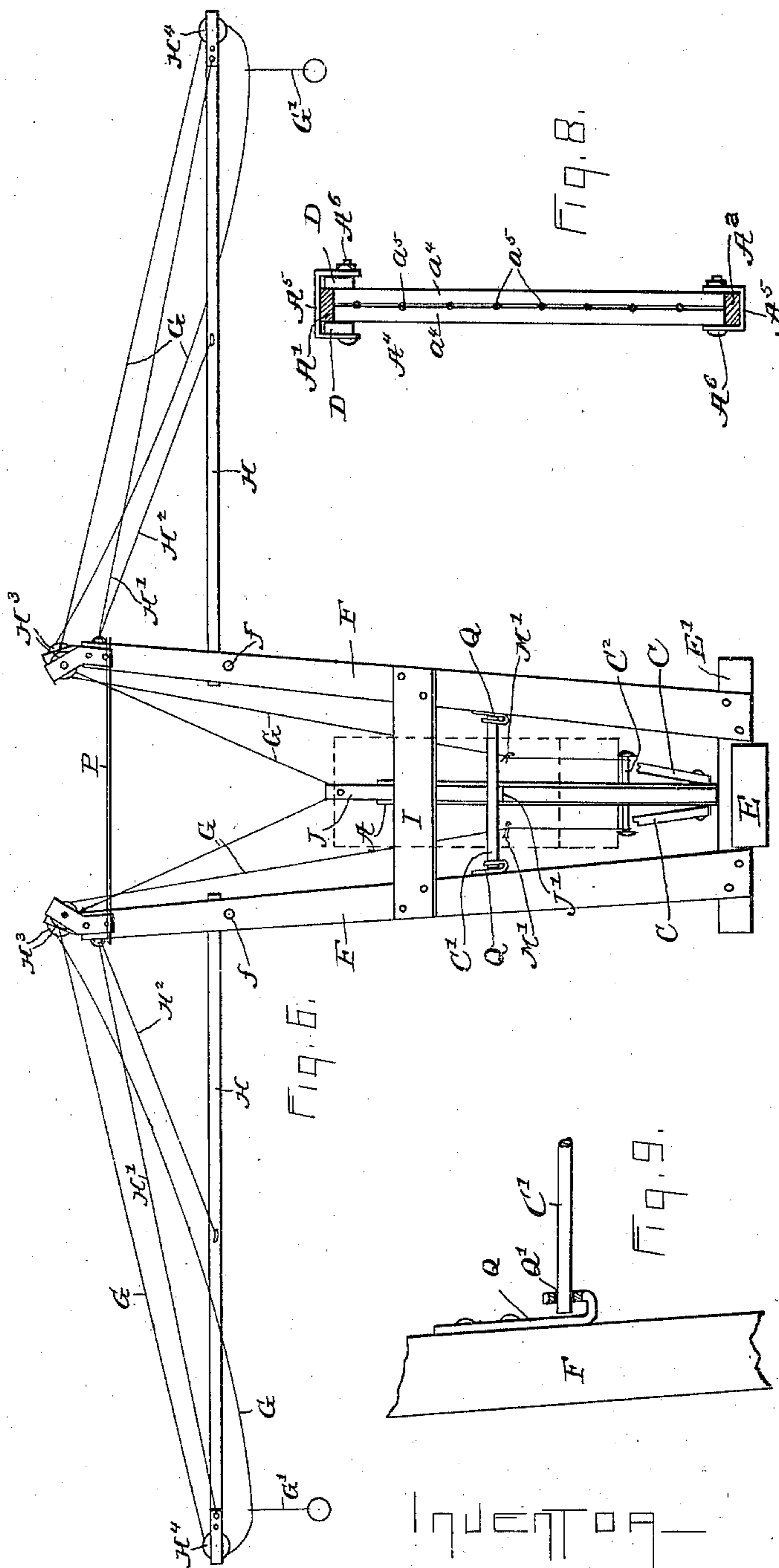
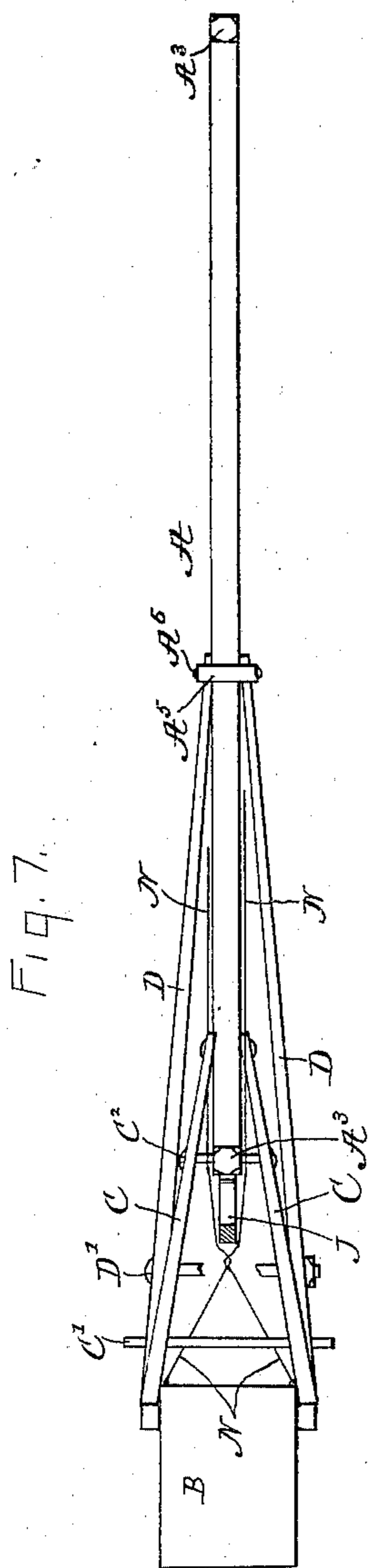
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2 Sheets—Sheet 2.



WITNESSES _____

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UNITED STATES PATENT OFFICE.

TERELIUS ALLEN HILL, OF MARYVILLE, TENNESSEE.

GATE.

SPECIFICATION forming part of Letters Patent No. 709,543, dated September 23, 1902.

Application filed October 24, 1901. Serial No. 80,366. (No model.)

To all whom it may concern:

Be it known that I, TERELIUS ALLEN HILL, a citizen of the United States, residing at Maryville, in the county of Blount and State of Tennessee, have invented certain new and useful Improvements in Gates; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to gates which extend across a roadway or entrance to a building or other similar passage.

The invention has reference particularly to gates which are supported at one end upon a hinge which is horizontal and perpendicular to the plane of the gate and located at one side of the passage or opening which the gate is intended to close.

The object of the improvement is to provide a simple and efficient gate embodying devices adapting the gate to be turned upon its hinge by pulling a cord or similar device extending perpendicularly, or substantially so, to the plane of the gate.

The present improvement is in some respects a modification of the improvement set forth in my pending application, Serial No. 63,394, filed June 6, 1901.

In the accompanying drawings, Figure 1 is a side elevation of the gate embodying my improvement. Fig. 2 is a detail plan showing the sill, posts, and gate detached from the counterbalance mechanism. Figs. 3 and 4 are details of the counterbalance-chest. Fig. 5 is a detail illustrating the manner of securing the arms which support the cords whereby the gate is lifted. Fig. 6 is a rear elevation. Fig. 7 is a plan of the gate proper, having the counterbalance-chest attached thereto. Fig. 8 is a vertical transverse section on the line 8 8 of Fig. 1 looking in the direction of the arrow. Fig. 9 is a detail illustrating the manner of attaching the hinge-shaft of the gate.

A is the gate proper. This is shown composed of the top rail A', bottom rail A², front and rear uprights A³, counterbalance-chest B, and braces C and D. Said gate is hinged

on the horizontal shaft C', which shaft is suitably supported by the posts F F, said posts being located at opposite sides of the gate and substantially opposite each other, and said shaft extending horizontally from one of said posts to the other and through the braces C a short distance in front of the counterbalance-chest B. One end of the braces C is shown secured to the forward upper portion of the counterbalance-chest, and the opposite end of each such brace is attached to the bottom rail A² and the rear upright A³ of the gate. The braces D are attached to the lower forward portion of the counterbalance-chest and pass across the braces C and obliquely upward and toward the front of the gate and are suitably secured to the braces C and to the gate preferably by a shaft or bolt D', extending through the braces C and D where said bases cross and to the rear upright A³ by a shaft or bolt D², extending through said braces and upright, and by a suitable fastening joining the upper ends of said braces C to the top rail A'. The drawings show a middle upright A⁴, placed between the top rail A' and the bottom rail A², with a strap or yoke extending over said top rail and over the sides of the braces D and a bolt A⁶ extending horizontally through said strap, braces, and middle upright. This constitutes a simple and effective means for firmly joining and securing said several parts by means of the one bolt. Said braces C and D serve to stay the gate in two directions, in a horizontal plane and in a vertical plane, because the gate is narrower than the counterbalance-chest, and the plane of the gate extends midway through said chest, so that said braces converge from said chest toward the plane of the gate, and both pairs of said braces are oblique with reference to the horizontal lines of said gate. Said counterbalance-chest is shown composed of three compartments B', B², and B³. When the gate is in a horizontal position, said compartments are alined vertically, as shown in Fig. 3, B' being the uppermost and B³ the lowermost, and when the gate is in the upright position said compartments are alined horizontally, as shown in Fig. 4. Suitable apertures B⁴ extend through the walls of said chest into compartments B' and B², and suit-

able plugs B^5 are used for closing said apertures. The partition B^6 , which separates the compartments B' and B^2 , is located adjacent to the shaft C' , so that said compartments are substantially at opposite sides of a plane cutting the gate lengthwise and located near and parallel to the shaft C' . By inserting more or less sand, gravel, or any other suitable weight material through said apertures leading into the compartments B' and B^2 not only can the aggregate of the weight of said chest be adjusted with reference to the weight of the gate at the opposite side of the shaft C' , but the weight in each compartment may be so proportioned as to properly adjust the counterbalance at each side of the shaft C' when the gate is in the upright position. In this way the counterbalance may be readily adapted to any peculiarity of construction in the gate whereby the weight at the top and bottom of the gate is varied. This means of adjusting the counterbalance is frequently useful. Even when a number of gates are constructed as similar as to shape and size as possible there are differences in weight of the same pieces which will require a corresponding adjustment of the upper and lower portions of the counterbalance. For example, if the bottom rail A^2 or other pieces at the lower portion of the gate are disproportionately heavy on account of the density of the wood or its absorption of water, or if in making the gate an additional piece is applied, so as to increase the weight of the lower portion of the gate, then allowance is made for the excessive weight by inserting into the compartment B' additional weight material until the desired approximation to equilibrium is attained. A counterbalance-chest having the compartments B' and B^2 is described in my application, Serial No. 63,394 aforesaid. In the chest herein shown the chamber B^3 is added, and it is to contain one or more weights b^3 , adapted to freely roll or slide when the gate is shifted. The arrangement of said compartment is such as to prevent said weight to a considerable extent from acting as a counterbalance. In other words, said compartment is inclined, the rear end being near a line extending lengthwise through the gate and through the hinge of the latter, while the forward end of said compartment is near a line at right angles to said last-mentioned line and extending through said shaft. Thus the weight in said compartment B^3 is approximately beneath the hinge of the gate, whether the gate is in the horizontal or the vertical position. The function of said weight or weights is to aid in arresting the movement of the gate when it reaches or approaches its limit of movement. Suppose the weight b^3 is in the position shown in Fig. 3 and the gate is put into motion to move to the upright position. Then the weight b^3 will travel toward the left in said compartment, and said movement will be accelerated as the position of the counterbalance-chest shown in Fig. 4 is

approached. When said position is attained, the movement of the gate should cease, and at such time or a little earlier said weight strikes what is then the lower wall of said chest and tends to counteract the upward movement of that portion of said chest. When the gate is turned from the upright toward the horizontal position, the movement and action of said weight are in the reverse direction. It will be observed that while said weight is moving from one end of said compartment to the other it exerts relatively small influence upon said chest, the weight in the compartments B' and B^2 being the main factors in lifting the gate.

The braces C and D are preferably detachably secured to the gate and also to the counterbalance-chest and to each other, to the end that the structure may be readily separated and the parts crated for shipment in knock-down form and in order that my improvement may be readily and economically applied to ordinary hinged gates already constructed.

E is a sill extending horizontally beneath and parallel to the gate proper. The function of said sill is to form means, either exclusive of or supplemental to the ground, for securing the posts F , F' , F^2 , and F^3 . It is to be understood that said sill may be omitted and the several posts mentioned set into the ground. As the posts F F' are usually set farther apart than the width needed for the sill E, a cross-sill E' may be applied to said sill E as a means of attachment for the lower ends of said posts. The posts F and F' at the same side of the sill E and the gate converge as they rise until their upper ends meet, where they are firmly joined by a bolt F^4 . Said posts F F' (and also the posts F^2 F^3) are separated sufficiently at the top to make room for the passage of the gate, as will be hereinafter described, and said posts F F' (and also the posts F^2 F^3) preferably diverge from the bottom toward the top, because greater stability is attained when the posts F F' , shaft C' , and cross-sill E' do not form a parallelogram.

Two arms H are used for supporting the cords G, one of said arms being placed at each side of the gate between the adjacent posts F and F' and hinged (so as to permit horizontal movement, as hereinafter described) on the shaft f , which extends horizontally through said posts. A guy-wire or similar brace H' extends from the upper ends of the posts F and F' to the other end of the adjacent arm H, and a similar guy wire or brace H^2 extends from approximately the same point on said posts to a point approximately at the middle of said arm. The object in using such guy-wires is to support the outer end and the middle of said arm in order that said arm may be made of lighter material and yet be maintained in the horizontal position. Two pulleys H^3 are secured at the upper ends of each pair of posts F F' ,

and one such pulley H^4 is secured at the outer end of each arm H . Said pulleys serve as guides for the cords G . Said guy-wires H^1 and H^2 prevent said arms H from turning downward with the shaft f as a hinge; but said arm is preferably arranged for horizontal movement upon a pivotal point on or adjacent to said shaft. This is accomplished by making said arm narrower than the space between the posts F and F' at that elevation, extending said arm over said shaft f , and extending a staple f' around said shaft and into said arm, as shown in detail in Fig. 5.

It has been found difficult to so secure the posts F and F' as to cause them to maintain their proper positions. My improvement embodies an effective method of connecting the said posts located at one side of the gate with those located at the other side of the gate. A bar I , extending horizontally from one post F to the other, constitutes such a connection. If the braces C and D were parallel, or approximately so, to each other, the uppermost of said braces would come into contact with said bar before the gate could attain the vertical position; but by placing said braces in the oblique positions and across each other, as shown, they not only constitute a simple, strong, and efficient means for joining the gate to the counterbalance-chest and for joining to the posts F , but they also avoid said bar I when the gate is in the upright position. Said bar also serves to engage the latch-bar J for locking the gate in the upright position. The lower end of said latch-bar is hinged to the lower portion of the gate adjacent to the counterbalance-chest. When the gate is raised, said latch-bar falls by gravity toward and upon said bar I and slides upward and rearward upon said bar until the shoulder J' of said latch-bar falls down behind the bar I . These several parts are so arranged and adjusted that this will occur when the gate attains approximately the vertical position. At the end of said gate opposite its hinge there are one upright post F^2 and two oblique posts F^3 , one located at each side of the gate and having its upper end extending along the side of the upper end of the post F^2 and suitably joined to the latter. Said posts F^3 stay the gate against lateral movement. A yoke K is located between the posts F^2 and the adjacent upright A^3 of the gate, said yoke extending along each side of said upright and being attached to the latter and inclosing a space toward the post F^2 . In said space is seated an upright latch L , suitably hinged at its lower end by a shaft L' , extending horizontally through said yoke and latch. A suitable shoulder L^2 extends from the post F^2 toward the gate. Said latch extends upward sufficiently to bear against said shoulder when the gate is in the horizontal position. A suitable spring L^3 may be interposed between the upper portion of said latch and the adjacent upright A^3 to normally hold the upper end of

said latch far enough away from said upright to cause said latch to extend beneath said shoulder. A cord M extends from the upper portion of said latch to each cord G , said cords M and G being united at M' . Each cord G extends from the upper end of the latch-bar J upward over the forward pulley H^3 , and from the latter around the pulley H^4 , and thence to the rearward pulley H^3 , and thence downward to a point near the lower rearmost corner of the gate, preferably the bolt extending through said braces C' and the rear upright A^3 , where said cord is attached. The cord M is made so short as to draw the cord G slightly toward the front of the gate when the latter is in the horizontal position, to the end that the cord M may be drawn sufficiently to release the latch L from the shoulder L^2 before the cord G draws upward on the gate. The cord G may be left sufficiently slack to permit the portion between the pulley H^4 and the forward pulley H^3 to depend within reach of a person approaching the gate. When the gate is closed, said depending portion of the cord G is drawn toward the gate, whereby the portion of said cord attached to the cord M and the lower portion of the gate is drawn upward. When the gate is to be closed, said depending portion of said cord G is drawn away from the gate. Such movement of said cord first lifts the latch-bar J out of engagement with the bar I and then causes said latch-bar to bear against said gate and turn the latter downward. A cord G' may be attached to said depending portion of said cord G and made of convenient length for grasping by the person who is to operate the gate.

Wire braces N are attached at each lower forward corner of the counterbalance-chest and extend thence obliquely upward to the front upper corner of the gate, where they are securely attached, preferably to the upper portion of the upright A^3 . Said wires are preferably crossed between the latch-bar J and the counterbalance-chest, so that said wires will form a rest for limiting the rearward movement of said bar. Another pair of wire braces O extend from the upper end of the counterbalance-chest obliquely downward and forward over the bar I to the lower front corner of the gate. By carrying said braces O over the bar I said bar will not be in the path of said wires when the gate is opened or closed. Said braces serve to impart additional rigidity to the gate structure.

P , Figs. 1, 2, and 6, is a stop for limiting the rearward movement of the gate. This is in the form of a V-shaped yoke extending horizontally rearward from the upper ends of the posts F F' . I have found that a stop located at the elevation shown is important in gates of this type. By placing such a stop as high as possible above the hinge of the gate strain on the latter and the portions of the gate adjacent to said hinge is obviated. In practice I have found that well-constructed

gates will break when the momentum of the gate when moving rearward is arrested by contact with a stop near the hinge of the gate.

The yoke K, which serves as a support for the latch L, serves also as a buffer for the protection of said latch. If the gate should veer sidewise while descending, said yoke, and not the latch, will strike the post F³ at the side to which the gate is veered.

The upright A⁴ may be divided lengthwise and in the plane of the gate to form two parts a⁴ to stand at each side of wires a⁵ when the latter are used to fill the space between the top and bottom rails of the gate. This is a convenient construction to use in new gates, and it is specially adapted to use when my improvement is to be applied to old gates which have been hinged or otherwise supported.

Fig. 9 illustrates in detail a convenient means for attaching the hinge-shaft C' to the posts F. To the inner face of each post is applied a plate Q, having one end upturned and provided with an aperture Q', which receives the end of the shaft C'. Said plates may be readily secured to the posts by means of screws or bolts, and their position may be readily varied for the proper adjustment of said shaft.

I claim as my invention—

1. A gate supported on a horizontal hinge and having a counterbalance and oblique braces, C and D, crossing each other and having their ends joined to said counterbalance and the gate, substantially as described.

2. A gate supported on a horizontal hinge and having a counterbalance and oblique braces, C and D, crossing each other and having their rear ends joined to said counterbalance and having their forward ends joined to the top and bottom rails of the gate, substantially as described.

3. A gate supported on a horizontal hinge and having a counterbalance and oblique braces, C and D, crossing each other and joined to each other where they cross and having their ends joined to said counterbalance and the gate, substantially as described.

4. A gate supported on a horizontal hinge and having a counterbalance and oblique braces, C and D, crossing each other and joined to each other where they cross, and having their rear ends joined to said counterbalance and their forward ends to the top and bottom rails, substantially as described.

5. A gate supported on a horizontal hinge and having a counterbalance and oblique braces, C and D, crossing each other and having their rear ends joined to said counterbalance and having the portions forward of the point of crossing joined to the rear upright and the top and bottom rails, substantially as described.

6. A gate supported on a horizontal hinge and having a counterbalance and oblique braces, C and D, crossing each other and joined to each other where they cross and hav-

ing their rear ends joined to said counterbalance and having the portions forward of the point of crossing joined to the rear upright and the top and bottom rails, substantially as described.

7. In a gate, the combination with the gate-frame, of a counterbalance, and two pairs of braces extending obliquely from said counterbalance to said gate-frame and crossing each other, and a horizontal hinge-shaft extending through two of said braces, substantially as described.

8. In a gate, the combination with the gate-frame, of a counterbalance, and two pairs of braces extending obliquely from said counterbalance to said gate-frame and crossing each other, a horizontal hinge-shaft extending through two of said braces, two posts, one located at each side of the gate and supporting said shaft, and a bar, I, connecting said posts above said braces, substantially as described.

9. The combination with a gate-frame, counterbalance, and braces connecting said counterbalance and frame, posts, F, and a bar, I, connecting said posts, of a latch-bar adapted to engage said bar and to hold said gate in the upright position, substantially as described.

10. The combination with a gate-frame and posts to which said gate is hinged, of a latch-bar hinged to said gate-frame, and a member suitably secured to said posts for making engagement with said latch-bar when the gate is in the upright position, substantially as described.

11. A gate supported on a horizontal hinge and having a counterbalance-chest comprising two compartments which are at opposite sides of a plane cutting said gate lengthwise and near which said hinge lies, and a third compartment adapted to receive a freely-shifting weight, substantially as described.

12. A gate supported on a horizontal hinge and having a counterbalance-chest comprising two compartments which are at opposite sides of a plane cutting said gate lengthwise and near which said hinge lies, and a third compartment having its ends adjacent to vertical lines extending through the hinge of the gate when the latter is opened or closed, substantially as described.

13. In a gate, the combination of the posts, F and F', shaft, f, arm, H, an operating-cord, staple, f', and a guy, substantially as described.

14. In a gate, the combination of the posts, F and F', arm, H, suitably hinged to said posts, and two guys, both joined to said posts, and one joined to the outer end of said arm and the other near the middle of the latter, and an operating-cord, substantially as described.

15. The combination with a gate supported on a horizontal hinge, of a latch-bar secured vertically to the rear end of said gate and arranged to bear against the rear end of the latter when the latch has been released, and

a cord attached to said latch-bar and arranged for lifting the latter whereby the gate is released and turned from the upright position, substantially as described.

5 16. The combination with the gate-frame and latch-bar secured to the rear portion of said frame, posts, F and F', arm, H, and suitable pulleys secured upon the outer end of said arm and upon said posts, of a cord extending from the rear portion of said gate upward and over a pulley on said posts, thence around the pulley on the outer end of said arm, thence over a pulley on said posts, and thence downward to said latch-bar, substantially as described.

15 17. In a gate, the combination with two posts, one standing at each side of the gate, of plates, Q, attached to the inner faces of said posts and having upturned ends having apertures, Q', substantially as described.

20 18. The combination with a gate-frame having a latch mounted thereon at each end, of posts and a cord-supporting arm, and duplex cords each extending from the outer end of said arm, one to one and the other to the other of said latches, substantially as described.

25 19. In a gate, the combination with the gate-frame, counterbalance, and two pairs of rigid braces crossing each other and joined by their ends to said frame and said counterbalance, of a pair of wire braces, N, joined to the lower portion of said counterbalance and to the upper, outer portion of said frame, substantially as described.

20. In a gate, the combination with a frame and counterbalance, and two pairs of rigid braces crossing each other and joined by their ends to said counterbalance and frame, of a wire brace extending from the upper portion of said counterbalance to the lower forward corner of said frame, substantially as described.

21. In a gate, the combination with a gate-frame, a counterbalance, two pairs of oblique braces joining said counterbalance and frame, posts, F, F', supporting said gate, and a bar, I, connecting said posts above said braces, of a wire brace extending from the upper portion of said counterbalance over said bar, I, to the lower forward corner of the gate-frame, substantially as described.

22. In a gate, the combination with a frame and counterbalance, and a pair of braces rigidly joining said counterbalance and frame, of a pair of wire braces joined to the front of the gate and extending along opposite sides of the latter and crossed between the gate-frame and counterbalance and then attached to the counterbalance, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses, this 21st day of October, in the year 1901.

TERELIUS ALLEN HILL.

Witnesses:

H. T. GAY,

R. A. MELROW.