

No. 622,207.

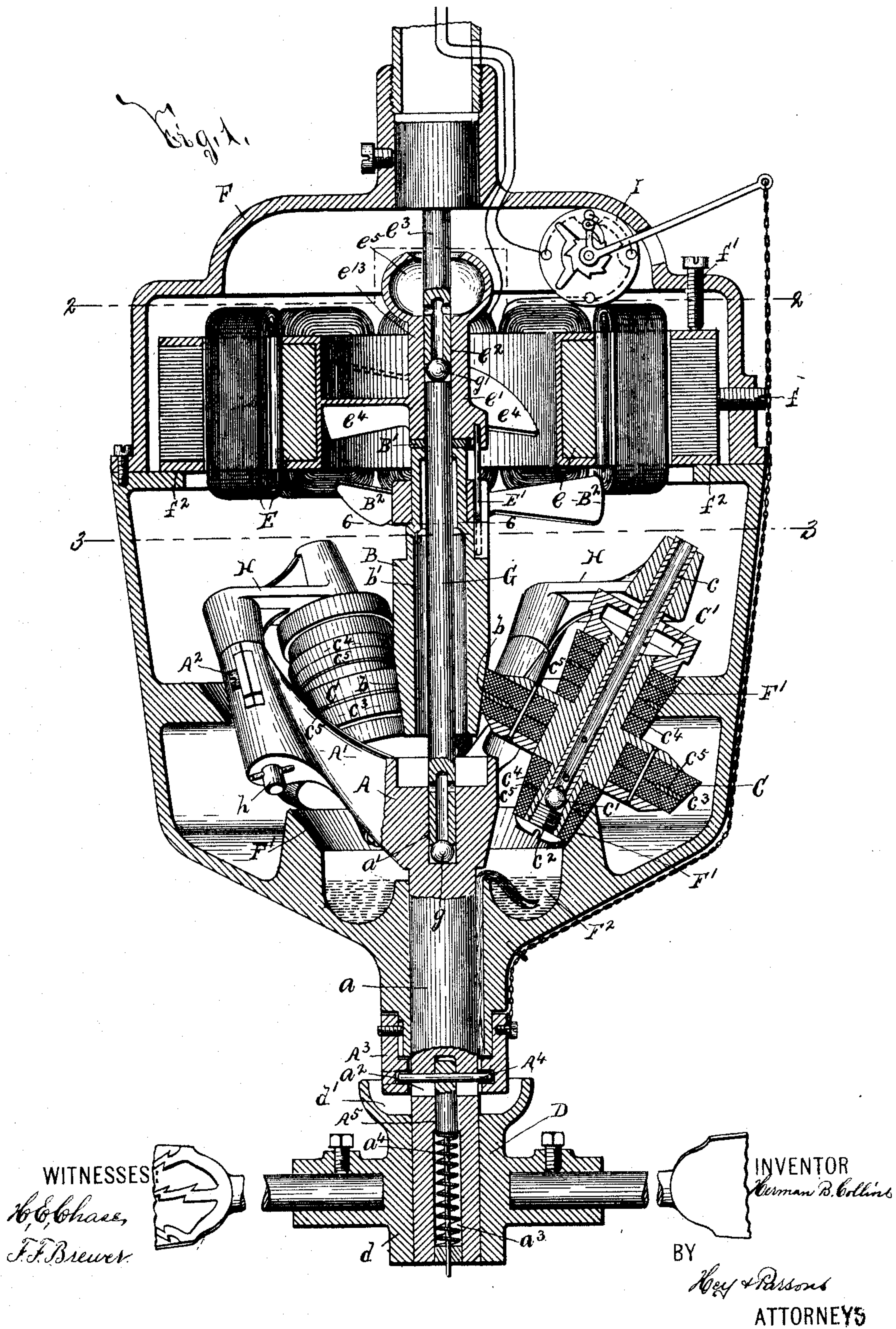
Patented Apr. 4, 1899.

H. B. COLLINS.
DRIVING MECHANISM.

(Application filed Apr. 10, 1896. Renewed Sept. 6, 1898.)

(No Model.)

4 Sheets—Sheet 1.



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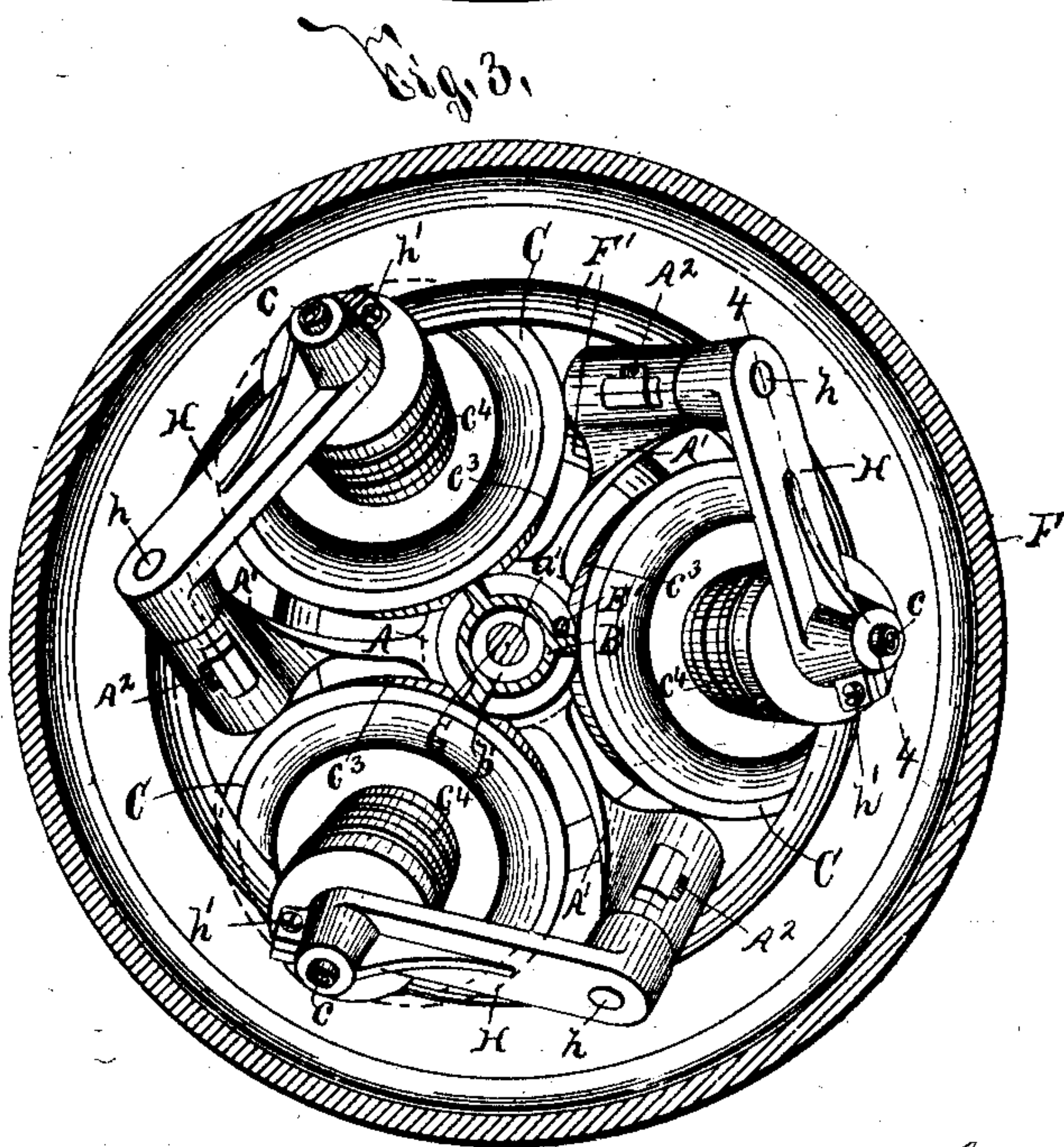
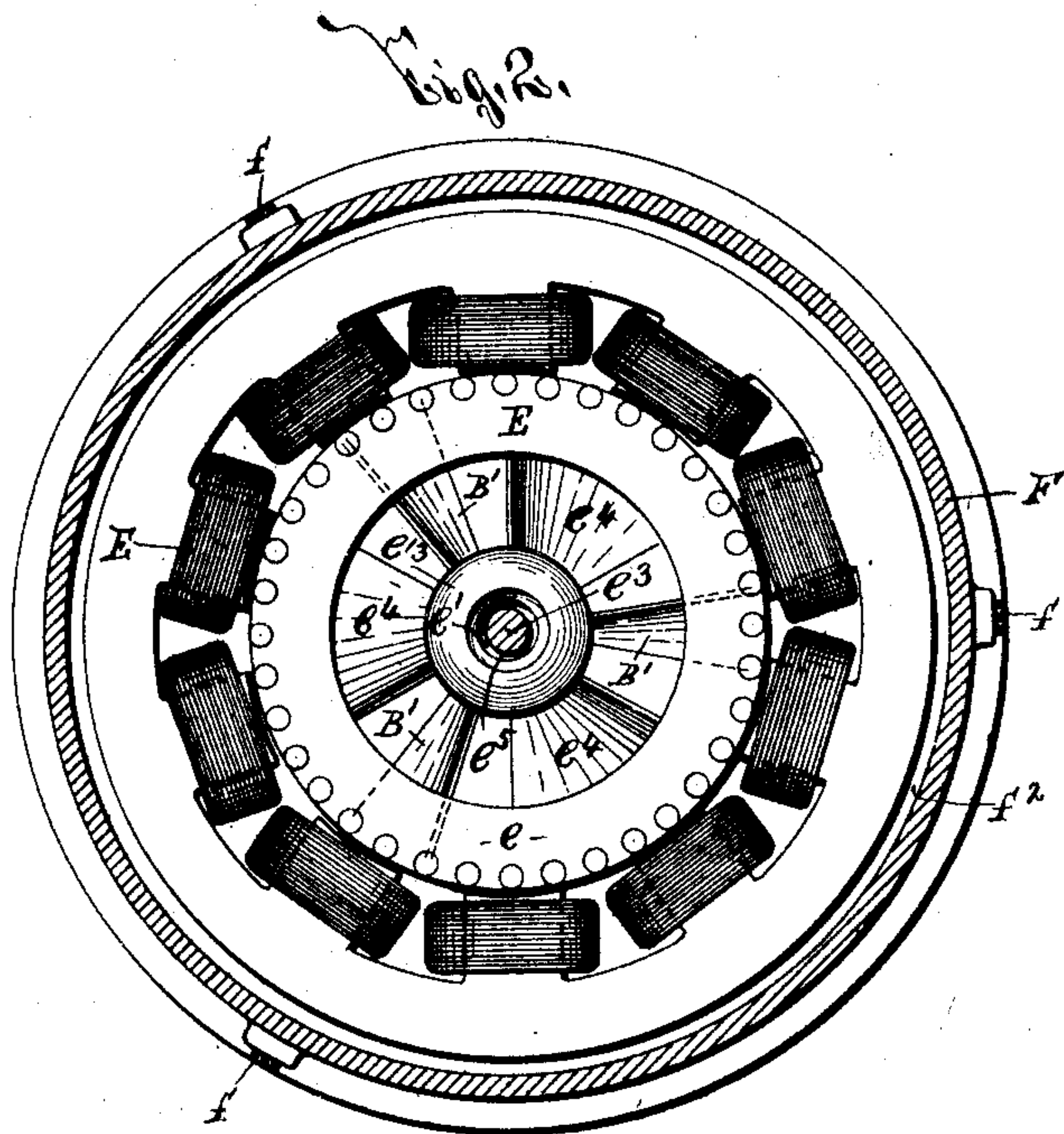
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4 Sheets—Sheet 2.

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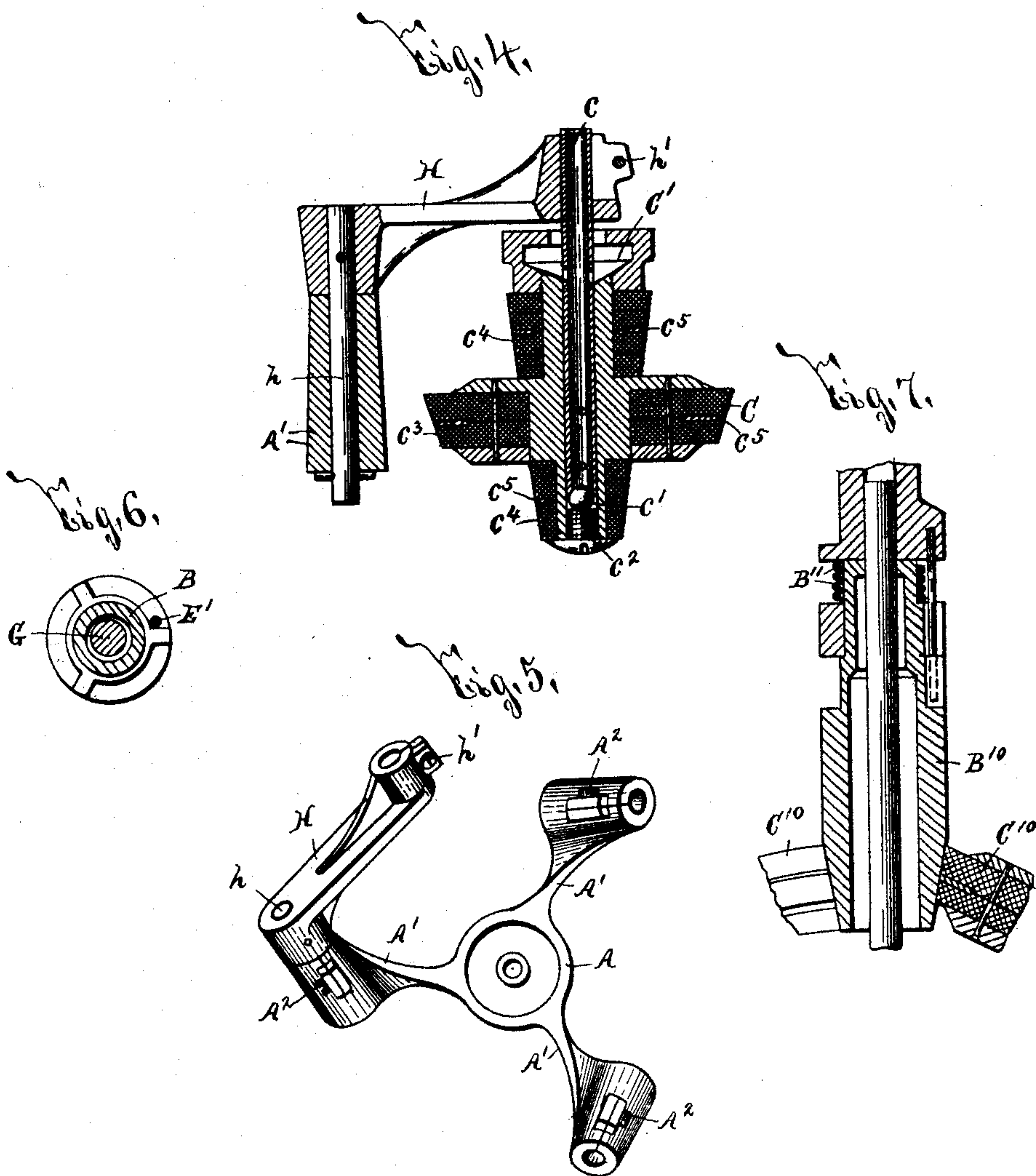
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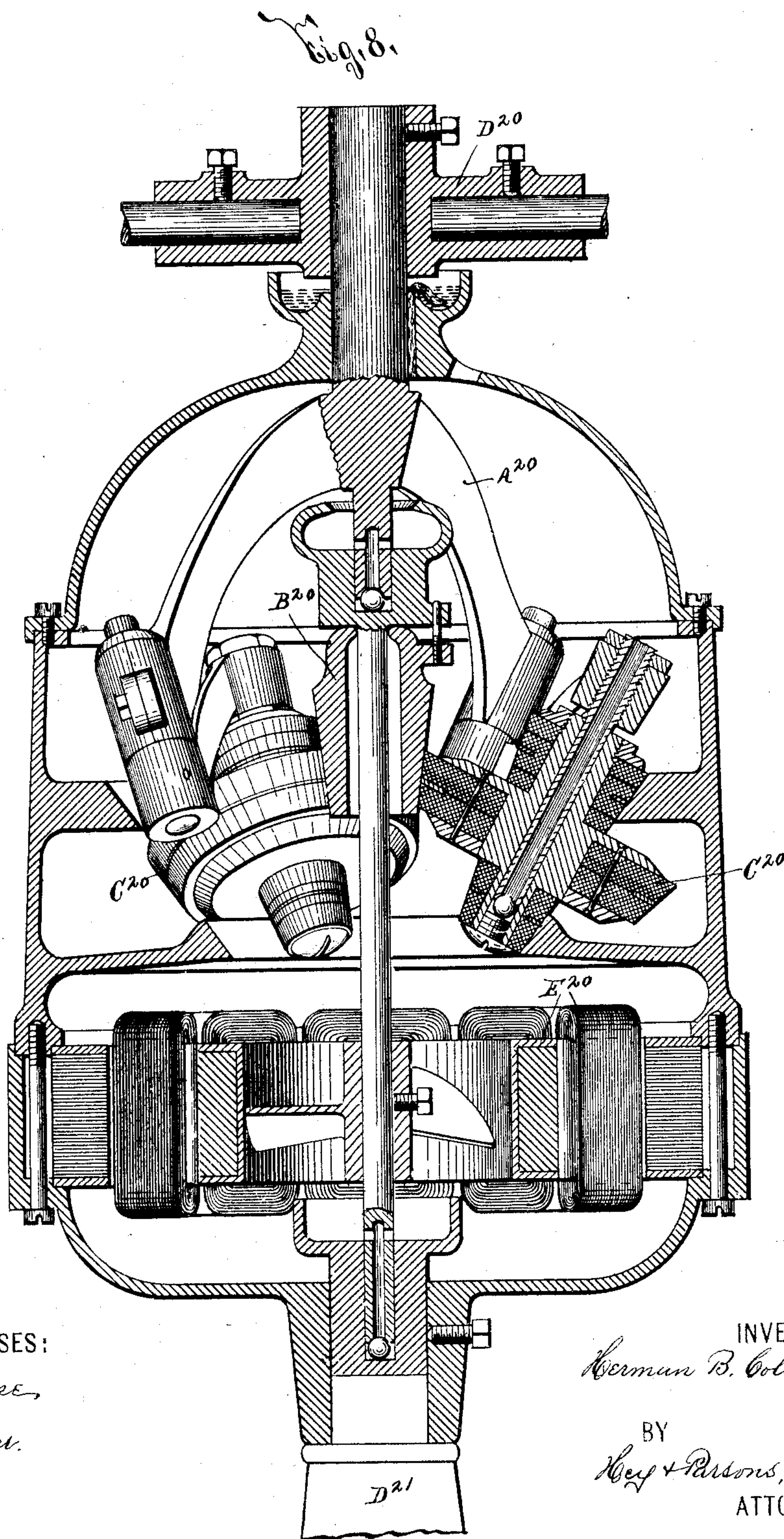
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

HERMAN B. COLLINS, OF FULTON, NEW YORK.

DRIVING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 622,207, dated April 4, 1899.

Application filed April 10, 1896. Renewed September 6, 1898. Serial No. 690,355. (No model.)

To all whom it may concern:

Be it known that I, HERMAN B. COLLINS, of Fulton, in the county of Oswego, in the State of New York, have invented new and useful Improvements in Driving Mechanism, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to improvements in driving mechanism particularly applicable for use in actuating ventilating-fans and other devices, and has for its object the production of a mechanism which is economically manufactured and is highly effective and durable in use; and to this end it consists, essentially, in the combination, construction, and arrangement of the component parts of the driving mechanism.

In describing this invention reference is had to the accompanying drawings, forming a part of this specification, in which like letters indicate corresponding parts in all the views.

Figure 1 is a vertical section, partly in elevation, of my improved driving mechanism shown as operatively connected to a ventilating-fan. Figs. 2 and 3 are horizontal sections taken, respectively, on lines 2 2 and 3 3, Fig. 1. Fig. 4 is a vertical section taken on line 4 4, Fig. 3. Fig. 5 is a top plan of the detached revoluble head or part of my driving mechanism, one of the supports for the actuating-wheels being shown as operatively connected thereto. Fig. 6 is a transverse section taken on line 6 6, Fig. 1. Fig. 7 is a section showing a slightly-modified construction of my invention, and Fig. 8 is a vertical section of a further-modified construction of my invention.

A represents a revoluble head or part, B a driver, and C actuating-wheels interposed between the revoluble head or part and the driver for communicating motion from one to the other.

The revoluble head or part A is connected in any desirable manner to any suitable device to be driven, as a fan D, here shown as partly broken away, and the driver B is connected to a power-transmitting mechanism of any desirable form, size, and construction, here illustrated as an electric motor E. It is obvious, however, that, if desired, the revo-

luble head or part may be connected to the power-transmitting device and that the part now termed the "driver" may then be connected to the device to be driven.

The revoluble head or part A and the driver B are preferably arranged in a vertical plane with their axes substantially coincident, as illustrated, and the head or part A is usually formed at one end with a spindle *a*, journaled in a frame F, which may also be used for supporting the motor E. The spindle *a* preferably extends beyond the adjacent part of the frame F, and the fan D is here shown as provided with a hub or head *d*, which encircles said projecting portion of the spindle *a*, is fixed thereto, and is provided at one end with an oil-cup *d'*.

The driver B is preferably mounted upon a shaft G and may be suitably connected to said shaft or to the armature *e* of the motor E. As here illustrated, one end of the shaft G is journaled in a socket *a'* in the revoluble head or part A, and its opposite end is fixed to a hub *e'*, which is provided upon the armature *e* and is formed with a socket *e''* for receiving a spindle *e'''*, fixed to the frame F. The revoluble head or part A and the spindle *e'''* thus form bearings for the opposite ends of the shaft G, and in order to reduce to a minimum the friction incidental to the revolution thereof suitable hardened steps, as balls *g g'*, are interposed between the ends of the shaft G and the adjacent faces of said bearings. The shaft G should be properly alined with the revoluble head or part A, and consequently the stationary part of the motor E is adjusted laterally by suitable means, as screws *f*, and is then held in its adjusted position by clamping-screws *f'*, which force said stationary part of the motor against a shoulder *f''*, formed upon the frame F.

The actuating-wheels C are usually connected to the revoluble head or part A and serve to support said head or part A, which usually depends therefrom. Said wheels C engage a peripheral face *b* of the driver B and generally revolve on axes arranged at an angle with each other, being here illustrated as loosely mounted on diverging spindles *c*, fixed to inclined supports H, projecting from arms A', formed upon the revoluble head or part A. The supports H are preferably provided with

spindles h , journaled in the arms A' for permitting automatic lateral adjustment of the wheels C toward the axes of the revoluble head or part A and the driver B . During this automatic lateral movement of the wheels C the revoluble head or part moves endwise, and consequently said head or part should be supported so as to be capable of a limited endwise movement. The arms A' are usually slitted and provided with clamping-screws A^2 , which may, when desired, clamp the spindles h from movement, and thereby hold the supports H in their adjusted position. The friction incidental to the revolution of the rollers C is materially reduced by hardened steps, as balls c' , which engage the lower ends of the spindles c and are mounted upon adjustable supports or screws c^2 , secured to the lower ends of said rollers C . The wheels C also engage a suitable track or engaging face F' , formed upon the frame F , and in order to facilitate their efficient engagement with said track or face F' and the engaging face b of the driver B said wheels are adjustable lengthwise of their axes. This adjustment is effected by moving the spindles c endwise in the arms H , which, as best seen at Fig. 5, are slitted and are provided with clamps h' for normally holding said spindles in their adjusted position.

In the illustrated construction of my invention the actuating-wheels C are utilized to drive the revoluble head or part A at a less speed than the driver B . To effect this result, I preferably form said actuating-wheels with faces $c^3 c^4$, which are of unequal diameter and engage the faces $b F'$, and consequently a considerable difference in speed is obtained in a limited space and the use of a driver of comparatively large diameter is permitted. It is apparent, however, that the ratio between the diameters of the faces $c^3 c^4$ may be varied, as desired, or that the faces of the rollers engaged with the face b may also engage the face F' . Moreover, any suitable means, as washers B' , interposed between the driver B and the hub e' may be used for depressing said driver a greater or less distance in order to present a surface of greater or less diameter to the wheels C , and thus vary the speed transmitted by my invention.

As preferably constructed, the frame F is provided with two tracks F' , arranged one above the other, and the wheels C are each formed with two faces c^4 of less diameter than the face c^3 , and consequently the rollers are effectively supported in position. The bearing-faces $c^3 c^4$ of the wheels C are preferably formed of the outer edges of yielding rings or disks suitably secured to the body of the rollers, and said faces are preferably provided with engaging rings c^5 , composed of material which is somewhat harder than the remaining portions of the faces $c^3 c^4$ and is softer than the faces $b F'$. The rings c^5 serve to maintain the desired regularity in the con-

tour of the engaging faces of the wheels C , but may obviously be omitted, if desired.

In the practical operation of my invention I have ascertained that it is advisable to provide for an automatic lateral adjustment of the portion of the driver B provided with the engaging face b , although such adjustment of the driver may be prevented, if desired. I usually render said portion of the driver B capable of lateral adjustment by providing the inclined face b upon one extremity thereof, detachably connecting its opposite extremity to the power-transmitting mechanism, as the motor E , and providing said driver with a longitudinal cavity b' , which extends throughout the greater portion of its length and is of greater diameter than the shaft G . The lower extremity of the driver B , provided with the engaging face b , is thus free to move laterally independently of the shaft G . As here illustrated, the driver B is loose on the shaft G , and its extremity, unprovided with the face b , closely fits said shaft and is driven by an arm E' , fixed to the hub of the motor E and detachably engaged with shoulders at said extremity of the driver B , Fig. 6. By thus connecting the driver B to the mechanism for revolving the same said driver is free to move endwise without liability of disengagement from the arm E' , although its upward movement is limited by the hub e' , which is normally engaged thereby when the washers B' are dispensed with.

In the preferable arrangement of my invention the supports H are free to swing inwardly and the revoluble part or head A and the fan D are suspended from the actuating-wheels C . The weight of the parts $A C D$ thus tends to force the actuating-wheels C toward the driver B and to increase the friction between their adjacent faces $b c^3$ for insuring positive rotation of the wheels C . This tendency of the wheels C also causes a greater or less upward tendency of the driver B , which may be varied by changing the inclination of the faces $b c^3 c^4 F'$.

The upward tendency of the driver B may be entirely obviated by operating the clamps A^2 so as to hold the spindles h from movement in the arms A' , and thus prevent the supports H from swinging toward the axis of the driver B . In this event the weight of the driver B may be relied upon as the force for frictionally engaging the faces $b c^3$, or a spring or other device well known to those skilled in the art may be employed for effecting the desired engagement of said faces. I have therefore shown at Fig. 7 a driver B^{10} , the adjacent portions of actuating-wheels C^{10} , and a spring B^{11} for engaging said parts.

When my invention is applied to ventilating-fans, I preferably use the alternating type of motors, the armatures of which revolve with great rapidity and are more or less liable to effect undue heating of the parts. In order to obviate this undesirable result, the driver

B is provided at its upper end with a suitable fan B², which causes a circulation of the air between the adjacent parts of my invention. The armature *e* may also be provided, as illustrated, with inclined arms or blades *e*⁴ for effecting a similar circulation of the air.

In devices of this character it is highly important that an ample supply of oil be provided, and consequently the upper end of the hub *e*¹³ of the armature *e*, the base of the frame F, and the upper ends of the actuating-wheels C are respectively formed with oil-chambers *e*⁵, F², and C', whence the oil escapes to the rotating parts of my invention through suitable passages formed in the spindle or bearing *e*³, the frame F, and the spindles *c*.

The current for actuating the motor D may be controlled by any suitable means, as a switch I, connected to a sleeve A³, encircling the spindle *a*; but as the construction of this switch forms no part of my invention it is unnecessary to herein specifically illustrate and describe the same. The sleeve A³ is engaged by a pin A⁴, which is arranged in a slot or aperture *a*² in the spindle *a* and is connected to an operating-piece A⁵, movable lengthwise of a chamber *a*³, that extends from the slot or aperture *a*² to the end of the spindle *a*. A spring *a*⁴ normally elevates said sleeve, and the operating-piece extends beyond the spindle *a* for permitting retraction of said operating-piece and sleeve against the action of the spring *a*⁴. The switch I, previously mentioned, is preferably so constructed that its operating parts are moved with each down movement of the sleeve A³ and operate to either make or break the circuit to the motor E.

At Fig. 7 I have shown a slightly-modified form of my invention particularly applicable for driving a fan D²⁰, supported by a column or standard D²¹. In this construction of my invention the rotary head or part A²⁰ is arranged above the driver B²⁰, the wheels C²⁰, and the motor E²⁰, all of which parts are, however, of substantially the same construction as the corresponding parts previously described.

The operation of my improved driving mechanism will now be readily understood upon reference to the foregoing description and the accompanying drawings, and it will be particularly noted that the parts revolve with a minimum amount of noise and friction and are readily adjusted and that owing to the lateral adjustment of the portion of the driver provided with the face *b* said driver revolves without increased friction when the engaging faces of the actuating-wheels are more or less untrue. The exact detail construction and arrangement of the component parts of said mechanism may, however, be somewhat varied without departing from the spirit of my invention, and hence I do not herein specifically limit myself thereto.

Having thus fully described my invention,

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

1. The combination with a revoluble head or part, and a rotary driver having their axes substantially coincident; of actuating-wheels for communicating motion from one of said parts to the other, said wheels being frictionally engaged with the driver and being revoluble on axes arranged at an angle with the former axes, and supports for the actuating-wheels, said supports being movable toward and away from each other, substantially as and for the purpose described.

2. The combination with a revoluble head or part, a rotary driver, actuating-wheels for communicating motion from one of said parts to the other, said wheels being revoluble on axes arranged at an angle with the axes of the revoluble head or part and the driver; and supports for the actuating-wheels, said supports being movable toward and away from each other, of fan-blades connected to the revoluble head or part, and an electric motor having its armature connected to the driver for actuating the same, substantially as and for the purpose specified.

3. The combination of actuating-wheels revoluble on diverging axes, a revoluble head or part connected to the actuating-wheels and having its axis arranged at an angle with the former axes, and a rotary driver having its axis arranged substantially coincident with the axis of the revoluble head or part, said driver having a portion thereof normally engaged with the adjacent surfaces of the actuating-wheels and automatically movable laterally toward and away from the axes of said actuating-wheels, substantially as and for the purpose set forth.

4. The combination of actuating-wheels revoluble on diverging axes, a revoluble head or part connected to the actuating-wheels and having its axis arranged at an angle with the former axes, a shaft having its axis arranged substantially coincident with the axis of the revoluble head or part, and a driver mounted on the shaft and having a portion thereof normally engaged with the adjacent surfaces of the actuating-wheels and automatically movable laterally independently of the shaft toward and away from the axes of said actuating-wheels, substantially as and for the purpose described.

5. The combination with a driver, actuating-wheels engaged with the driver, said wheels being revoluble on diverging axes and automatically movable laterally toward and away from the axis of the driver, and a revoluble head or part supported by the actuating-wheels and depending therefrom, said revoluble head or part being movable endwise as the actuating-wheels are moved toward and away from each other, substantially as and for the purpose specified.

6. The combination of actuating-wheels revoluble on diverging axes, supports for the actuating-wheels, said supports being movable

toward and away from each other, a revoluble head or part connected to the actuating-wheels and having its axis arranged at an angle with the former axes, and a rotary driver having its axis arranged substantially coincident with the axis of the revoluble head or part, said driver having a portion thereof normally engaged with the adjacent surfaces of the actuating-wheels and automatically movable laterally toward and away from the axes of said actuating-wheels, substantially as and for the purpose set forth.

7. The combination with a revoluble part formed with a socket, and a shaft provided with a driver and having one end projecting into the socket, said revoluble part and shaft revolving at differential speed; of actuating-wheels revoluble on axes arranged at an angle with each other and connecting the revoluble head or part and the driver for communicating motion from one to the other, and supports for the actuating-wheels, said supports being movable toward and away from each other, substantially as and for the purpose specified.

8. The combination of a rotary driver, actuating-wheels revoluble on axes arranged at an angle with each other and movable laterally toward and away from the axis of the rotary driver, a revoluble head or part depending from the actuating-wheels and movable endwise as the actuating-wheels are movable laterally, and a track for engaging the actuating-wheels, substantially as and for the purpose described.

9. The combination with a revoluble head or part, and a rotary driver having their axes substantially coincident; of actuating-wheels for communicating motion from one of said parts to the other, said wheels being revoluble on axes arranged at an angle with the former axes, and supports for said wheels movable toward and away from the axes of the rotary head or part and the driver, substantially as and for the purpose set forth.

10. The combination with a revoluble head or part, and a rotary driver having their axes substantially coincident; of actuating-wheels for communicating motion from one of said parts to the other, said wheels being revoluble on axes arranged at an angle with the former axes, supports for said wheels movable toward the axes of the rotary head or part and the driver, and means for holding the supports in their adjusted position, substantially as and for the purpose specified.

11. The combination with a revoluble head or part, and a rotary driver having their axes substantially coincident; of automatically-adjustable actuating-wheels for communicating motion from one of said parts to the other, said wheels being revoluble on axes arranged at an angle with the former axes, and means for supporting the actuating-wheels and permitting automatic adjustment thereof, substantially as and for the purpose set forth.

12. The combination with a revoluble head

or part, and a rotary driver having their axes substantially coincident; of actuating-wheels for communicating motion from one of said parts to the other, said wheels being revoluble on axes arranged at an angle with the former axes, supports for the actuating-wheels movable toward and away from the axes of the rotary head or part and the driver, spindles for the actuating-wheels movable endwise in the supports, and means for holding the spindles in their adjusted position, substantially as and for the purpose set forth.

13. The combination with a revoluble head or part, and a rotary driver having their axes substantially coincident; of actuating-wheels for communicating motion from one of said parts to the other, said wheels being revoluble on axes arranged at an angle with the former axes, supports for the actuating-wheels movable toward and away from each other, and shafts for the wheels provided with oil-passages, substantially as specified.

14. The combination of a revoluble head or part, a rotary driver, actuating-wheels for communicating motion from one of said parts to the other, said wheels being revoluble on axes arranged at an angle with the axes of the revoluble head or part and the driver, and an electric motor provided with separated blades or arms and having its armature supported by the blades or arms and connected to the driver said blades or arms being inclined transversely for agitating the air and preventing heating of the adjacent parts, substantially as and for the purpose set forth.

15. The combination of a revoluble head or part, a rotary driver, actuating-wheels for communicating motion from one of said parts to the other, said wheels being revoluble on axes arranged at an angle with the axes of the revoluble head or part and the driver, an electric motor having its armature connected to the driver, and a fan actuated by the motor and arranged in proximity thereto for preventing heating of the motor, said fan being detachably connected to the motor, substantially as and for the purpose described.

16. The combination of a supporting-frame, a revoluble head or part, a rotary driver, actuating-wheels for communicating motion from one of said parts to the other, said wheels having their axes arranged at an angle with each other, a motor for actuating the driver, and means supported by the frame and movable toward and away from each other at substantially right angles to the axis of the driver for laterally adjusting the stationary parts of the motor, substantially as and for the purpose specified.

17. The combination of a supporting-frame, a revoluble head or part, a rotary driver, actuating-wheels for communicating motion from one of said parts to the other, said wheels having their axes arranged at an angle with each other, a motor for actuating the driver, means supported by the frame and movable toward and away from each other at

substantially right angles to the axis of the driver, for laterally adjusting the stationary parts of the motor, and means for clamping the stationary parts of the motor in their adjusted position, substantially as and for the purpose set forth.

18. The combination of a revoluble head or part, a rotary driver, actuating - wheels for communicating motion from one of said parts to the other, said wheels having their axes arranged at an angle with each other, a motor for actuating the driver, a switch for controlling the operation of the motor, and means movable lengthwise of the rotary head or part for actuating the switch, substantially as and for the purpose described.

19. The combination of a supporting-frame, a revoluble head or part having a lengthwise chamber, a rotary driver, actuating-wheels

for communicating motion from one of said parts to the other, said wheels having their axes arranged at an angle with each other, a motor for actuating the driver, a switch for controlling the operation of the motor, a sleeve movable lengthwise of the revoluble head or part for actuating the switch, and an operating-piece within said lengthwise chamber for operating the sleeve, substantially as specified.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 9th day of April, 1896.

HERMAN B. COLLINS.

Witnesses:

E. A. WEISBURG,
K. H. THEOBALD.