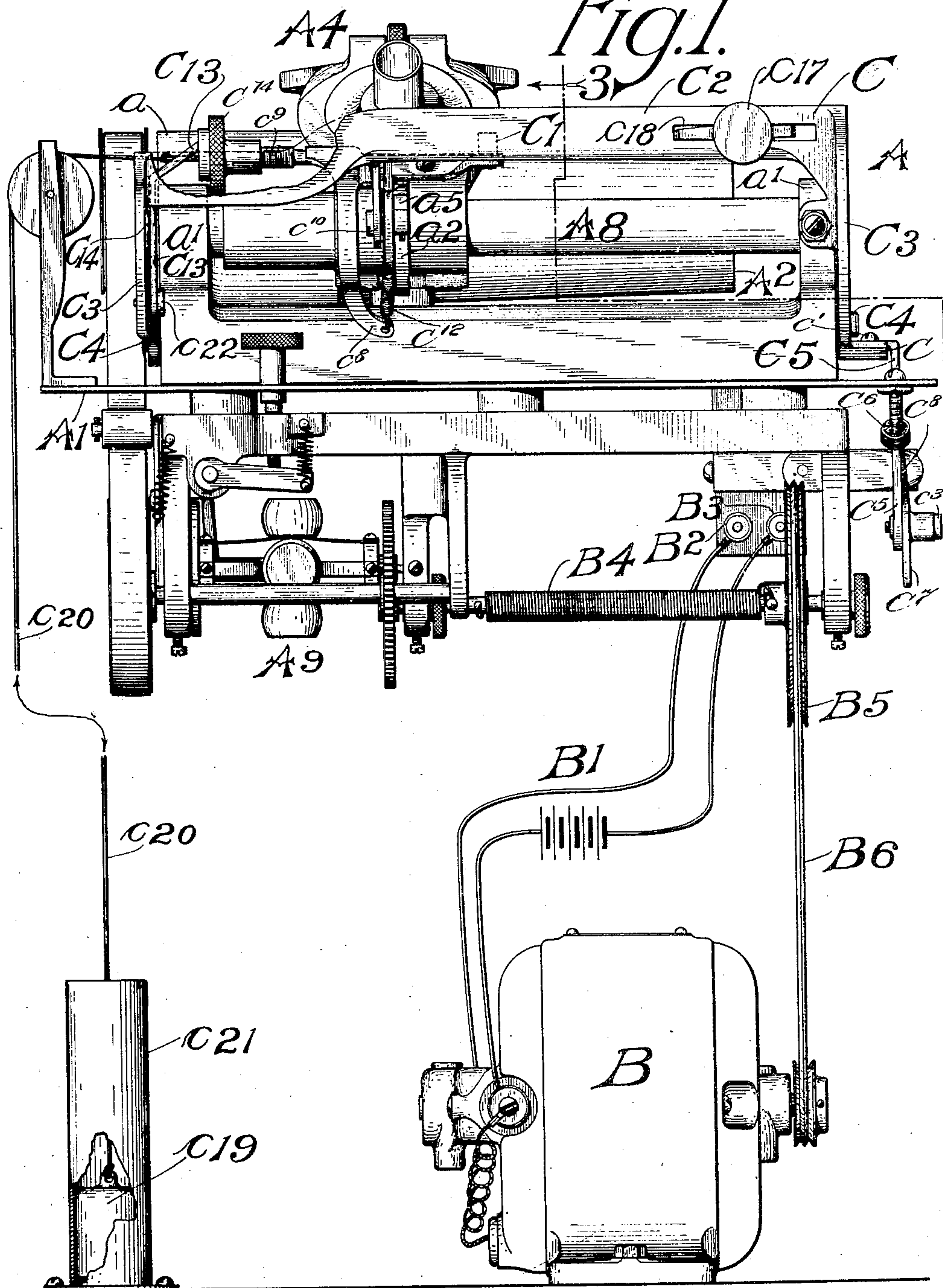


APPLICATION FILED AUG. 24, 1907.

3 SHEETS—SHEET 1.

Fig.1.



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APPLICATION FILED AUG. 24, 1907.

Patented Dec. 14, 1909.

3 SHEETS—SHEET 2.

943,313.

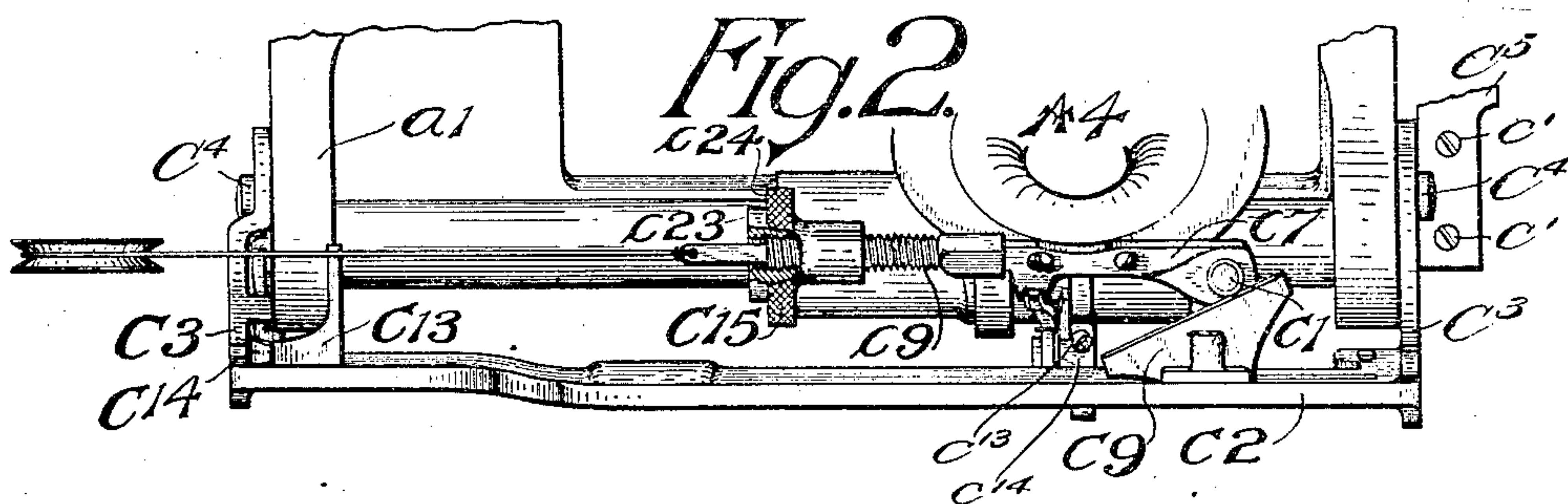


Fig. 4.

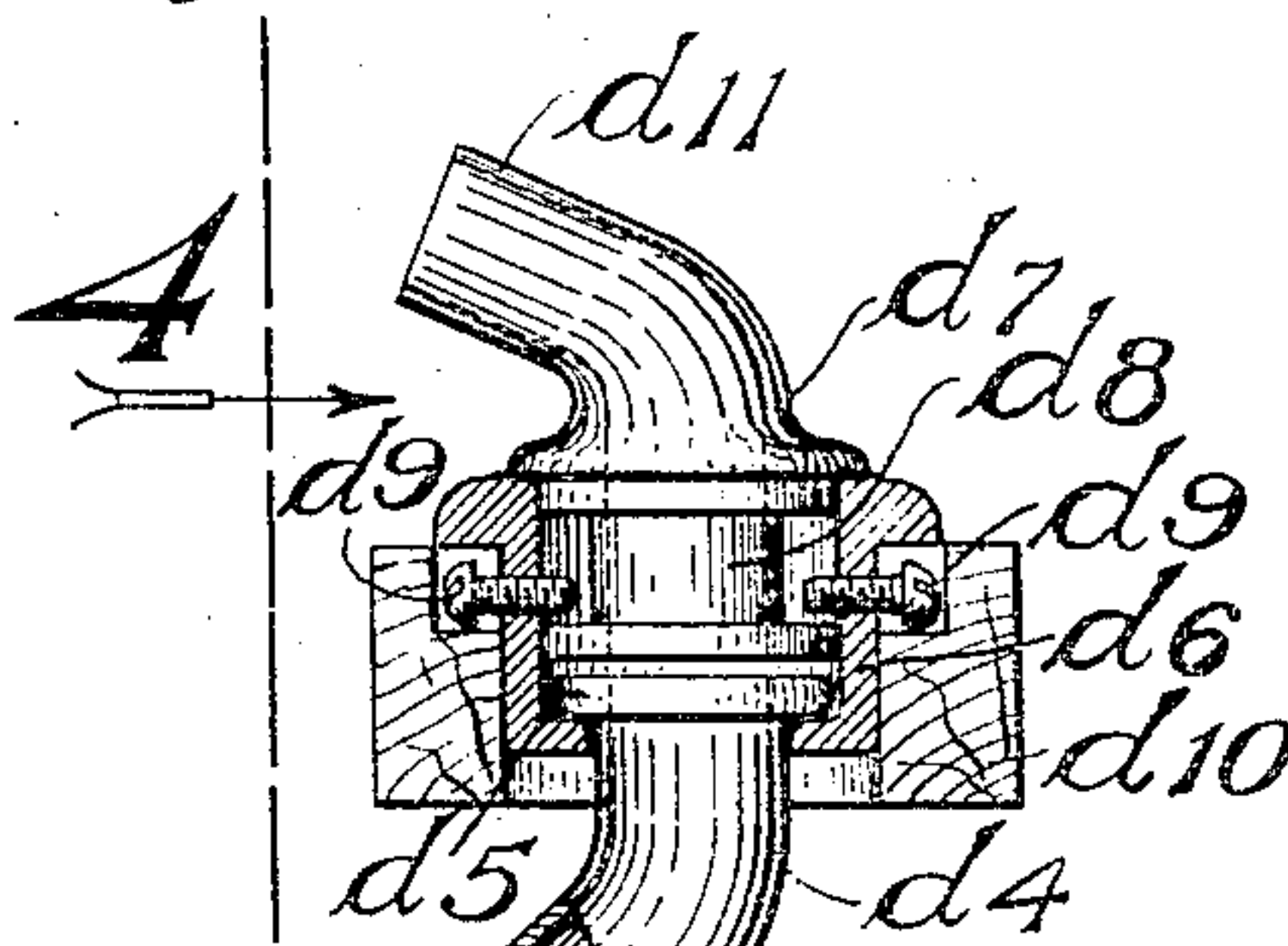
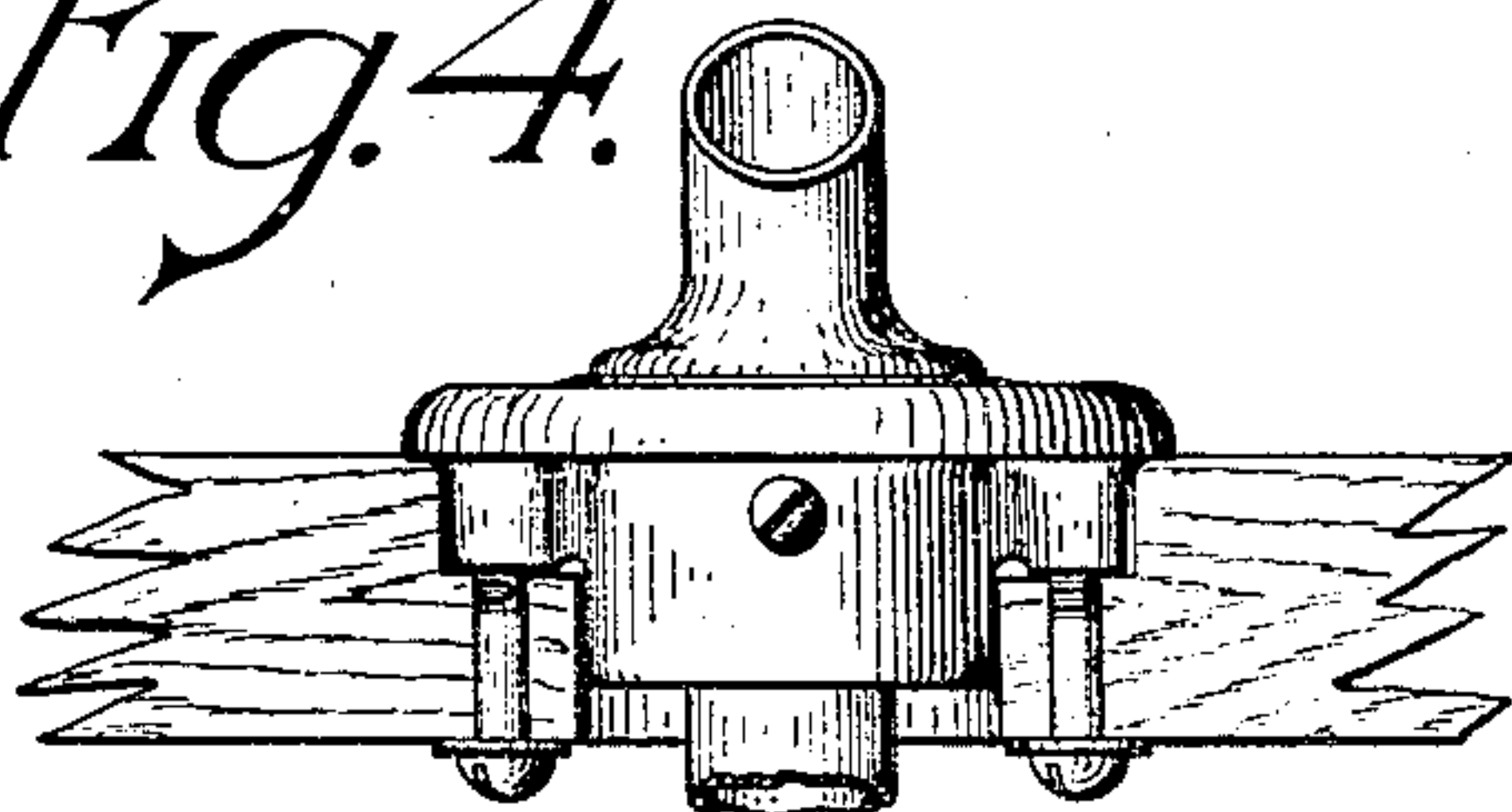
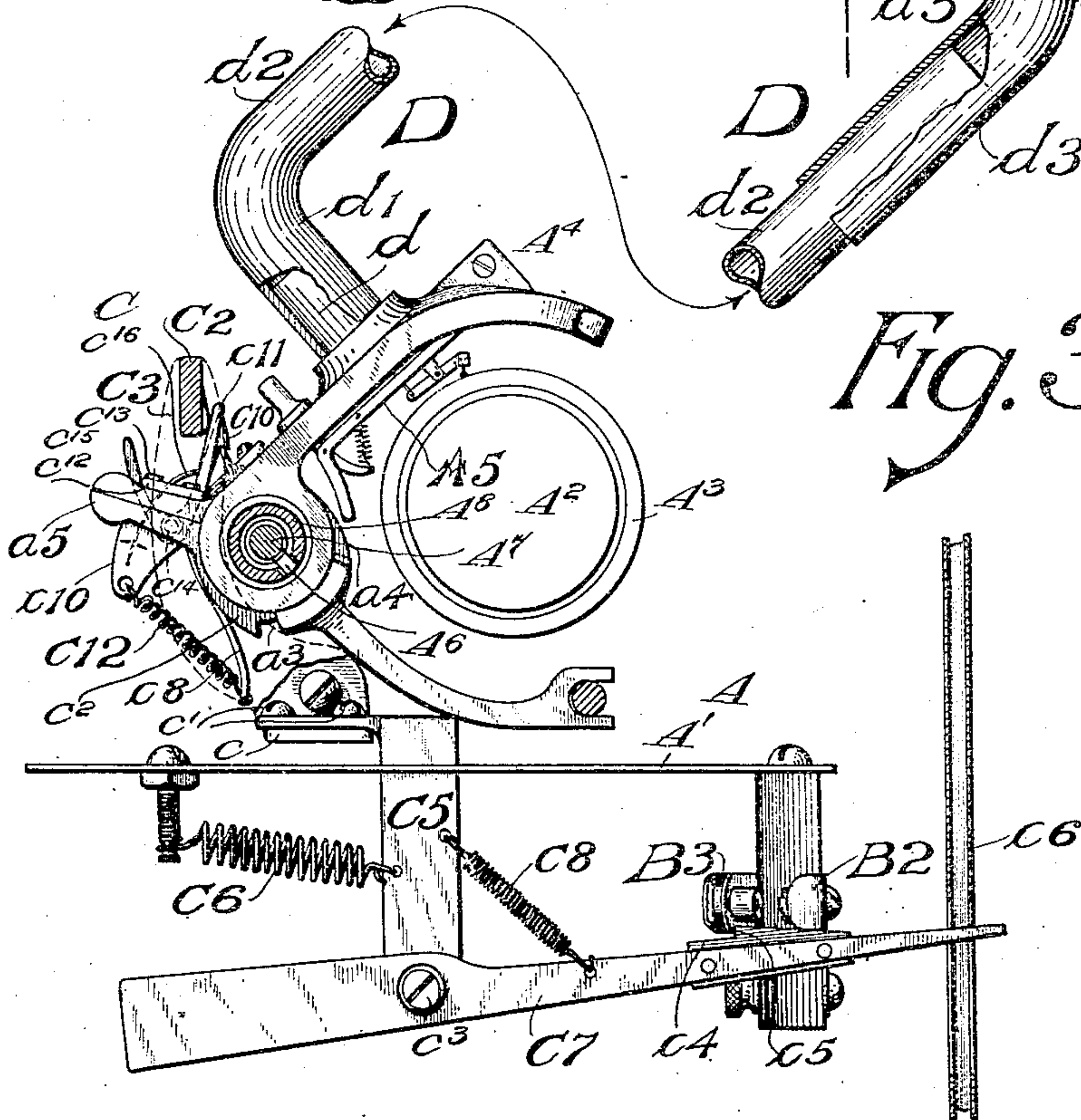


Fig. 3.



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3 SHEETS—SHEET 3.

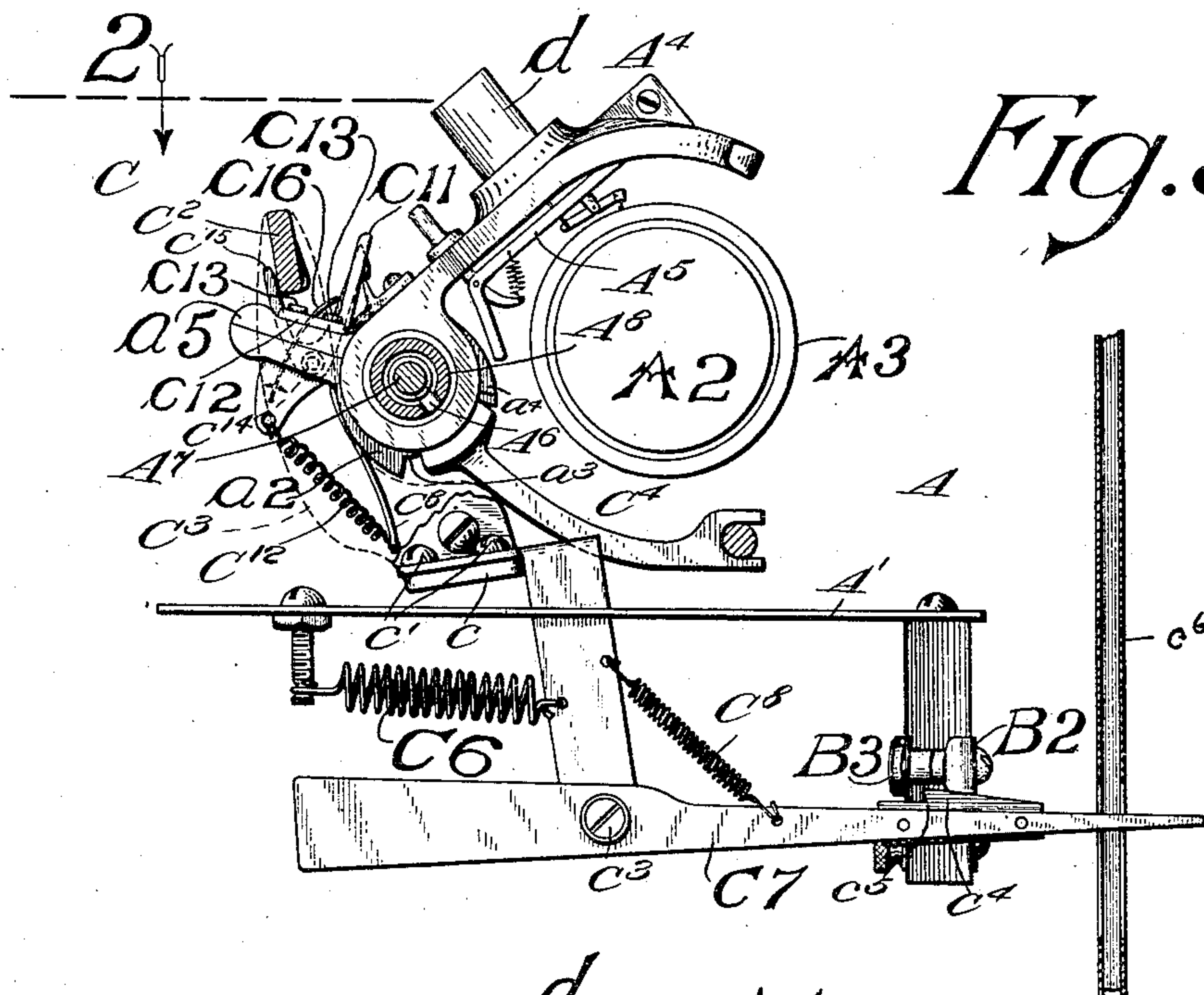


Fig. 5.

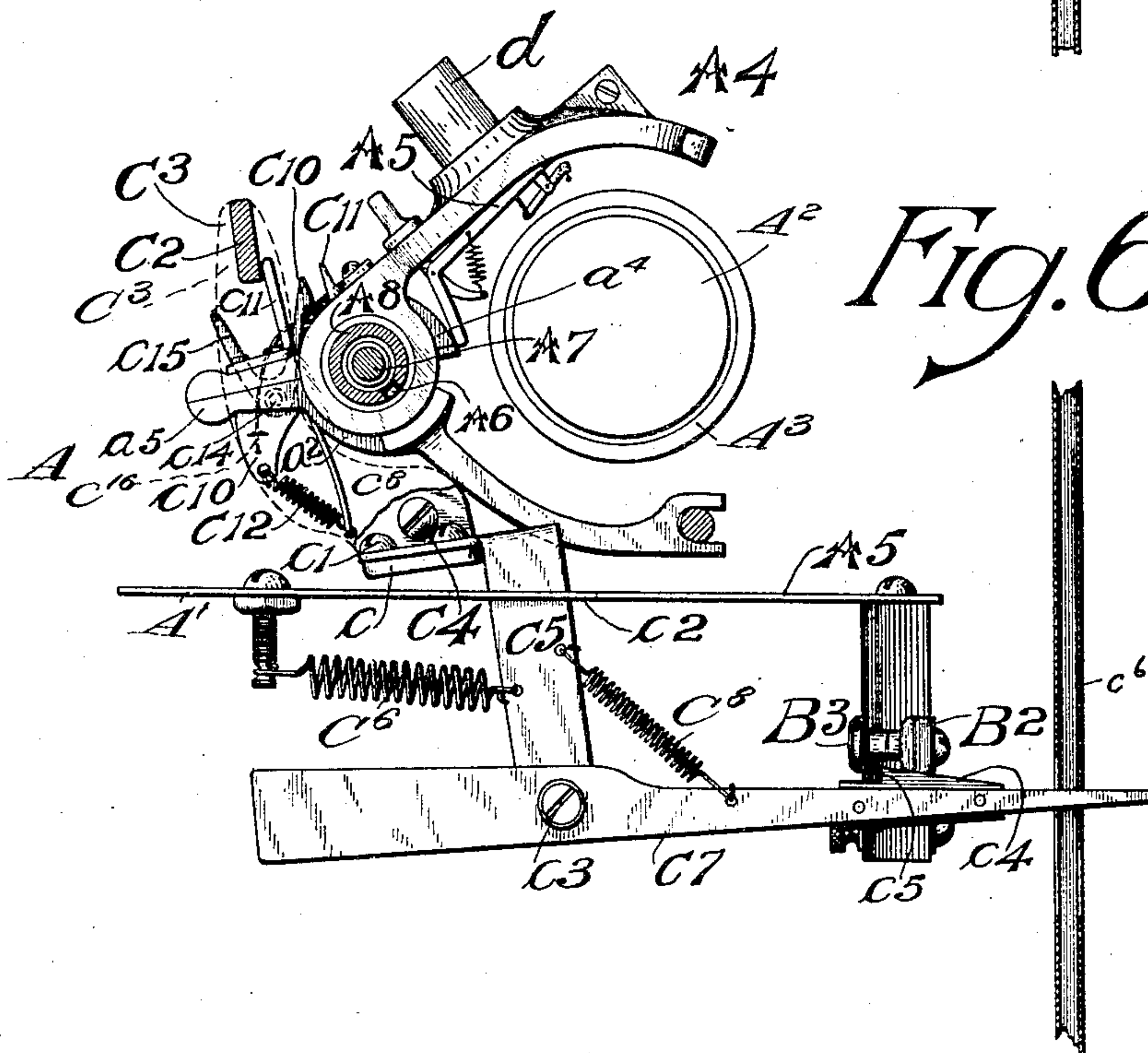


Fig. 6.

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943,313.

Specification of Letters Patent.

Patented Dec. 14, 1909.

Application filed August 24, 1907. Serial No. 389,933.

To all whom it may concern:

Be it known that I, HERBERT S. MILLS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Phonographs, of which the following is a specification.

My invention relates to improvements in phonographs, and particularly to that class of phonographs which is intended for use in coin-controlled machines in which it is desired to repeat the record each time a coin is inserted in the machine.

My object is to provide a phonograph, of this class, of novel and improved construction, and my invention constitutes an improvement on that described in my application No. 352,672, filed Jan. 17, 1907.

The invention is illustrated in its preferred embodiment in the accompanying drawings, in which—

Figure 1 represents a front elevational view of phonograph mechanism constructed in accordance with my invention, a dash-pot or weight-guide employed being shown brokenly and moved from its proper position with relation to the other parts of the mechanism; Fig. 2, a broken plan view showing the relation of the reproducer and a cam-roller carried thereby to a shiftable cam-equipped bar which serves in the operation of breaking the electric circuit of the motor employed and also in releasing the latch which permits a spring-actuated cam-collar to elevate the needle-holder to withdraw the needle from the record, the view being taken approximately as indicated at line 2 of Fig. 5; Fig. 3, a broken sectional view taken as indicated at line 3 of Fig. 1, but showing a telescopic tube employed for connecting the reproducer-horn with the ear-trumpets of the machine; Fig. 4, a view taken as indicated at line 4 of Fig. 3; Fig. 5, a view similar to Fig. 3, but showing the switch of the electric circuit closed; and Fig. 6, a view similar to Fig. 5, but showing the shiftable bar mentioned in its shifted position and showing the needle withdrawn from the record.

It may be stated preliminarily that in the mechanism illustrated in the accompanying drawings power is transmitted from an electric motor through a power-transmission torsion-spring, as set forth in my above-

mentioned application. In the preferred construction of the present invention, when the motor-circuit is completed, as may be accomplished by dropping a coin into the coin-chute, the motor operates, through the medium of the power-transmission coil-spring, to actuate the record and the reproducer feed-screw, causing the reproducer to traverse the record. The mechanism is provided with a shiftable cam-retracted member which carries a cam which is actuated by a cam-roller mounted on the reproducer, when the reproducer completes its movement across the record, and said member serves to release a latch which normally locks the cam-collar which serves to move the needle-holder, said cam-collar being provided with an actuating spring which serves to turn it upon its axis when said latch is released. Said shiftable member operates, also, to actuate a switch-retracting member which serves to break the circuit of the electric motor when said shiftable member is permitted to return, under the action of a strong spring with which it is provided, to its normal position. The shiftable member, or bar, when retracted, is locked in the retracted position by a spring-actuated member which moves into position between the shiftable member and an adjacent member of the frame when the member is shifted; and the reproducer is equipped with an adjustable member which serves to retract said bar-locking member when the reproducer is returned to its starting position. As will be understood from the description hereinafter given, I am able, by attaching simple parts to an ordinary phonograph, such as now can be obtained in the market, to provide for the automatic elevation of the needle from the record and the disconnection of the feed-screw clutch or nut from the feed-screw, maintaining said parts in this condition during the automatic return of the reproducer to the starting position, the breaking of the circuit of the electric motor employed for driving the phonograph, and the automatic lowering of the needle and reengagement of the clutch with its feed-screw upon the return of the reproducer to its starting position.

In the construction illustrated, A represents a phonograph comprising the usual parts, namely a frame A¹, a record-carrier, or mandrel, A², fitted with a cylindrical rec-

ord A³, a reproducer-carrier A⁴ supporting a lever-form needle-holder A⁵ and equipped with a screw-clutch or nut A⁶, a reproducer-carrier feed-screw A⁷ contained within the reproducer-carrier guide A⁸ and geared to the shaft of the record-carrier A² in the usual manner, and a governor A⁹ of well known construction; B, an electric motor having a circuit B¹ fitted with contact-points B², B³, the latter of which is movable to permit the circuit to be broken as indicated in Fig. 3; B⁴, a shock-absorbing power-transmission torsion-spring actuated by a wheel B⁵ connected by a belt B⁶ to the motor shaft and serving to actuate the phonograph record, the governor and the reproducer feed-screw, as set forth in the above-mentioned application; C, circuit-controlling and needle-elevating mechanism actuated by the reproducer, and comprising a cam-roller C¹ carried by the reproducer, a shiftable cam-equipped switch-actuated bar C² extending parallel with and located in front of the reproducer-carrier guide, a pair of arms C³ supporting said bar and carried by pivots C⁴, an arm C⁵ rigidly connected with one of the arms C³, a spring C⁶ which tends to hold the bar C² in the position in which it is shown in Figs. 3 and 5, a switch-actuating link C⁷ pivotally connected with the arm C⁵ and connected therewith by a spring C⁸, a cam C⁹ adjustably connected with the bar C², a cam-collar latch C¹⁰ which normally engages a locking-lug C¹¹ carried by the reproducer-carrier and serves to prevent rotation of the cam-collar which serves to elevate the needle-holder and release the clutch from the feed-screw, and a spring C¹² whose function is to rotate said cam-collar when the latch C¹⁰ is released by the forward shifting of the bar C²; C¹³, a member movable to the right from the position shown in Fig. 1 under the action of a spring C¹⁴ which becomes interposed between the frame-member and the shiftable bar C², as shown in Fig. 2, when the bar is shifted to its forward position; C¹⁵, an adjustable member serving to return the member C¹³ to its normal position and permit the bar C² to resume its normal position when the reproducer returns to its starting position; and D, telescopic tube-connections between the reproducer and the ear-trumpets (not shown).

The general construction of the phonograph illustrated is well understood, and it will be unnecessary to go into details, except as may be necessary to enable the description of the novel features which have been added to be understood. The frame A¹ has the usual standard *a* for supporting the rotary record-carrier and the usual standards *a*¹ in which the reproducer-guide is mounted and the feed-screw journaled. Motion is communicated from the shaft of the record-carrier by a train of gears (not

shown) to the feed-screw A⁷ in the usual manner. The record A³ is the usual cylindrical wax record.

The reproducer-carrier A⁴ is mounted upon its guide A⁸ in the usual well known manner. It is equipped with a rotary collar *a*² which is provided with the usual cam-surface *a*³ for retracting the screw-clutch or follower (usually of yoke-shape) and is further equipped with the usual cam-surface *a*⁴ for actuating the needle-holder A⁵. Said collar is further equipped with an arm *a*⁵, through the medium of which said collar may be turned upon its axis.

The motor B may be of any approved type of electric motor, and may derive its power from any suitable source. In the present instance, the contact members B², B³ are leaf-springs equipped with contact-points which are adapted to bear against each other and close the circuit as indicated in Fig. 5, the member B³ being adapted to be withdrawn through the medium of the member C⁷, as indicated in Fig. 3, thereby breaking the circuit.

The shiftable bar C² is adapted to swing about the axis formed by the pivots C⁴. One of the arms C³ which carry the bar C² is provided beneath its pivot with a lateral projection *c* to which is rigidly screwed the arm C⁵, as by means of screws *c*¹. The member C⁵ works in a slot *c*² in the frame-plate. The member C⁷ is connected with the arm C⁵ by a pivot *c*³, and said member C⁷ is equipped with an insulation-member *c*⁴ provided with a shoulder *c*⁵ which is adapted to engage the leaf-spring B³ and retract the same to break the circuit, as shown in Fig. 3. The member C⁷ is adapted to be released from the member B³ by means of a coin which may be dropped through the coin-chute *c*⁶ through a slot in which the member C⁷ extends. It will be understood that when the bar C² is shifted forwardly by the reproducer, as the latter nears the end of its traverse, the member C⁷ will be thrown rearwardly so as to be in position to engage the member B³; and when the reproducer returns to its starting position and releases the bar C², the arm C⁵ will be moved forwardly, thereby returning the member C⁷ to the position shown in Fig. 3 and breaking the electric circuit.

The cam-collar C¹ is mounted on a member *c*⁷ (see Fig. 2) which is rigidly connected with the reproducer-carrier. The member *c*⁷ is equipped with a downward extension *c*⁸ with which the lower end of the spring C¹² is connected. The member *c*⁷ is also equipped with a threaded stud *c*⁹ which carries the adjustable member C¹⁵, said member C¹⁵ being really a nut connected with said stud. Rigidly connected with the arm *a*⁵ of the cam-collar *a*² is a member *c*¹⁰ having an arm *c*¹¹ adapted to engage the bar

C². The upper end of the spring C¹² is connected with the member c¹⁰. The member c¹⁰ has a portion c¹² bent at right angles to over-lie the arm a⁵ of the cam-collar a², said portion being screwed to said arm by the same screws c¹³ which serve to connect the two parts of the separable cam-collar. The latch C¹⁰ is connected by a pivot c¹⁴ with the member c¹⁰. Said latch is provided with an arm c¹⁵ adapted to be engaged by the bar C² when the latter is shifted forwardly, thereby to release the latch C¹⁰ from the locking-lug C¹¹ and permit the spring C¹² to rotate the cam-collar a² and thereby elevate the needle or stylus and disengage the screw-clutch or collar. A spring c¹⁶ tends to hold the latch C¹⁰ in the locking position.

The cam C⁹ is connected with the bar C² by a screw c¹⁷ which extends through a slot c¹⁸ with which said bar is provided. The member C¹⁵ is adapted to strike against the standard a¹ of the frame when the reproducer is returned to its starting position, which is accomplished by a weight c¹⁹ which is connected by a cord c²⁰ with the reproducer-carrier and which is movable in a guide or dash-pot c²¹. The member C¹³ which serves to lock the shiftable bar in its forward position is loosely connected with one of the arms C³ by a screw c²², the connection being sufficiently loose to permit the spring C¹⁴ to swing the member C¹³ to the right to enable it to become interposed between the frame-member a¹ and the bar C², as indicated in Fig. 2. The member C¹⁵ is adapted to strike an arm on the member C¹³, thereby forcing said member from between the frame-member a¹ and the bar C² so that the bar C² will be permitted to return to its normal position when the reproducer-carrier returns to its starting position. The member C¹⁵ is formed with shoulders c²³ and c²⁴ adapted, respectively, to engage the member C¹³ and the frame-member a¹.

The reproducer is equipped with a short tube or horn d upon which is swiveled the short arm d¹ of a metallic tube d² which has the angular form shown in Fig. 3, it being understood that the right-hand portion of Fig. 3 is shown removed from its normal position. The main arm of the tube d² normally occupies an inclined position and is telescopically received by the inclined portion of a tube d³ which has an upturned portion d⁴ whose upper end is formed with a flange d⁵ swiveled in a cup d⁶ having a perforated bottom through which the vertical portion d⁴ of the tube d³ extends. Swiveled in the cup d⁶ is a tube-section d⁷ having a circular groove d⁸ into which projects screws d⁹ which extend through the sides of the cup d⁶. The cup d⁶ is supported by a frame-member d¹⁰ which constitutes, usually, a part of the cabinet of the machine. The tube-section d⁷ has a horn d¹¹ with which the

union hose of the ear-trumpet tubes (not shown) is connected. It will be understood that as the reproducer-carrier moves, the upper portion of the telescopic tube which is composed of the members d², d³ turns within the cup d⁶, while the lower end of said telescopic tube turns upon the horn or pivot d. The telescopic tube, of course, changes its length as the reproducer travels across the machine.

The operation will be readily understood from the foregoing detailed description. The circuit B¹ may be closed by depressing the rear end of the member C⁷, as by means of a coin, thus releasing the switch or spring-contact member B³. Thereupon the motor will actuate the phonograph, causing the reproducer to be fed across the record in the usual way. When the reproducer approaches the end of its operation, the cam-roller C¹ engages the cam C⁹ and shifts the bar C² forwardly, whereby the member C⁷ is thrust rearwardly. As the bar C² is shifted forwardly, it engages the arm c¹⁵ of the latch C¹⁰, thereby releasing the latch from engagement with the locking-lug C¹¹ and permitting the spring C¹² to rotate the cam-collar a² and elevate the needle and release the feed-screw clutch. During the forward shifting of the bar C² and before the release of the latch C¹⁰, the locking-member C¹³ is permitted to enter between the frame-member a¹ and the bar C², so that the bar C² will be temporarily locked in its forward position. As the cam-collar a² is rotated under the action of the spring C¹², the arm c¹¹, which is rigid with the cam-collar, is brought into engagement with the bar C². When the feed-screw clutch is disengaged from the feed-screw, the weight c¹⁹ operates to return the reproducer-carrier to its starting position, the member C¹³ is forced back to its normal position by the member C¹⁵, thereby permitting the bar C² to be thrown back to its normal position under the action of the relatively strong spring C⁶, which overpowers the spring C¹². Thus, the cam-collar a² is rotated, through the medium of the arm c¹¹, back to its normal position, thereby throwing the feed-screw clutch into reengagement and lowering the needle upon the record. It will be observed that the starting position of the reproducer may be regulated by adjusting the member C¹⁵, which determines the time when the bar C² shall be permitted to return to its normal position and permit the feed-screw clutch to reengage the feed-screw. When the bar C² is drawn rearwardly under the action of the spring C⁶ the member C⁷ operates to separate the contact-member B³ from the contact-member B², thereby interrupting the electric circuit and stopping the motor.

It is noteworthy that the improved construction provides for the automatic return

of the reproducer-carrier to its starting position by a very simple expedient, whereby the expense of the mechanism is greatly reduced, the durability of the machine is increased, and the certainty of action enhanced. The other features of improvement also enhance the durability of the machine and simplify the operation of the machine and the manipulation of its parts.

The foregoing detailed description has been given for clearness of understanding only, and no undue limitation is to be understood therefrom.

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

1. The combination with a phonograph having a record-carrier, a reproducer-carrier and a feed-screw for the reproducer-carrier, of a follower for said screw, a follower-retracting member, a spring tending to move said follower-retracting member, latching-means for the follower-retracting member, a latch-releasing member actuated by the reproducer as the reproducer nears the end of its traverse, means for locking said latch-releasing member, and means carried by the reproducer for releasing said latch-releasing member as the reproducer returns to its starting position.

2. The combination with a phonograph having a record-carrier, a reproducer-carrier and a feed-screw for the reproducer-carrier, of a follower for said screw, a rotary cam for retracting said follower, yielding means tending to rotate said cam to retract said follower, locking-means for said rotary cam, a cam-equipped shiftable bar actuated by said reproducer and adapted to release said locking-means, means for locking said bar in its shifted position, and means carried by the reproducer for releasing said last-named locking-means when the reproducer-carrier resumes its starting position.

3. The combination with a phonograph, of means for throwing the follower of the feed-screw into and out of engagement with the feed-screw, comprising a shiftable member actuated by the reproducer as it nears one end of its traverse, a locking-member for said shiftable member, and adjustable means carried by the reproducer and serving to disengage said locking-member as the reproducer approaches the other end of its traverse.

4. The combination with a reproducer-carrier of a phonograph and its feed-screw, of a rotary cam, a follower for said feed-screw retracted by said cam, a spring tending to rotate said cam, a shiftable bar equipped with a cam actuated by the reproducer-carrier, an arm on the rotary cam adapted to be engaged by said bar to restore the cam to its normal position, and means for locking the cam in its normal position.

5. The combination with a reproducer-carrier of a phonograph and its feed-screw, of a rotary cam, a follower for said feed-screw retracted by said cam, a spring tending to rotate said cam, a latch connected with said cam and engaging the reproducer-carrier, an arm connected with said cam, a shiftable bar adapted to be actuated by the reproducer-carrier and serving to release said latch in one position of the reproducer-carrier and to restore said cam to its normal position in another position of the reproducer-carrier, means for locking said bar in its shifted position, and means carried by the reproducer for releasing said bar.

6. The combination with a phonograph having a record-carrier and a reproducer-carrier, of an electric motor serving to operate the phonograph, said motor having a switch, a feed-screw, a follower for the feed-screw, a rotary cam serving to retract the feed-screw, the follower and the needle-holder of the reproducer, a latch adapted to lock said rotary cam, a shiftable bar actuated by the reproducer-carrier in one direction and serving to release said latch, a spring serving to retract said shiftable bar, and circuit-controlling means controlled by said shiftable bar, for the purpose set forth.

7. The combination with a reproducer-carrier, its feed-screw, and a follower for the feed-screw, of a rotary cam serving to retract the follower, a spring tending to rotate said cam, a latch for said cam, a shiftable bar serving to release said latch when shifted in one direction and to return said rotary cam to its normal position when shifted in the other direction, cams on said bar and reproducer, whereby said bar is shifted in one direction, and a spring serving to restore said bar to its normal position.

8. The combination with a reproducer-carrier of a phonograph and its feed-screw, of a rotary cam, a follower for said feed-screw retracted by said cam, a spring tending to rotate said cam, a latch connected with said cam and engaging the reproducer-carrier, an arm connected with said cam, a shiftable bar adapted to be actuated by the reproducer-carrier and serving to release said latch in one position of the reproducer-carrier and to restore said cam to its normal position in another position of the reproducer-carrier, means for locking said bar in its shifted position, and means carried by the reproducer for releasing said bar.

9. The combination with a phonograph having a record-carrier and a reproducer-carrier, of an electric motor serving to operate the phonograph, said motor having a switch, a feed-screw, a follower for the feed-screw, a rotary cam serving to retract the feed-screw, the follower and the needle-holder of the reproducer, a latch adapted to lock said rotary cam, a shiftable bar act-

ated by the reproducer-carrier in one direction and serving to release said latch, a spring serving to retract said shiftable bar, and circuit-controlling means controlled by
5 said shiftable bar, for the purpose set forth.

10. The combination with a reproducer-carrier of a phonograph, of a bent tube-section having an arm swiveled on the horn of the reproducer-carrier, a bent tube-section

telescopically connected with said first-named 10 tube-section, a cup having swiveled connection with said second-named tube-section, and a tube-section removably connected with said cup.

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In presence of—

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W. T. JONES.