

No. 629,719.

Patented July 25, 1899.

J. H. GOODFELLOW.

GRATE FOR STOVES OR FURNACES.

(Application filed Apr. 23, 1898.)

(No Model.)

2 Sheets—Sheet 1.

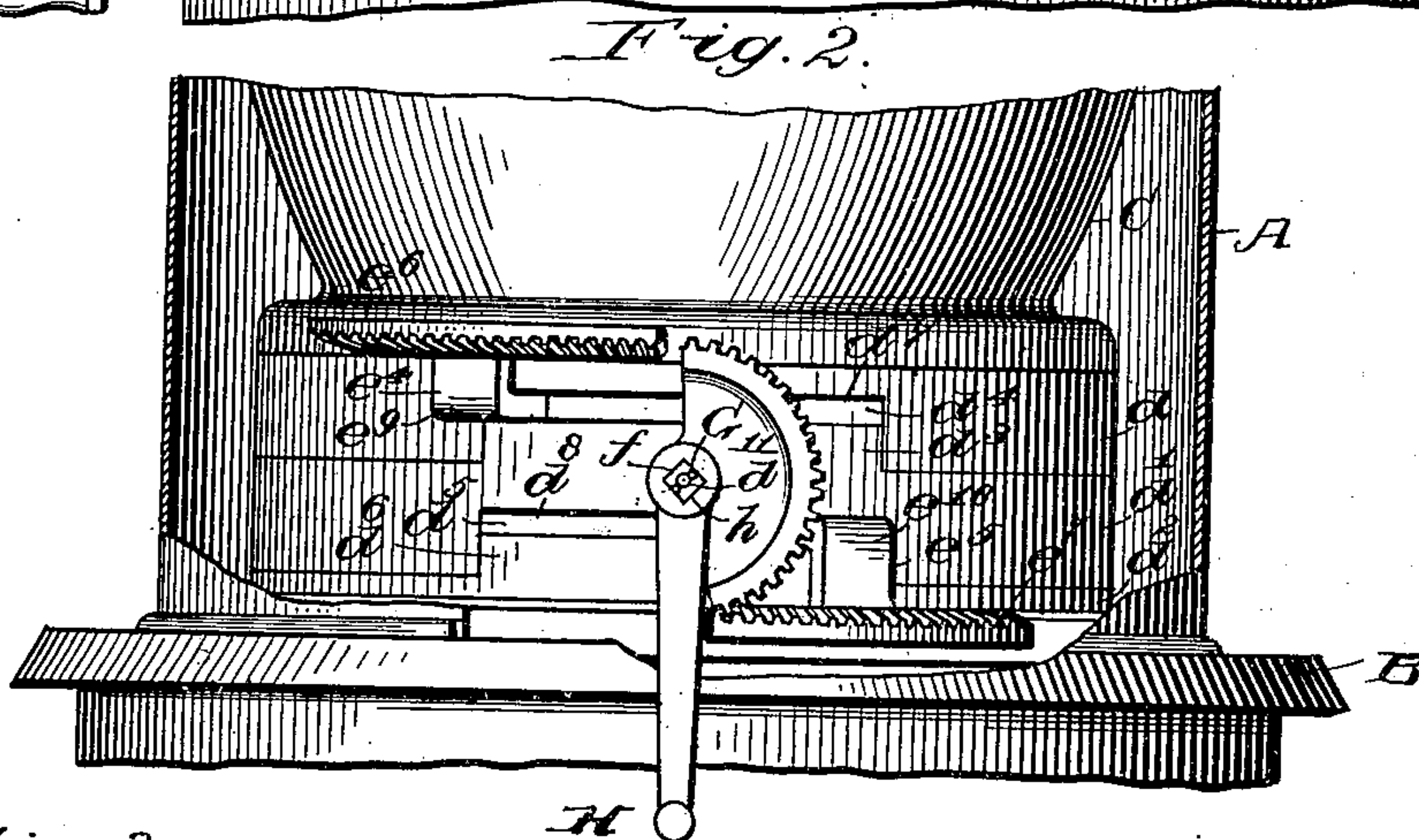
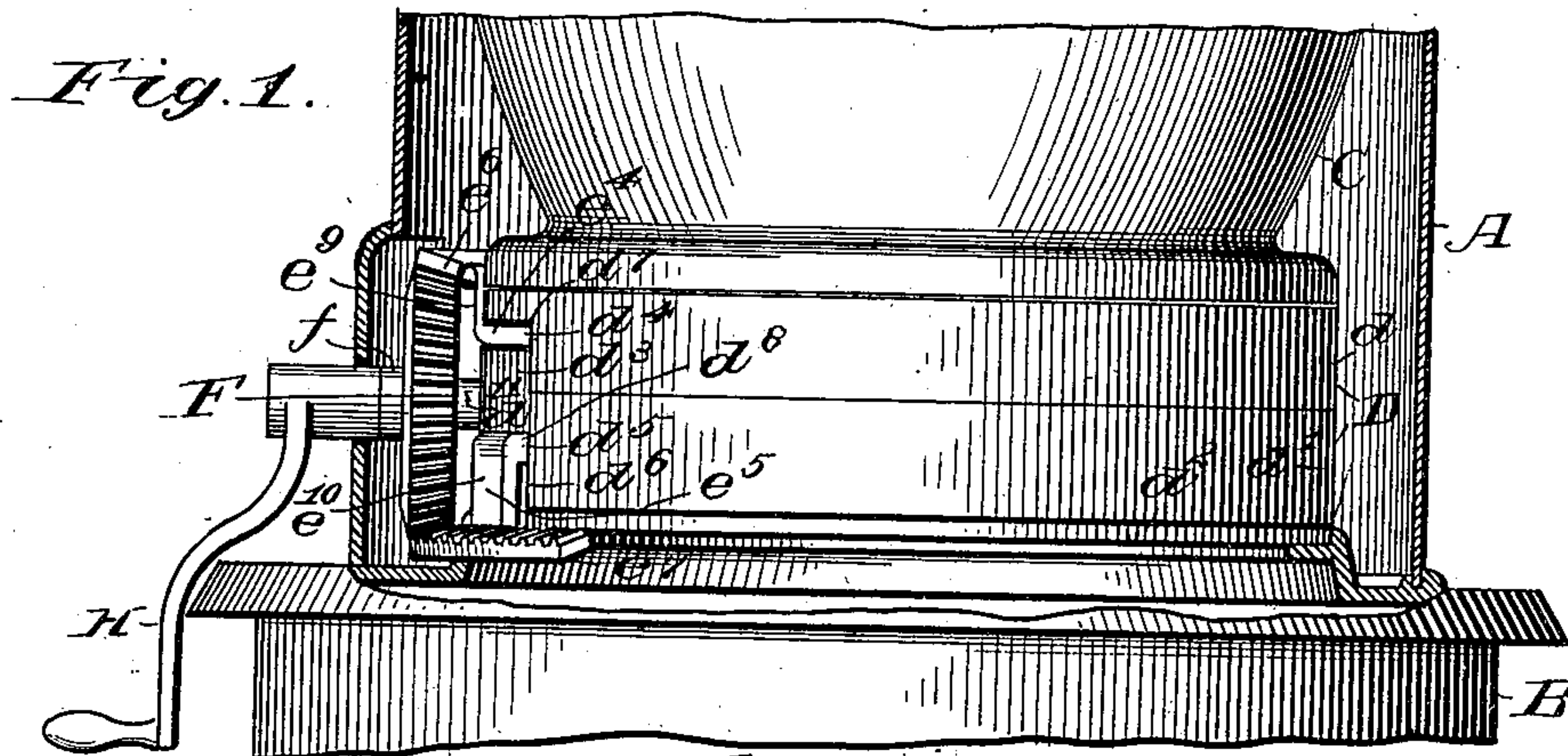


Fig. 3.

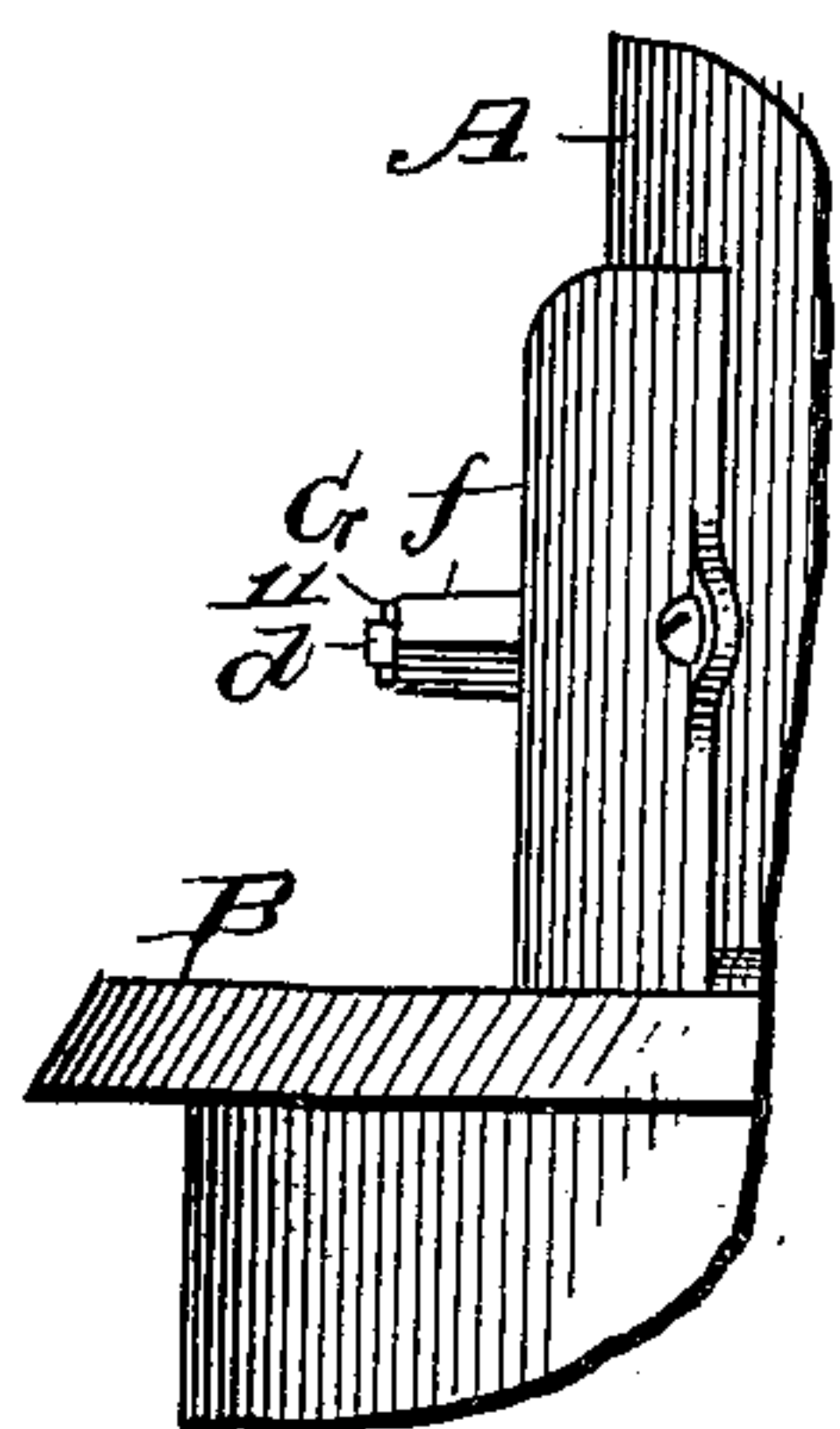
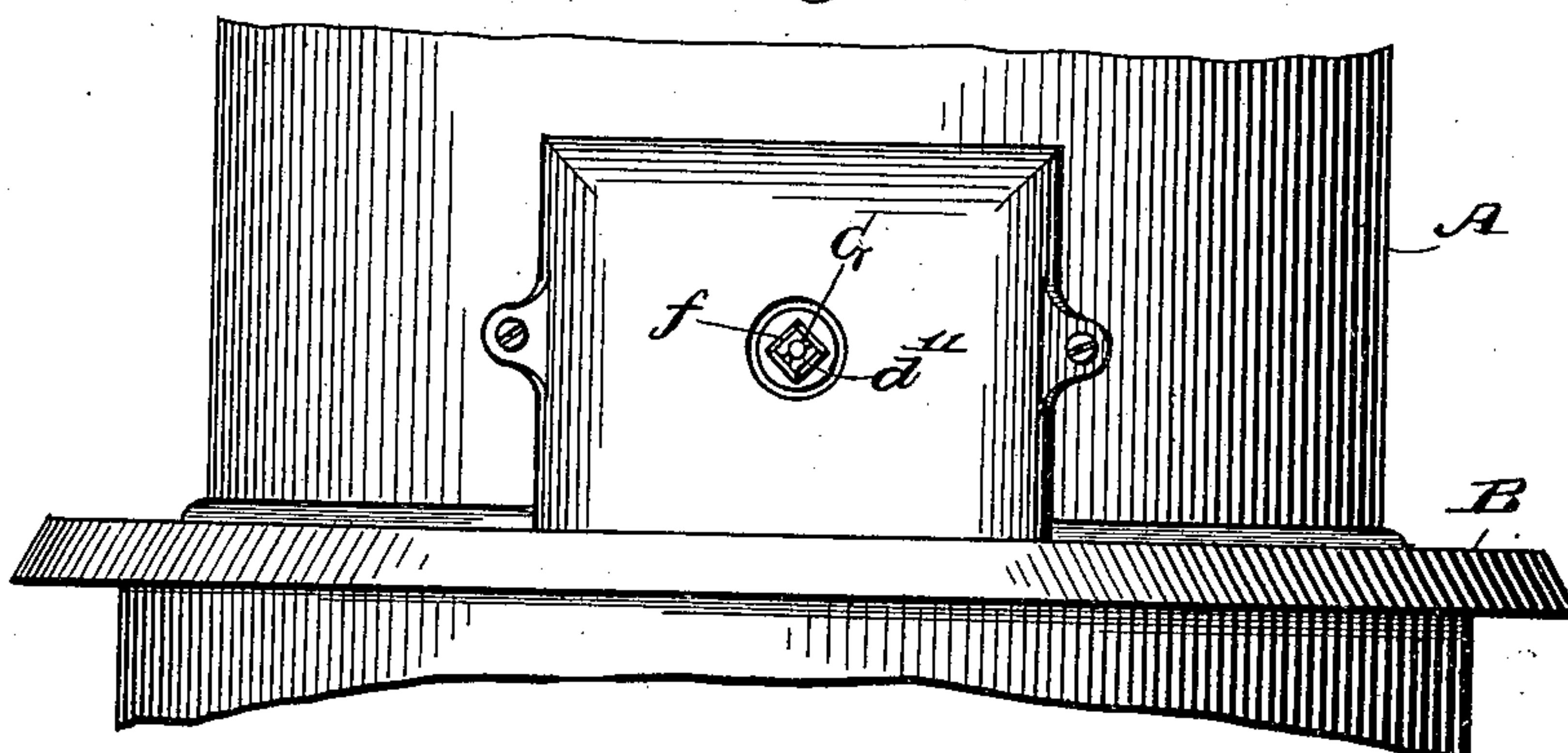


Fig. 4.



WITNESSES.

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2 Sheets—Sheet 2.

Fig. 5.

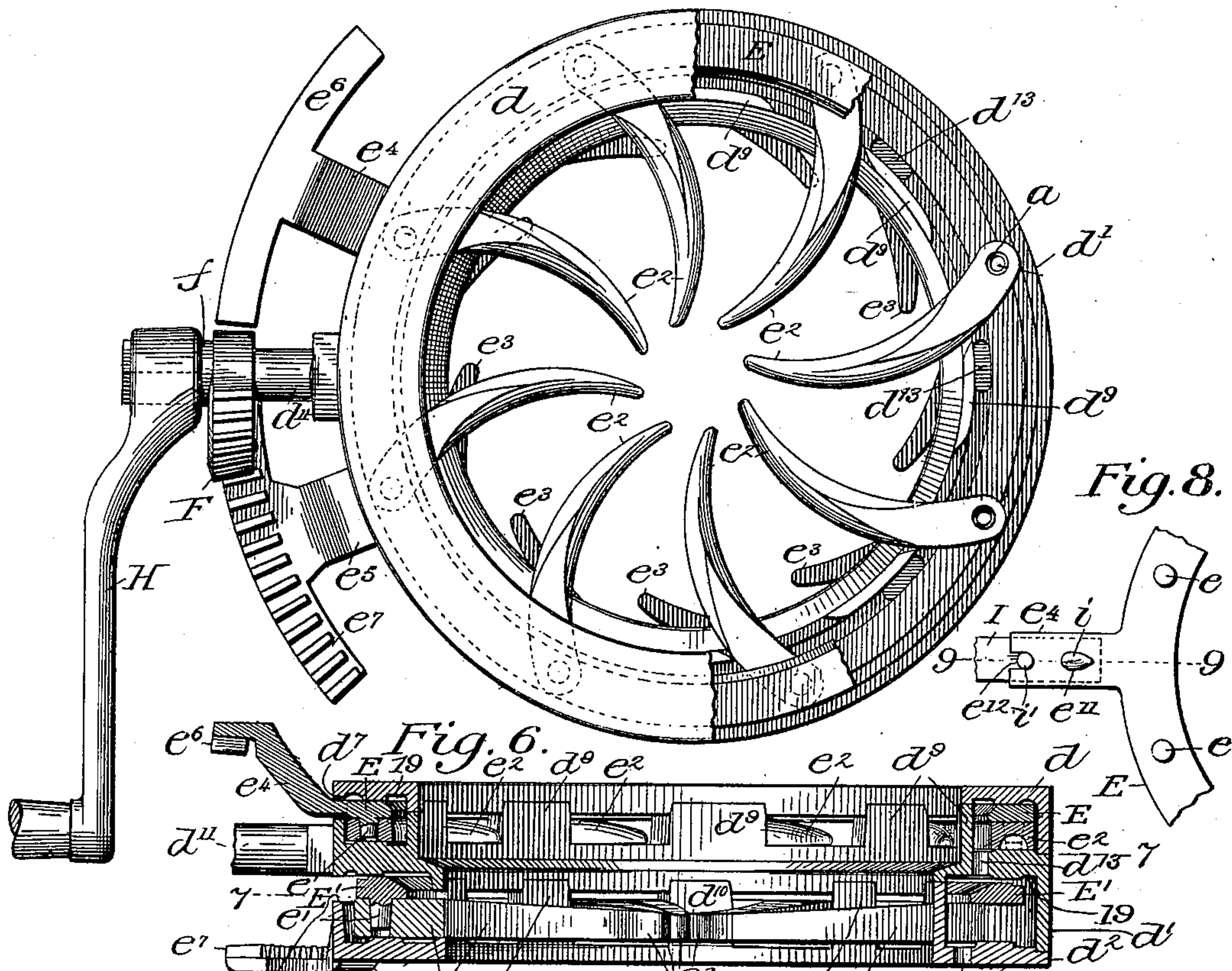


Fig. 8.

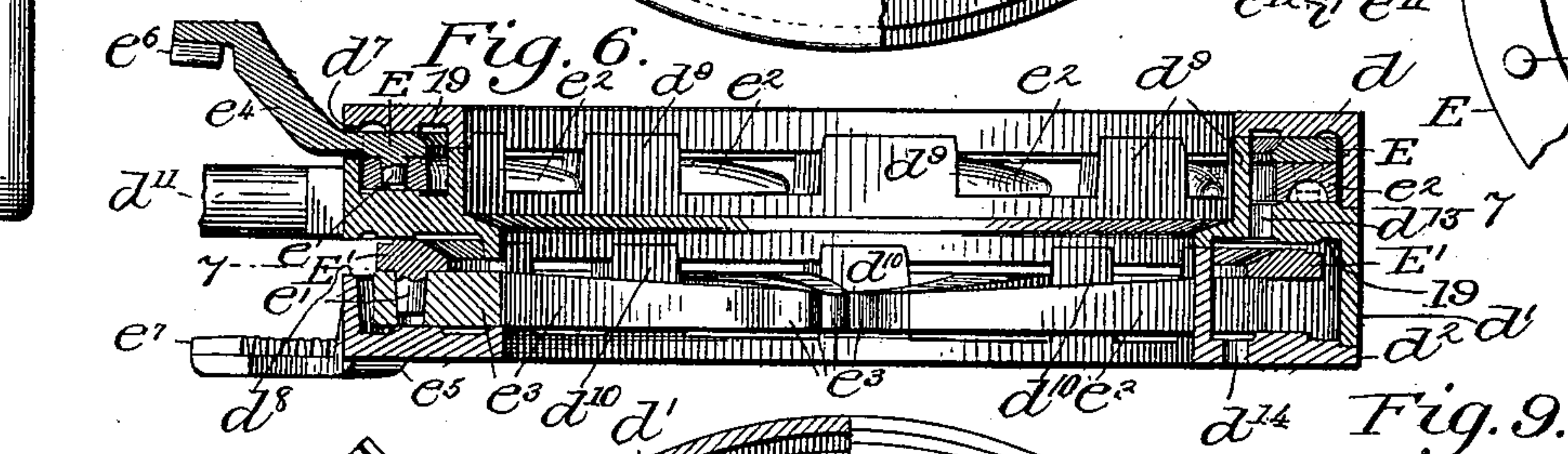
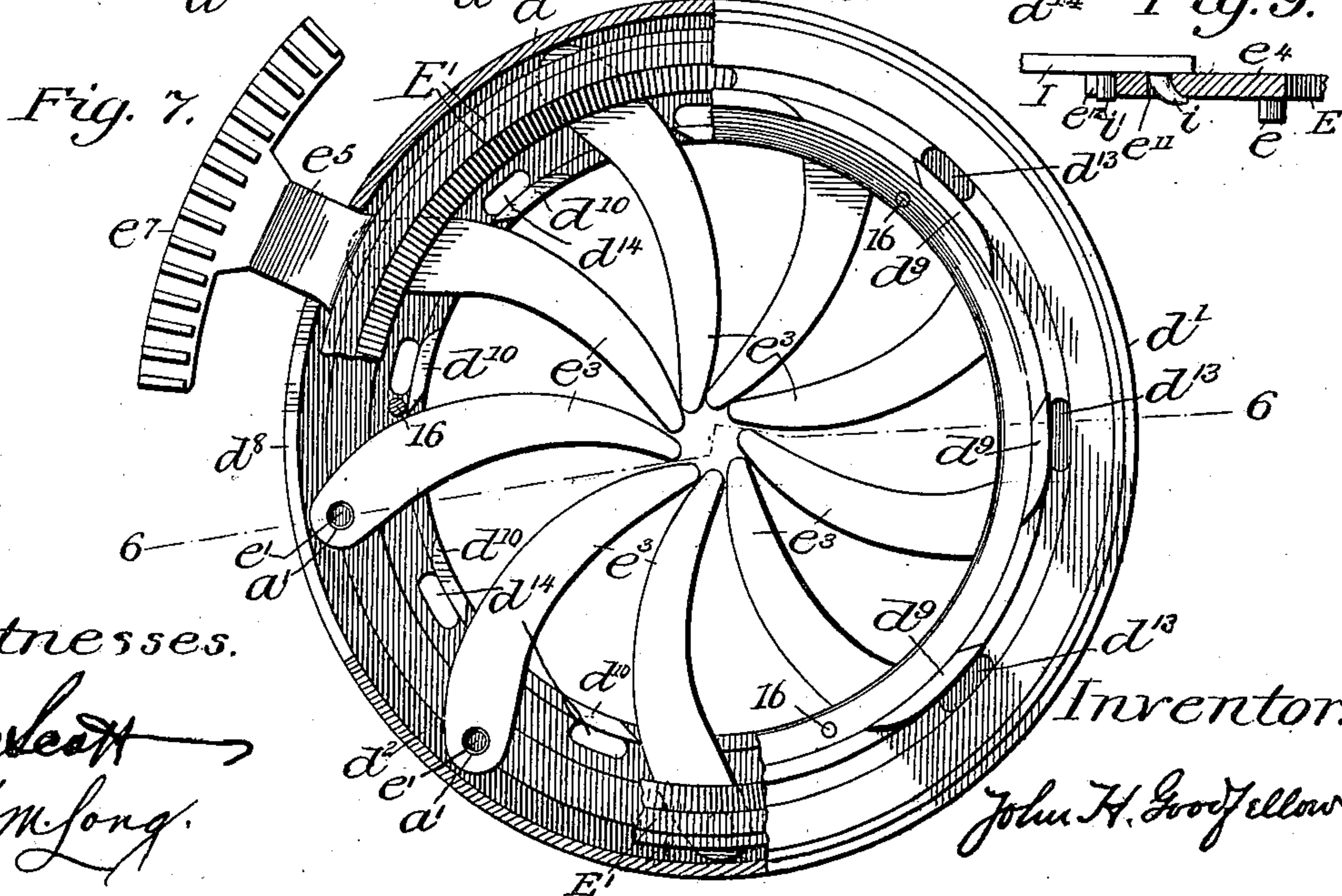


Fig. 9.



Witnesses.

Alex. Leath
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UNITED STATES PATENT OFFICE.

JOHN H. GOODFELLOW, OF LOWELL, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO JOSEPH W. PIPER, OF SAME PLACE.

GRATE FOR STOVES OR FURNACES.

SPECIFICATION forming part of Letters Patent No. 629,719, dated July 25, 1899.

Application filed April 23, 1898. Serial No. 678,592. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. GOODFELLOW, a citizen of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Grates for Stoves or Furnaces, of which the following is a specification.

My invention relates to grates for stoves and furnaces; and it consists in the devices and combinations hereinafter described and claimed.

The object of this invention is to enable the ashes and clinkers at the bottom of the combustion-chamber to be readily removed without disturbing the fuel above, and thus to have at all times a well-ignited mass of fuel on the supporting-grate.

In carrying out my invention I use two grates, one above the other, the fuel resting normally upon the lower grate, and I provide each of these grates with movable fingers or grate-bars adapted to be withdrawn from or from under the fuel and at will to be forced into or under the fuel in such a manner that the fuel above the upper grate may be supported upon said upper grate while the lower grate-bars are withdrawn to allow the ashes and clinkers below the upper grate to fall or be removed from the combustion-chamber.

In the accompanying drawings, on two sheets, Figures 1 and 2 are central vertical sections of the body or casing of a stove or portable furnace, showing in elevation the fire-pot and the grate-operating parts and housings; Fig. 3, a side elevation of the front part of the casing, showing the gear-case and the hub of the gear; Fig. 4, a front elevation of the parts shown in Fig. 5. Fig. 5 represents a top plan view of the grates and their operating racks and gear, also the upper housing and operating-ring broken away, looking into the interior of the upper housing and showing the preferred shape of the cut-off fingers extended in position to support the fuel; Fig. 6, a central vertical section of the grates and their housings, showing the cut-off fingers withdrawn and the fuel-grate in its normal position to support the fuel. Fig. 7 represents a top plan view, showing the upper

wall of the lower housing and operating-ring broken away, illustrating my invention. Figs. 8 and 9 show modifications, Fig. 8 being a plan of a part of the under side of one of the operating-rings, provided with an arm, with a handle detachably secured to said arm, and Fig. 9 a side elevation of a part of said handle and a vertical radial section of said arm and ring.

The casing or body A and base B, said casing containing a fire-pot C or combustion-chamber and the base containing an ash-pit, are of any usual construction and operation.

The fire-pot C is supported upon a housing D, which rests upon the base B and is represented as consisting, for convenience, of three rings $d d' d^2$, the two upper rings $d d'$ having recesses $d^4 d^5$ in their under surfaces, Fig. 2, to receive and fit corresponding upward projections $d^3 d^6$ on the two lower rings $d' d^2$, said projections filling said recesses laterally, but not vertically, thus leaving horizontal openings or slots $d^7 d^8$ in said housing D. The rings $d d' d^2$ may be secured to each other in any usual manner, as by vertical bolts 16, passing through them or through ears, with which they may be provided in an obvious manner. Two grates are shown consisting of rings E and E' and fingers $e^2 e^3$, the rings resting upon the outer ends of the fingers and pivoted thereto at $e e'$, the preferred shape of said fingers being shown in Figs. 5 and 7, where said fingers are represented as tapering from their pivoted ends to their free ends and slightly curved. The pivots $e e'$ may be cast or otherwise made integral with their respective rings E E', and the holes $a a'$ in the fingers may be cast therein. The fingers $e^2 e^3$ are arranged between abutments $d^9 d^{10}$ on the upper sides of the housing-rings $d' d^2$, so that when the grate-rings are partly rotated with respect to said housing-rings the free ends of said fingers are caused to swing toward or away from the center of the housing D and at the same time to project into or be withdrawn from the central opening of said housing, and as a means for reducing friction to their moving parts the recesses or grooves 19 are formed. The housing-rings $d' d^2$ are provided with vertical perforations $d^{13} d^{14}$, which

extend through the same to allow the escape of ashes and to prevent the grate rings and fingers from being clogged by the accumulation of ashes in the housing-rings. Said perforations d^{13} d^{14} also serve to admit the air to the outer parts of the bed of coals and serve the purpose of a gas-ring—that is, they assist in the combustion of the gas from the coal.

Each grate-ring E E' is provided with an outwardly-extending arm e^4 e^5 , which reaches loosely through the corresponding slot d^7 d^8 of the housing and is provided with an arc-shaped rack e^6 e^7 or segment of an annular bevel-gear, arranged parallel with said grate-ring. The teeth of the upper rack e^6 point downward and the teeth of the lower rack e^7 upward, and the arms e^4 e^5 are, if necessary, offset at e^9 e^{10} sufficiently to admit between said racks a segment of a bevel spur-gear F, Figs. 1, 2, and 5, the same being about one-half of a full gear, having a hub f , which turns upon a horizontal stud d^{11} , projecting radially from the housing-ring d' , and may be retained on said stud by any convenient means, as by a split pin G, which passes through the free end of said stud outside of said hub. The outer end of the hub is square or many-sided to enable it to be engaged by a crank or wrench H, having a corresponding opening h for that purpose.

When the grates are first put in place, the arms e^4 e^5 are turned in opposite directions to the limit of their traverse and the segmental gear F is arranged to be in engagement with one rack and just out of engagement with the other rack, as shown in Figs. 2 and 5, where the upper grate is represented as being in a position to support the fuel, while the fingers or bars of the lower grate are in their retracted position. The grates being in this position and the wrench or crank in the position shown in Fig. 2, if said wrench or crank is turned upward to the left and through a complete circle the lower grate E' will first be turned, its rack and arm moving to the left end of the slot d^8 and its fingers being thrown out and meeting in the center of the combustion-chamber and there remaining, and then the gear will be disengaged from the lower and engaged with the upper rack, turning the latter to the right and causing the upper grate bars or fingers to be withdrawn from under the fuel, which will then fall upon the lower grate. By turning the crank in the opposite direction the fingers of the upper grate will first be forced into the fuel and the fingers of the lower grate will be drawn out from under the fuel. In either case the fingers of both grates will be in their fuel-supporting position before the fingers of either grate can be withdrawn from said position and the grates will be successively opened and closed by the rotation of the crank and gear.

In Figs. 8 and 9 the arm e^4 e^5 of the grate E E' (the grate being in other respects as above described) is operated directly by a

handle I applied thereto, and the racks and gear are dispensed with, said arm having a hole e^{11} to receive a bent stud or hook i , with which said handle I is provided, and having also a slot e^{12} in its end to receive a straight stud i' on said handle, so that when the bent stud i is first inserted in the hole and the straight stud is in the slot e^{12} turning the handle will turn the grate. The construction shown in Figs. 8 and 9 allows either grate to be turned, whatever the position of the other grate.

I claim as my invention—

1. In a grate, the combination of two fuel-supporting grates situated one above the other and adapted to be moved to their operative positions within the fire-chamber and withdrawn therefrom, and means by which the grates may be independently operated or moved successively in opposite directions.

2. In a stove, the combination of a combustion-chamber, two fuel-supporting grates situated one above the other, and means by which one of said grates is moved to its operative position within the combustion-chamber and by which, by continuing the movement, the other is withdrawn therefrom.

3. In a stove or furnace, the combination with a fire-chamber, of two fuel-supporting grates situated one above the other, each adapted to be moved in a horizontal plane into and from the fire-chamber, and means by which one of said grates is moved to its operative position within the fire-chamber and by continuing the movement of the operating means the other is withdrawn therefrom.

4. In a grate, the combination of a housing provided with openings communicating with the combustion-chamber, fuel-supporting fingers resting on the bottom of the housing and adapted to be passed through the openings, a ring resting on the outer ends of the fingers and pivotally connected therewith, and means provided with a reduced contact-surface for holding the ring and fingers in their operative position.

5. In a grate, the combination of two fuel-supporting grates situated one above the other adapted to be moved to their operative position within the fire-chamber and withdrawn therefrom, of two housings incasing the same, the upper housing having a larger internal diameter than the lower, the fuel-supporting grates being correspondingly formed.

6. In a stove or furnace, the combination of a cut-off grate consisting of two annular housings situated one above the other and adapted to form a part of the fire-chamber, two series of curved tapering fingers or grate-bars adapted to be received therein, two rings, one within each housing, pivotally connected to said series of bars, and means for rotating the rings independently or successively in opposite directions to move the two series of fingers alternately into and out of the fire-chamber.

7. In a grate, the combination with an an-

nular housing forming a part of a grate, a series of independent curved and tapered fingers or bars having their under sides hollowed out and adapted to be received within said housing and furnished with a tapered hole in their larger ends adapted to make a pivotal connection with a tapered pintle carried by the operating-ring resting thereupon.

8. In a grate, a housing consisting of a series of annular rings provided with internal and external flanges constructed and arranged to interlock, their inner walls forming a part of the fire-chamber and provided with grate-bar-receiving openings and their exterior walls with a slot through which the grate-bars are operated and their inner bearing-surfaces grooved and perforated.

9. In a stove, the combination with a combustion-chamber, of an annular housing having its outer wall provided with a slotted opening for the passage of an operating device and its inner walls divided into ports for the passage of the grate-fingers and furnished with perforations in the bottom of the housing for the free passage of air to the interior of the housing and the passage of ashes to the ash-pit from the housing.

10. In a stove, the combination with a combustion-chamber, of two annular housings situated one above the other beneath the fire-chamber and having a slotted opening through their outer walls for the passage of an operating device, and each inner wall divided into ports for the passage of their respective series of grate-bars and having the bottom walls of each chamber or housing perforated for the passage of air and ashes, as set forth.

11. The combination of a fire-pot, two grates, arranged one above the other, below said fire-pot, each of said grates consisting of a grate-ring and fingers, pivoted thereto, and each grate-ring being provided with a rack, curved concentrically with said grate-ring,

said racks being inverted with respect to each other, a stationary housing, having abutments arranged on opposite sides of each of said fingers, and a segmental gear, supported by said housing, and, when turned, engaging said racks one at a time, to move said racks successively in opposite directions and to cause the fingers of one grate to be thrown inward, and the fingers of the other grate to be immediately thereafter thrown outward.

12. The combination of the base, the housing, supported thereon, and consisting of superimposed housing-rings, each superimposed ring having a recess to receive a projection, with which the housing-ring next below is provided, and which fills said recess laterally but not vertically, grate-rings, arranged in said housing, fingers, pivoted to said grate-rings and projecting through the inner face of said housing-rings, between abutments, with which said housing-rings are provided, said grate-rings being provided with arms which project through said recesses above said projections, and means for imparting motion to said grate-rings.

13. The combination of the base, the housing, supported thereon, grate-rings, arranged in said housing and having fingers, adapted to project through the inner face of said housing, and the fire-pot, supported on said housing, said housing forming with said fire-pot, a combustion-chamber, said housing consisting of superimposed rings and said housing-rings below said grates having downwardly-extending perforations to allow the escape of ashes and the ingress of air.

In witness whereof I have signed this specification, in the presence of two attesting witnesses, this 18th day of April, A. D. 1898.

JOHN H. GOODFELLOW.

Witnesses:

ALBERT M. MOORE,
KIRKLEY HYDE.