

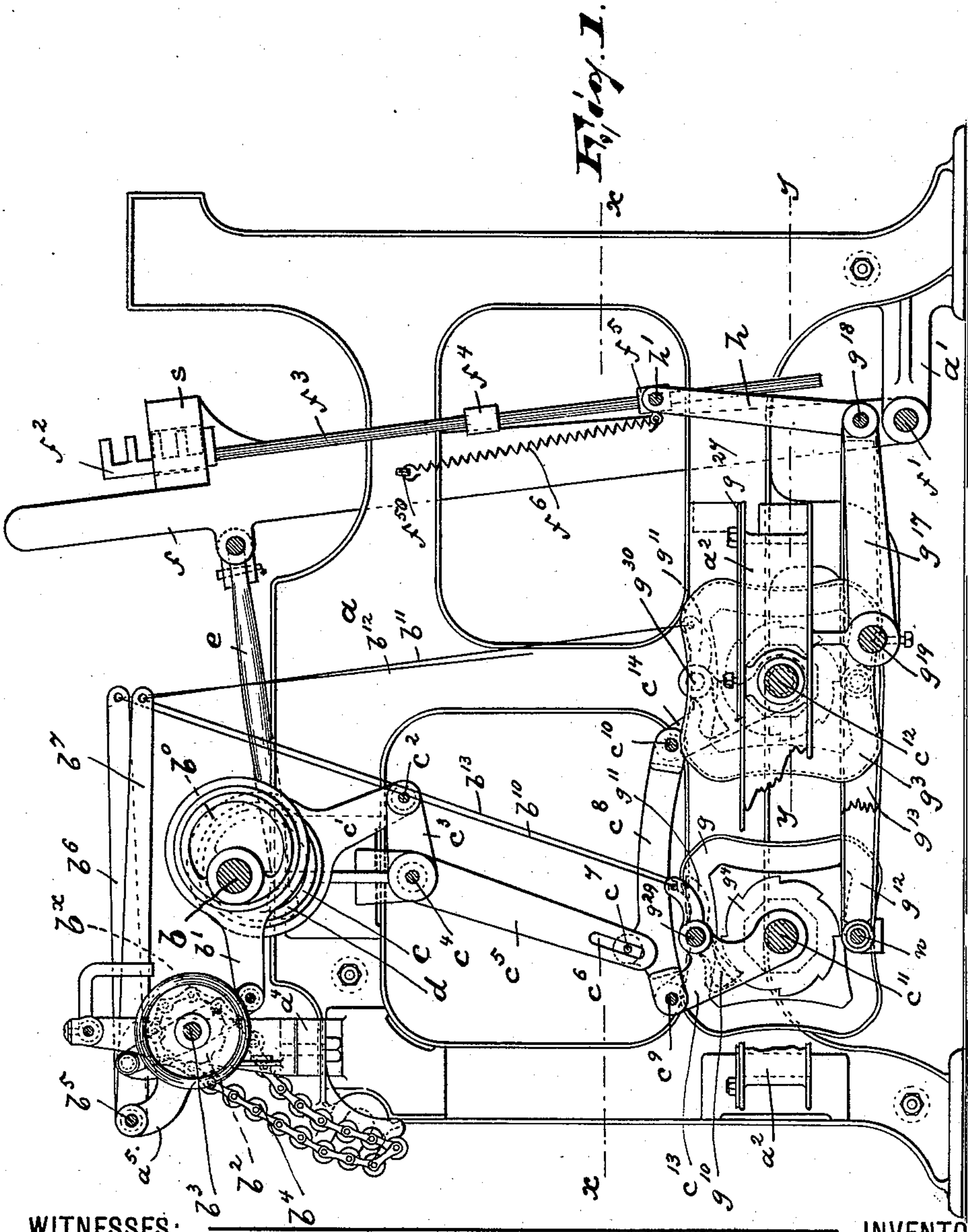
(No Model.)

3 Sheets—Sheet 1.

A. F. DU FAUR & A. GARTNER.
BOX LOOM.

No. 572,251.

Patented Dec. 1, 1896.



WITNESSES:

INVENTORS:

Wm. Drell.
Duncan M. Robertson.

Adolf Faber Du Faur and
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BY *Partners & Co* ATTY'S.

(No Model.)

3 Sheets—Sheet 2

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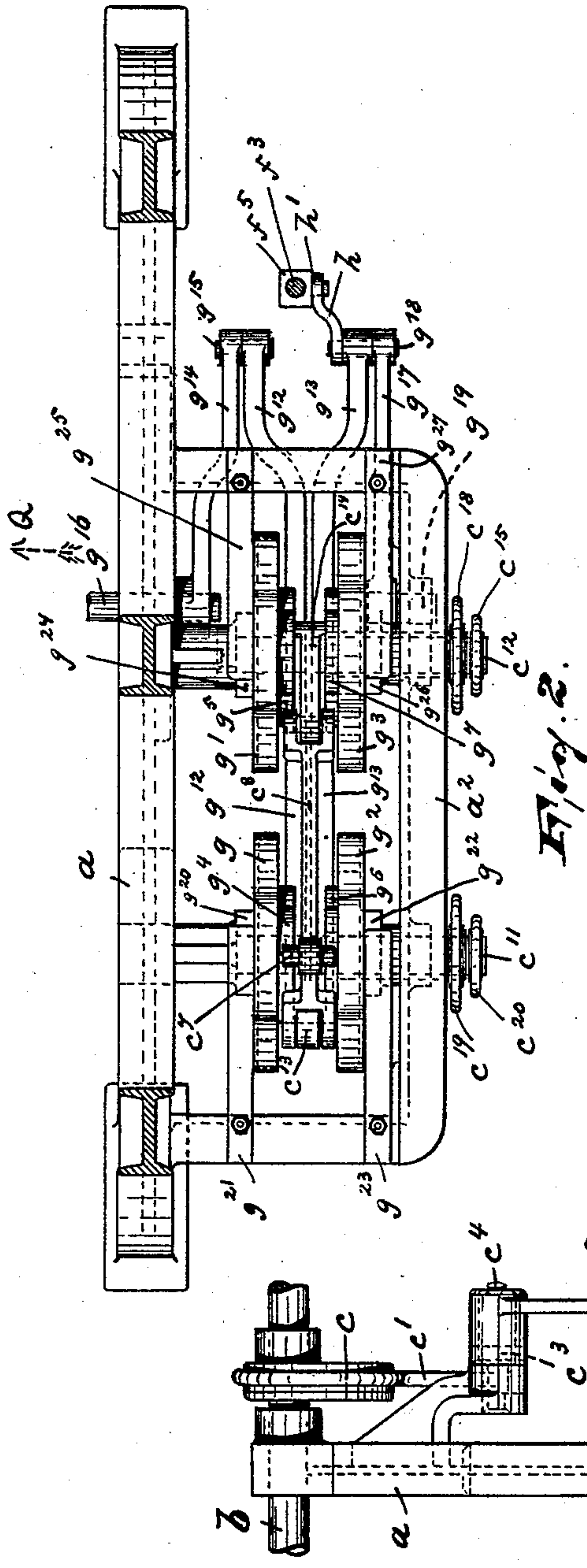


Fig. 2.

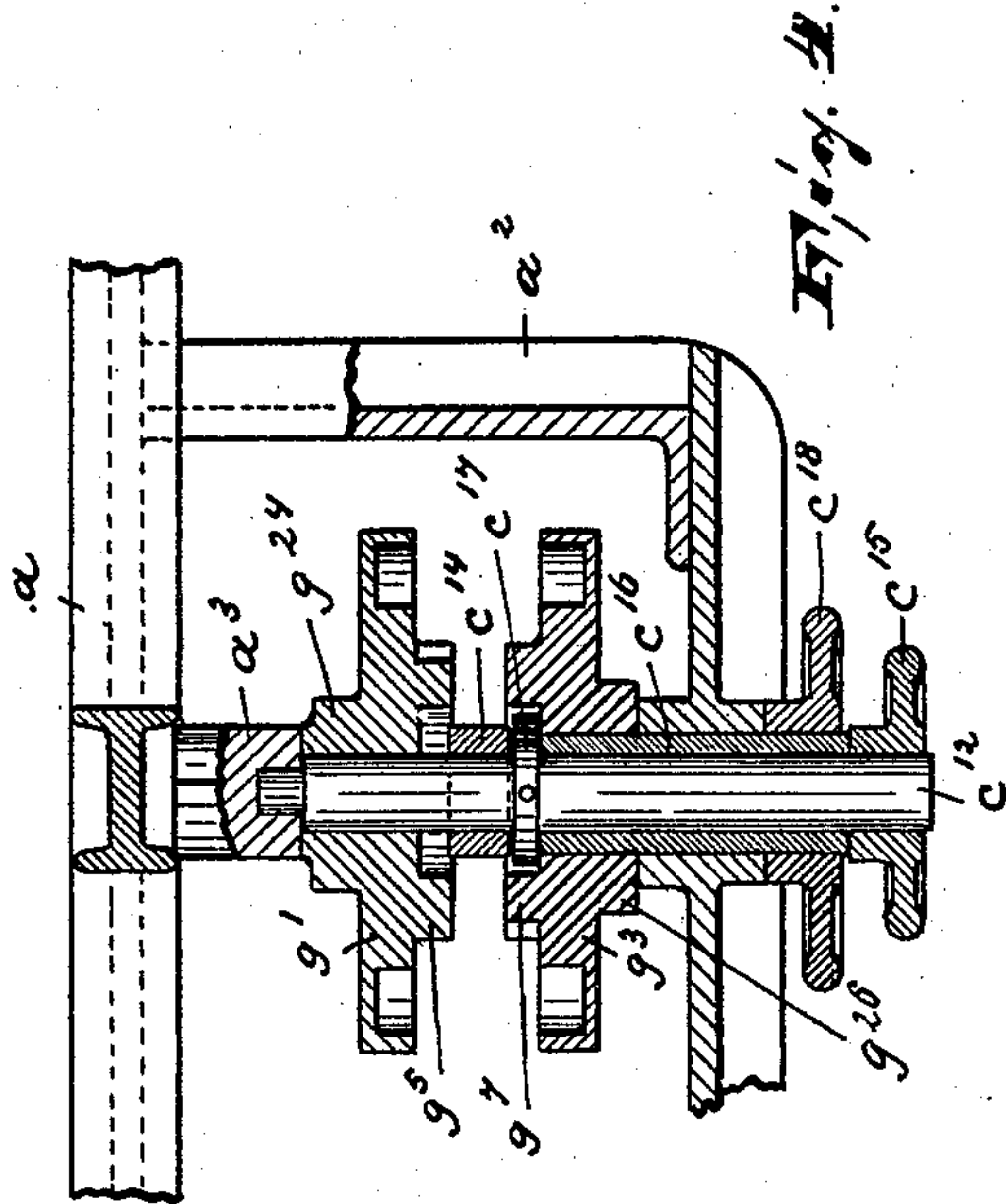


Fig. 4.

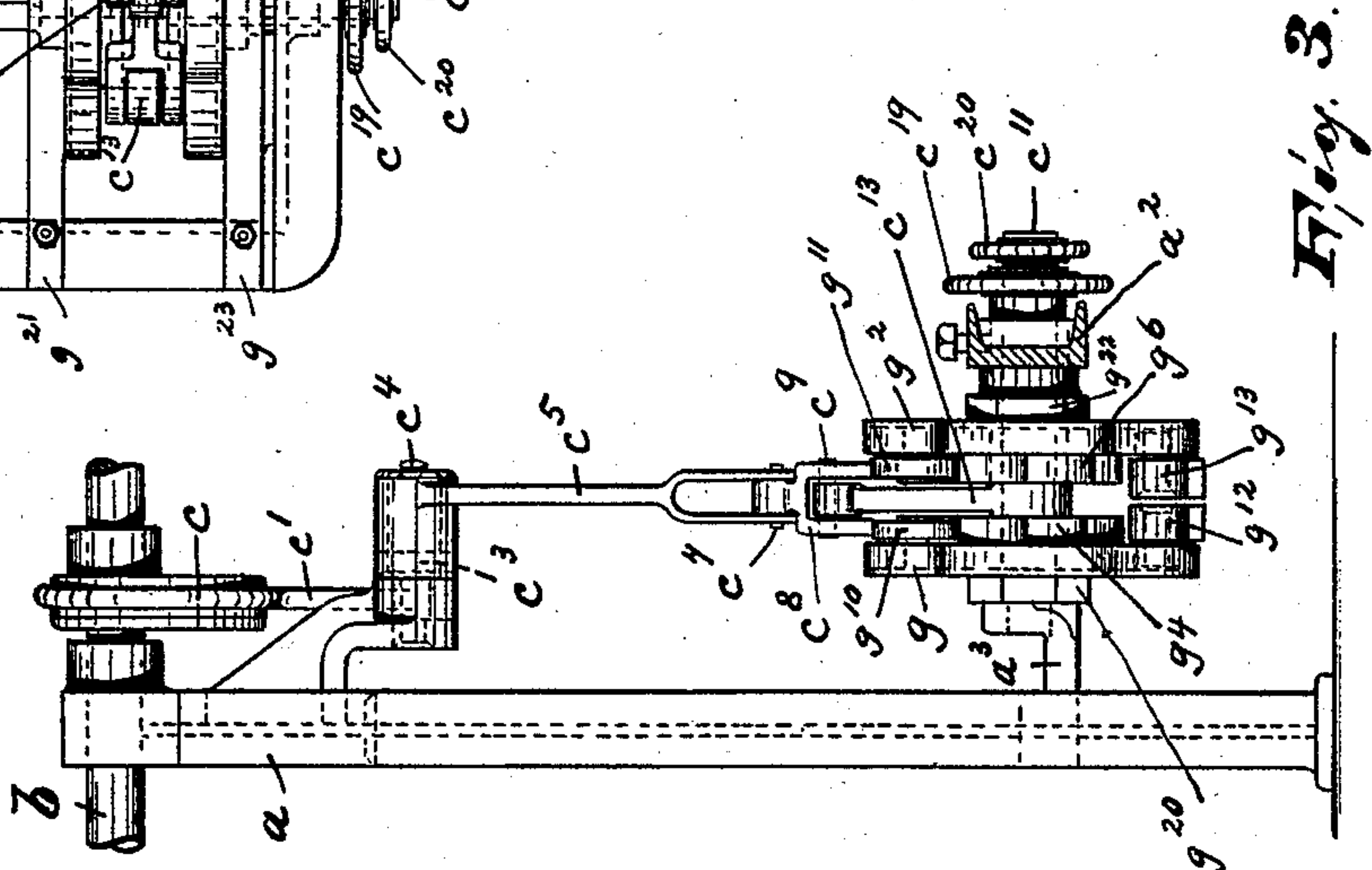


Fig. 3.

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(No Model.)

3 Sheets—Sheet 3

A. F. DU FAUR & A. GARTNER.
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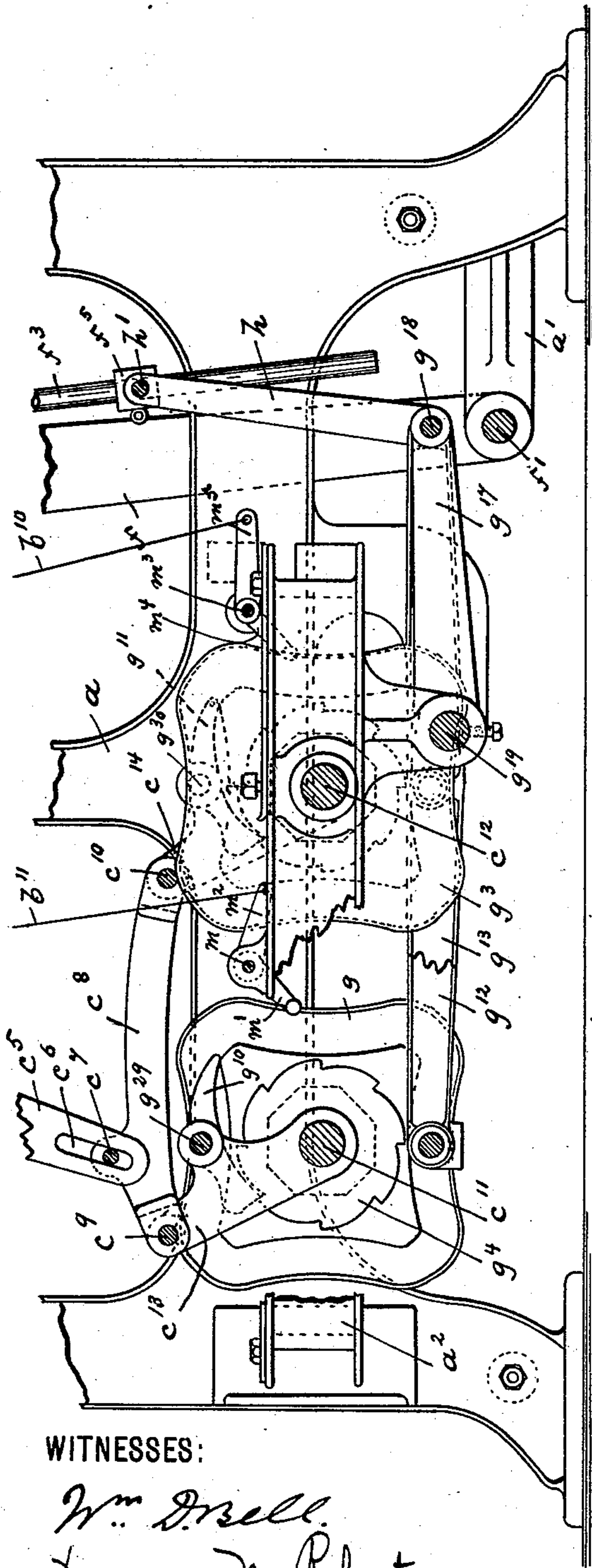


Fig. 7.

WITNESSES:

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Duncan M. Robertson.

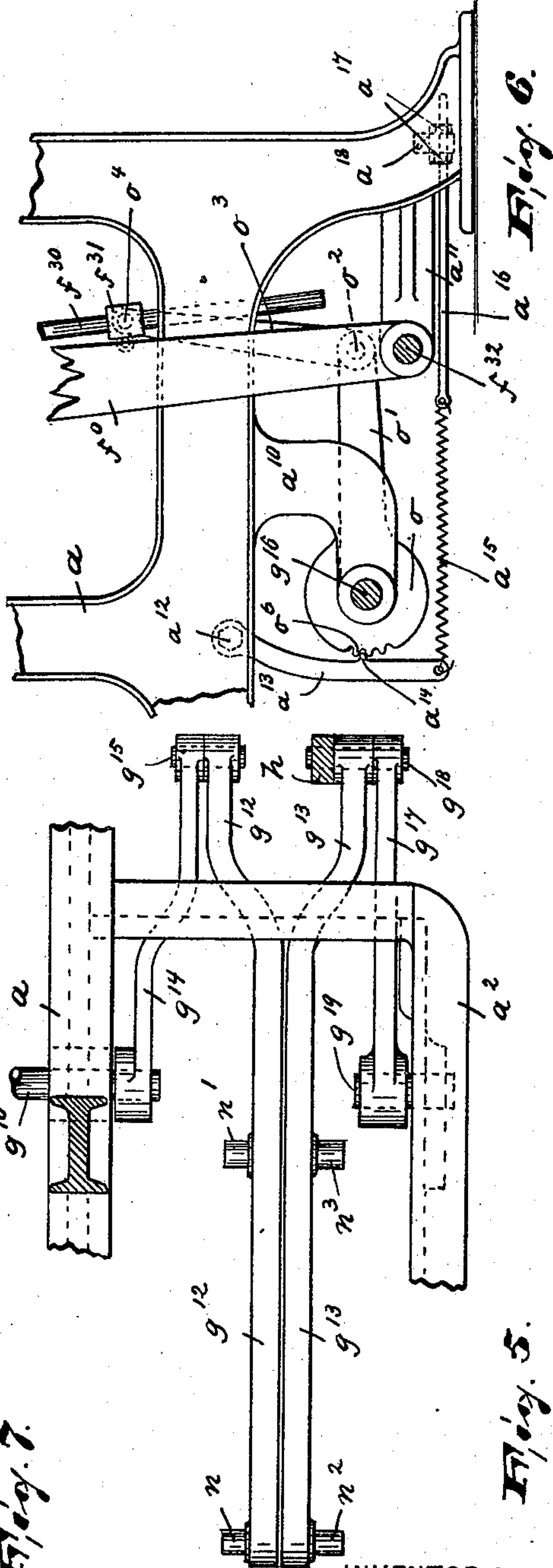


Fig. 5.

INVENTORS:

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UNITED STATES PATENT OFFICE.

ADOLF FABER DU FAUR AND ALFRED GARTNER, OF NEWARK, NEW JERSEY,
ASSIGNORS TO ROBERT ATHERTON, OF PATERSON, NEW JERSEY.

BOX-LOOM.

SPECIFICATION forming part of Letters Patent No. 572,251, dated December 1, 1896.

Application filed August 5, 1896. Serial No. 601,697. (No model.)

To all whom it may concern:

Be it known that we, ADOLF FABER DU FAUR and ALFRED GARTNER, citizens of the United States, residing in Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Box-Looms; and we 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.

The present invention relates to improvements in box-loom, and especially to that class of box-loom in which the floating levers operating the box-rods are controlled by two cam or cam-groove wheels—as, for example, in the United States Letters Patent No. 556,968, dated March 24, 1896.

The object of this invention is to provide a box-loom, especially of the character specified, with simple means for transmitting the motion of the main driving-shaft to the cam or cam-groove wheels operating the lifting-levers of the shuttle-boxes, to more easily and readily control the movement of the said lifting-levers, and to reduce the jar or shock of the boxes while being changed from one position to another.

The invention consists in the improved box-loom, its lifting-levers controlling “cam-groove wheels,” in the means for operating and controlling the said cam-groove wheels, in the mechanism for equalizing the movement of the said lifting-levers, and in the combination and arrangement of the various parts, substantially as will be hereinafter more fully described, and finally embodied in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several views, Figure 1 is a side elevation of a loom provided with our improvements, certain portions being removed or broken away and others shown in section to better illustrate the nature of the said invention; Fig. 2, a sectional view on the line $x x$ of Fig. 1, certain

parts being added and others removed; Fig. 3, an end elevation of Fig. 1, the multiplier not being shown; Fig. 4, an enlarged sectional view on the line $y y$ of Fig. 1; Fig. 5, an enlarged detail view of the arrangement of the lifting-levers for the boxes on both sides of the loom; Fig. 6, an enlarged detail view taken in the direction of the arrow Q, Fig. 2, and illustrating the means for operating and controlling the box (and its rod) on the other side of the loom; and Fig. 7, an enlarged detail side elevation similar to that of the lower part of Fig. 1 and illustrating a slight modification thereof.

In said drawings, a represents the loom-frame, in which is arranged the driving-shaft b , carrying the eccentric c and transmitting its motion, through the pitman e , pivoted, as at d , to said eccentric, to the lay or batten s , supported by swords f and f^0 , which are fulcrumed, as at f' and f^{32} , to the bracket-frames a' and a^{11} of the loom a , respectively.

At each end of the lay are arranged the shuttle-boxes f^2 , carried by rods f^3 , (and f^{30}), each of which rods is guided by the block f^4 , (and f^{31}), secured to its respective sword, all said parts of the usual and well-known construction.

On the shaft b is also mounted an eccentric b^0 , operating, through its projecting arm b^1 , the oscillating lever b^x , fulcrumed on the shaft b^3 , the latter having its bearing in the bracket-frame a^4 . On said shaft is also mounted the sprocket-wheel b^2 , carrying the pattern-chain b^4 , which latter controls the treadle-levers b^6 and b^7 , fulcrumed, as at b^5 , to the projecting portion a^5 of the bracket-frame a^4 . The pattern-chain is operated from the oscillating arm by means not specifically mentioned in the present application, and which means are made the subject of a concurrent application, Serial No. 601,694, filed August 5, 1896; but it will be manifest that other well-known devices for operating the treadle-levers $b^6 b^7$ can be used in connection with the improvements hereinafter specified.

At the lower portion of the loom-frame a is arranged a bracket-frame a^2 , serving as bearings for the parallel cam-shafts c^{11} and c^{12} , which have their inner ends supported by the

bracket-frames a^3 , as clearly shown in Figs. 2, 3, and 4.

On the cam-shaft c^{12} , which is provided at its forwardly-projecting portion with a hand-wheel c^{15} , is secured the cam-groove wheel g' , having integral therewith the ratchet-wheel g^5 and the octagonal-shaped brake-wheel g^{24} . On said cam-shaft is also loosely mounted the sleeve c^{16} , prevented from lateral movement by means of the collar c^{17} on shaft c^{12} , which sleeve carries the cam-groove wheel g^3 , the ratchet g^7 , and the brake-wheel g^{26} . The projecting end of the sleeve c^{16} is provided with a hand-wheel c^{18} , all as clearly shown in Fig. 4. As will be observed from said figure, the cam-groove wheels g' and g^3 and their respective ratchet and brake wheels are arranged symmetrically with relation to each other, and the said ratchet-wheels are on the inner and the brake-wheels on the outer faces of said cam-groove wheels.

On the cam-shaft c^{11} are arranged and mounted in a manner similar to that described in connection with cam-shaft c^{12} , Fig. 4, the cam-groove wheels g and g^2 , their respective ratchet-wheels g^4 and g^6 , brake-wheels g^{20} and g^{22} , and hand-wheels c^{20} and c^{19} . (See Fig. 2.)

The cam-groove wheels on one cam-shaft are in the same plane as the corresponding cam-groove wheels on the other cam-shaft and are each provided with an endless cam-groove consisting of four concave and four convex curves arranged alternately and symmetrically, as clearly shown in Figs. 1 and 7.

On the cam-shafts c^{11} and c^{12} are loosely mounted the oscillating levers c^{13} and c^{14} , respectively, pivotally connected at their free ends, as at c^9 and c^{10} , to the arm or link c^8 , which latter is provided with the horizontally-arranged pin c^7 , engaging the elongated slot c^6 of the free end of arm c^5 of an angle-lever which is fulcrumed, as at c^4 , to the loom-frame. The other arm, c^3 , of said angle-lever is pivotally connected, as at c^2 , to the arm c' , carried by and projecting from the eccentric c , all as clearly shown in Fig. 1 of the drawings.

The oscillating levers c^{13} and c^{14} are provided with horizontally-arranged pins g^{29} and g^{30} , respectively, on each of which pins and on each side of the levers are fulcrumed the pawls g^{10} g^{11} , adapted to engage the respective ratchet-wheels g^4 g^6 and g^5 g^7 , to thus intermittently rotate the same (and the cam-groove wheels connected therewith) in a manner hereinafter described.

In each endless cam-groove is arranged and adapted to be operated thereby a pin n , n' , n^2 , and n^3 , respectively. The pins n^2 and n^3 are secured in and project from the floating lever g^{13} , pivotally secured at one end, as at g^{18} , to the free end of lever g^{17} , which latter is fulcrumed, as at g^{19} , to the bracket-frame a^2 . On the pivot g^{18} is also arranged one end of link h , the other end of which is pivoted, as at h' , to the collar or block f^5 , secured on the box-rod f^3 . A spiral spring f^6 extends from

said collar or block to a pin f^{50} on the loom-frame, and tends to draw said collar and the box-rod f^3 upward, as will be manifest.

The pins n and n' are secured to and project from the lever g^{12} , which is pivotally secured, as at g^{15} , to one end of lever g^{14} . The other end of said lever is secured to the shaft g^{16} , which traverses the loom and which is arranged parallel to the driving-shaft b . On the other end of said shaft, which has its bearing in the bracket-frame a^{10} , (see Fig. 6,) is secured the disk o , provided at one side of its periphery with four notches o^6 , adapted to be engaged by the tooth or projection a^{14} , arranged on the lever a^{13} , which is pivoted, as at a^{12} , to the loom-frame. The free end of said lever is connected to the spiral spring a^{15} , attached to the rod a^{16} , the other end of which is screw-threaded and penetrates the lug a^{18} and carries the nuts a^{17} , by means of which it can be horizontally adjusted, as will be manifest.

From the disk o projects an arm o' , pivotally connected, as at o^2 , to the lower end of the link o^3 , the upper end of which is pivoted, as at o^4 , to a collar or block f^{31} , secured on the box-rod f^{30} . The brake-wheels g^{20} , g^{22} , g^{24} , and g^{26} , which are octagonal-shaped, are each engaged and thus controlled by the flat springs g^{21} , g^{23} , g^{25} , and g^{27} , respectively, as clearly shown in Fig. 2 of the drawings.

The pawls g^{10} and g^{11} are connected at their projecting free ends by cords or wires b^{10} b^{13} b^{11} b^{12} with the respective treadle-levers b^6 b^7 , or, as in Fig. 7, the said projecting free ends of said pawls are adapted to be engaged by the shorter arms m' or m^4 of the angle-levers, which latter are fulcrumed, as at m and m^3 , respectively, to the bracket-frame a^2 , and which angle-levers have their longer arms m^2 and m^5 connected with the said cords or wires, as will be more particularly described in the operation.

In operation the lifting-levers g^{13} and g^{12} , and thus the box-rods f^3 and f^{30} , are operated by their respective coöperating cam-groove wheels g^2 g^3 and g g' substantially in the same manner as described in connection with the hereinbefore-mentioned United States Letters Patent No. 556,968, that is to say, when said cam-groove wheels are rotated one-eighth of a revolution the floating levers operated thereby are raised or lowered, the cam-groove wheels are securely held in position by the flat springs engaging flat sides of their respective octagonal-shaped wheels g^{20} , g^{22} , g^{24} , and g^{26} , and it only remains necessary to describe the mode or operation for intermittently rotating the said cam-groove wheels.

The angle-lever c^3 c^5 is oscillated by means of the eccentric c and the arm c' , carried thereby. This oscillating movement is transmitted by means of the link c^8 to the pawl-carrying oscillating radial arms c^{13} and c^{14} . The pawls g^{10} and g^{11} are so constructed or weighted that they are normally out of engagement

with the teeth of their respective ratchet-wheels. (See pawl g^{11} , connected with cord b^{11} , Fig. 1.) When, for instance, the treadle-lever b^6 is raised by the ball of the pattern-chain, the cord b^{10} , connected thereto, raises the projecting end of its pawl g^{10} , and thus brings the said pawl into engagement with one tooth of the ratchet-wheel, and as the said pawl is carried along by the oscillating arm c^{13} (from right to left) it turns said ratchet-wheel one-eighth of a revolution, and therefore also the cam-groove wheel g connected therewith. The end of the lifting-lever g^{12} (through its pin n) is thus lowered and the box-rod correspondingly raised, as will be manifest. If the lever b^6 should remain raised, the pawl g^{10} would naturally engage the successive teeth of its ratchet-wheel, and thus intermittently rotate the same one-eighth of a revolution at a time. When the lever b^6 is again lowered, the pawl g^{10} returns to its normal (floating) position, and thus prevents a further rotation of the ratchet and cam-groove wheel connected therewith.

In the modification illustrated in Fig. 7 the said pawls g^{10} g^{11} are so constructed that the pawl-shaped end is heavier and normally slides on the curved portion of the teeth of its respective ratchet-wheel. Said pawl-shaped end is prevented from engaging the straight portion of the teeth, when the pawl and its carrying oscillating lever is at its returning-point, (at the right,) as the free end of said pawl strikes against the arm m' of the pivoted angle-lever, the normal position of which is illustrated in the left-hand portion of said Fig. 7. The said pawl is thus turned on its fulcrum g^{20} and raised above the crown of the tooth which at that time is in the vertical line of the shaft c^{11} . Should, however, the angle-lever be raised by the cord or wire connecting it with its respective lever b^6 b^7 , the projecting end of the pawl g^{11} (see right-hand portion of Fig. 7) will not strike against the arm m^4 of said angle-lever. The pawl will then engage the straight portion of the tooth and thus rotate the ratchet-wheel one-eighth of a revolution, as will be manifest.

By the arrangement illustrated in Fig. 6 and used in connection with the box-rod on the other side of the loom additional friction is given to the disk o , carrying the arm o' , whereby the jar or shock of the box (and its rod) while being changed from one position to another is greatly reduced. Furthermore, a vibration of the box and its rod after a change has been made is prevented by means of the lever a^{13} engaging with its tooth or projection a^{14} the corresponding notch o^6 in the periphery of the disk o , as will be manifest.

We do not intend to limit ourselves to the precise construction shown and described, as various alterations can be made without changing the scope of our invention; but

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

1. The combination with a lever, and with two cam-groove wheels controlling the same, of a ratchet-wheel connected with each of said cam-groove wheels, a fulcrumed arm for each of said ratchet-wheels, a pawl pivotally secured to each of said fulcrumed arms and adapted to engage the teeth of its respective ratchet-wheel, and means for oscillating said fulcrumed arms, all said parts, substantially as and for the purposes described.

2. The combination with a lever, and with two cam-groove wheels controlling the same, of a ratchet-wheel connected with each of said cam-groove wheels, a fulcrumed arm for each of said ratchet-wheels, a pawl pivotally secured to each of said fulcrumed arms and adapted to engage the teeth of its respective ratchet-wheel, a link pivotally connecting the said fulcrumed arms, and means for oscillating said link, all said parts, substantially as and for the purposes described.

3. The combination with a lever, and with two cam-groove wheels controlling the same, of a ratchet-wheel connected with each of said cam-groove wheels, a fulcrumed arm for each of said ratchet-wheels, a pawl pivotally secured to each of said fulcrumed arms and adapted to engage the teeth of its respective ratchet-wheel, a link pivotally connecting the said fulcrumed arms, a fulcrumed angle-lever pivotally and self-adjustably connected with one arm to the said link, and means for oscillating the other arm of said angle-lever, all said parts, substantially as and for the purposes described.

4. The combination with a lever, and with two cam-groove wheels controlling the same, of a ratchet-wheel connected with each of said cam-groove wheels, a fulcrumed arm for each of said ratchet-wheels, a pawl pivotally secured to each of said fulcrumed arms and adapted to engage the teeth of its respective ratchet-wheel, means for controlling said pawls, and means for oscillating the said arms, all said parts, substantially as and for the purposes described.

5. The combination with a lever, and with two cam-groove wheels controlling the same, of a ratchet-wheel connected with each of said cam-groove wheels, a fulcrumed arm for each of said ratchet-wheels, a pawl pivotally secured to each of said fulcrumed arms and adapted to engage the teeth of its respective ratchet-wheel, means for controlling said pawls, a link pivotally connecting the said fulcrumed arms, and means for oscillating said link, all said parts, substantially as and for the purposes described.

6. The combination with the main driving-shaft, of an eccentric on said shaft, a fulcrumed oscillating angle-lever operated from said eccentric, two cam-shafts arranged parallel with the driving-shaft, a cam-groove

wheel on each of said cam-shafts, the shuttle-box lifting-lever operated by said cam-groove wheels, a ratchet-wheel connected with each of said cam-groove wheels, an arm loosely mounted on each of said cam-shafts, a pawl pivotally secured on each of said arms and adapted to engage the teeth of its respective ratchet-wheel, a link pivotally connecting the said arms, and connected with and operated by the oscillating angle-lever, all said parts, substantially as and for the purposes described.

7. The combination with the main driving-shaft, of an eccentric on said shaft, a fulcrumed oscillating angle-lever operated from said eccentric, two cam-shafts arranged parallel with the driving-shaft, a cam-groove wheel on each of said cam-shafts, the shuttle-box lifting-lever operated by said cam-groove wheels, a ratchet-wheel connected with each of said cam-groove wheels, an arm loosely mounted on each of said cam-shafts, a pawl pivotally secured on each of said arms and adapted to engage the teeth of its respective ratchet-wheel, means for controlling the pawls, a link pivotally connecting the said arms, and connected with and operated by the oscillating angle-lever, all said parts, substantially as and for the purposes described.

8. The combination with the main driving-shaft, of an eccentric on said shaft, a fulcrumed oscillating angle-lever operated from said eccentric, two cam-shafts parallel with the driving-shaft, a cam-groove wheel on each of said cam-shafts, the shuttle-box lifting-lever operated by said cam-groove wheels, means operated from the oscillating angle-lever to intermittingly rotate said cam-groove wheels, and a spring-controlled brake-wheel connected with each cam-groove wheel, all said parts, substantially as and for the purposes described.

9. The combination with the main driving-shaft, of an eccentric on said shaft, a fulcrumed oscillating angle-lever operated from said eccentric, two cam-shafts parallel with the driving-shaft, a cam-groove wheel on each of said cam-shafts, a ratchet-wheel connected with each of said cam-groove wheels, an arm loosely mounted on each cam-shaft, a pawl pivotally secured on each arm and adapted to engage the teeth of its respective ratchet-wheel, a link pivotally connecting said arms, and connected with and operated by said fulcrumed angle-lever, and a spring-controlled brake-wheel for each cam-groove wheel, all said parts, substantially as and for the purposes described.

10. The combination with the main driving-shaft, of an eccentric on said shaft, a fulcrumed oscillating angle-lever operated from said eccentric, two cam-shafts parallel with the driving-shaft, a cam-groove wheel on each of said cam-shafts, a ratchet-wheel connected with each of said cam-groove wheels, an arm loosely mounted on each cam-shaft, a pawl

pivotally secured on each arm and adapted to engage the teeth of its respective ratchet-wheel, a link pivotally connecting said arms, and connected with and operated by said fulcrumed angle-lever, means for controlling the pawls, and a spring-controlled brake-block for each cam-groove wheel, all said parts, substantially as and for the purposes described.

11. The combination with the shuttle-box lifting-lever and the cam-groove wheels controlling the same, a fulcrumed lever pivotally connected to one end of said lifting-lever, a ratchet-wheel connected with each cam-groove wheel, a fulcrumed arm for each of said ratchet-wheels, a pawl pivotally secured to each of said arms and adapted to engage the teeth of its respective ratchet-wheel, and means for oscillating said arms, all said parts, substantially as and for the purposes described.

12. The combination with the shuttle-box lifting-lever and the cam-groove wheels controlling the same, a fulcrumed lever pivotally connected to one end of said lifting-lever, a ratchet-wheel connected with each cam-groove wheel, a fulcrumed arm for each of said ratchet-wheels, a pawl pivotally secured to each of said arms and adapted to engage the teeth of its respective ratchet-wheel, means for oscillating said arms, and a spring-controlled brake-wheel for each of the cam-groove wheels, all said parts, substantially as and for the purposes described.

13. The combination with the pattern-chain and the treadle-levers operated thereby, of the main driving-shaft, an eccentric on said shaft, a fulcrumed oscillating angle-lever operated from said eccentric, two cam-shafts parallel with the driving-shaft, a cam-groove wheel on each of said cam-shafts, the shuttle-box lifting-lever operated by said cam-groove wheels, a ratchet-wheel connected with each of said cam-groove wheels, an arm loosely mounted on each of said cam-shafts, a pawl pivotally secured on each of said arms and adapted to engage with its pawl-shaped end the teeth of its respective ratchet-wheel, and having its projecting end controlled by its respective treadle-lever, and a link pivotally connecting the said arms, and connected with and operated by the fulcrumed angle-lever, all said parts, substantially as and for the purposes described.

14. The combination with the pattern-chain and the treadle-levers operated thereby, of the main driving-shaft, an eccentric on said shaft, a fulcrumed oscillating angle-lever operated from said eccentric, two cam-shafts parallel with the driving-shaft, a cam-groove wheel on each of said cam-shafts, the shuttle-box lifting-lever operated by said cam-groove wheels, a ratchet-wheel connected with each of said cam-groove wheels, an arm loosely mounted on each of said cam-shafts, a pawl pivotally secured on each of said arms and adapted to engage with its pawl-shaped end

the teeth of its respective ratchet-wheel, and having its projecting end controlled by its respective treadle-lever, a link pivotally connecting the said arms, and connected with
5 and operated by the fulcrumed angle-lever, and a spring-controlled brake-wheel for each of said cam-groove wheels, all said parts, substantially as and for the purposes described.

In testimony that we claim the foregoing we have hereunto set our hands this 29th day 10 of July, 1896.

ADOLF FABER DU FAUR.
ALFRED GARTNER.

Witnesses:

WM. D. BELL,
DUNCAN M. ROBERTSON.