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PATENTED NOV. 6, 1906.

A. H. L. HALLASCHKA & K. A. GRIMM.
ROTATABLE GRATE FURNACE,

APPLICATION FILED FEB. 28, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

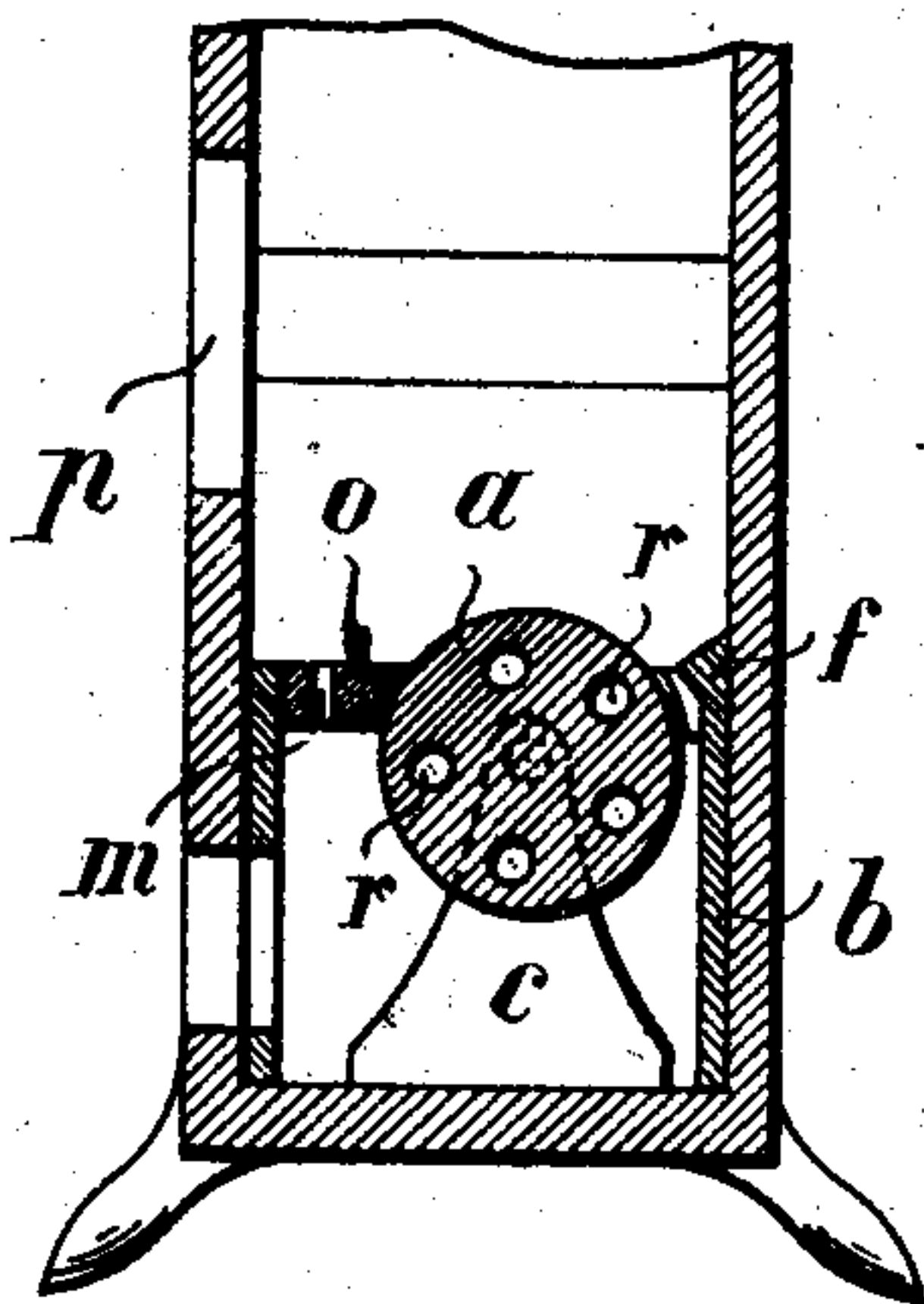


Fig. 2.

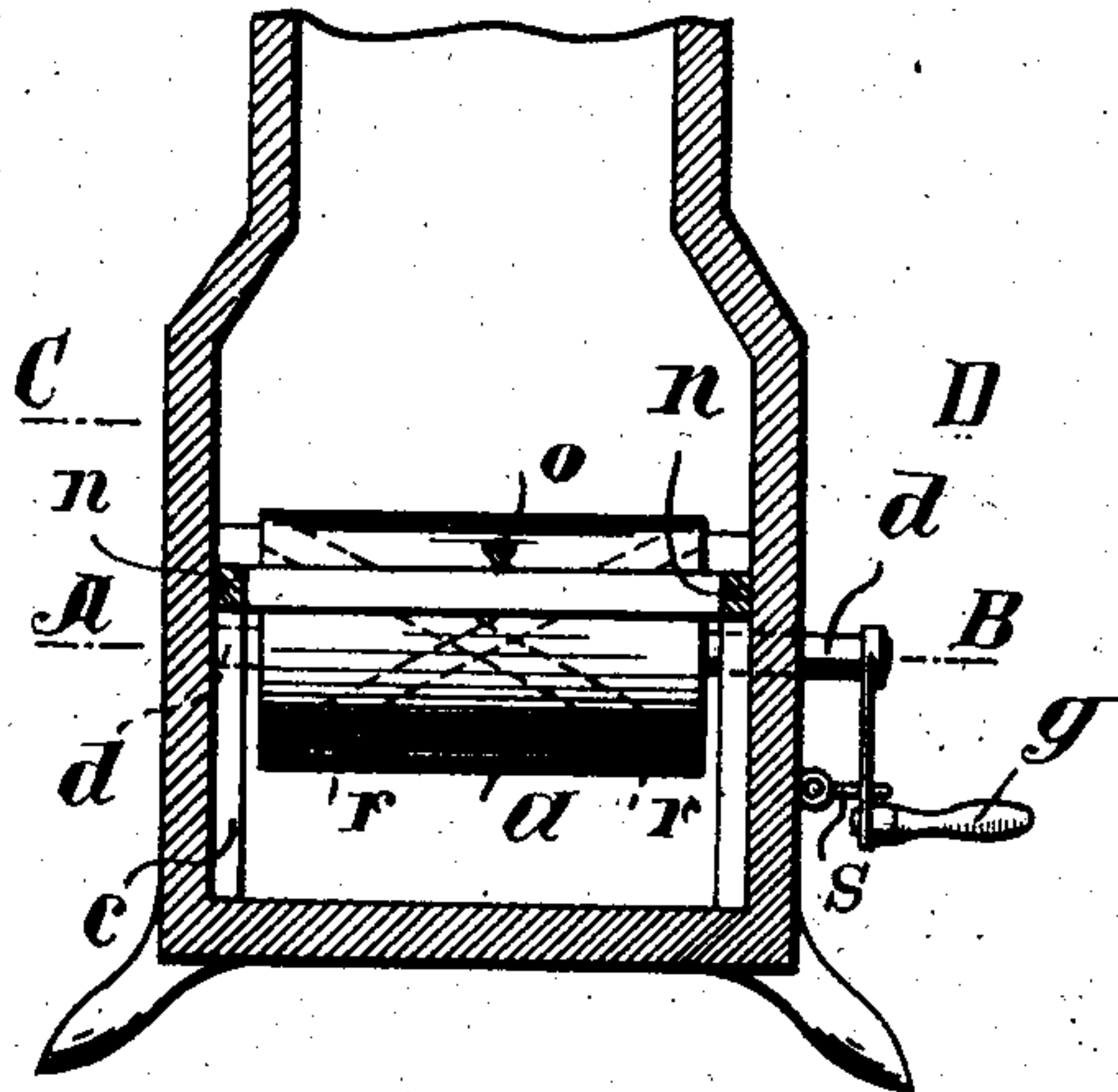


Fig. 3.

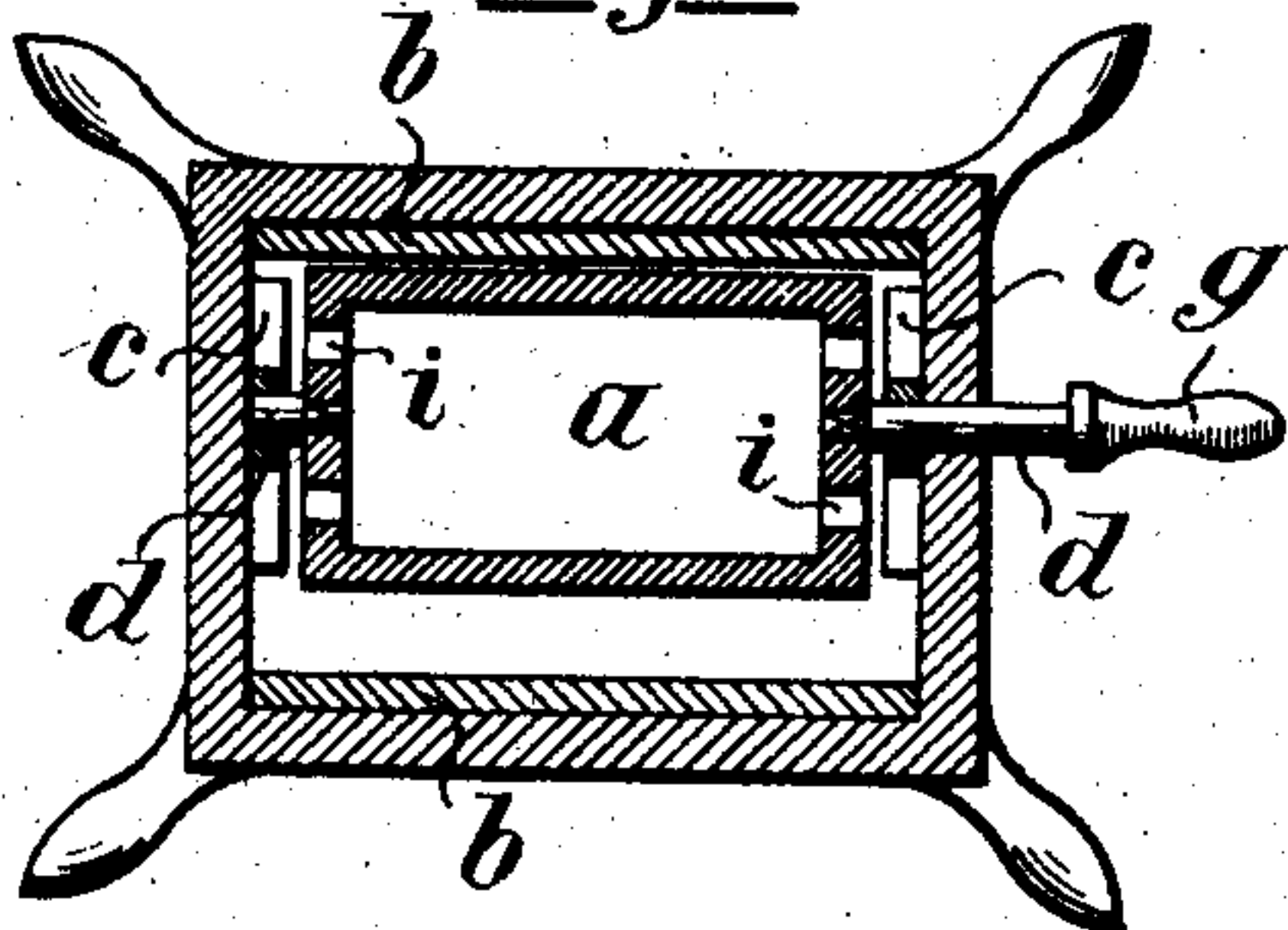


Fig. 4.

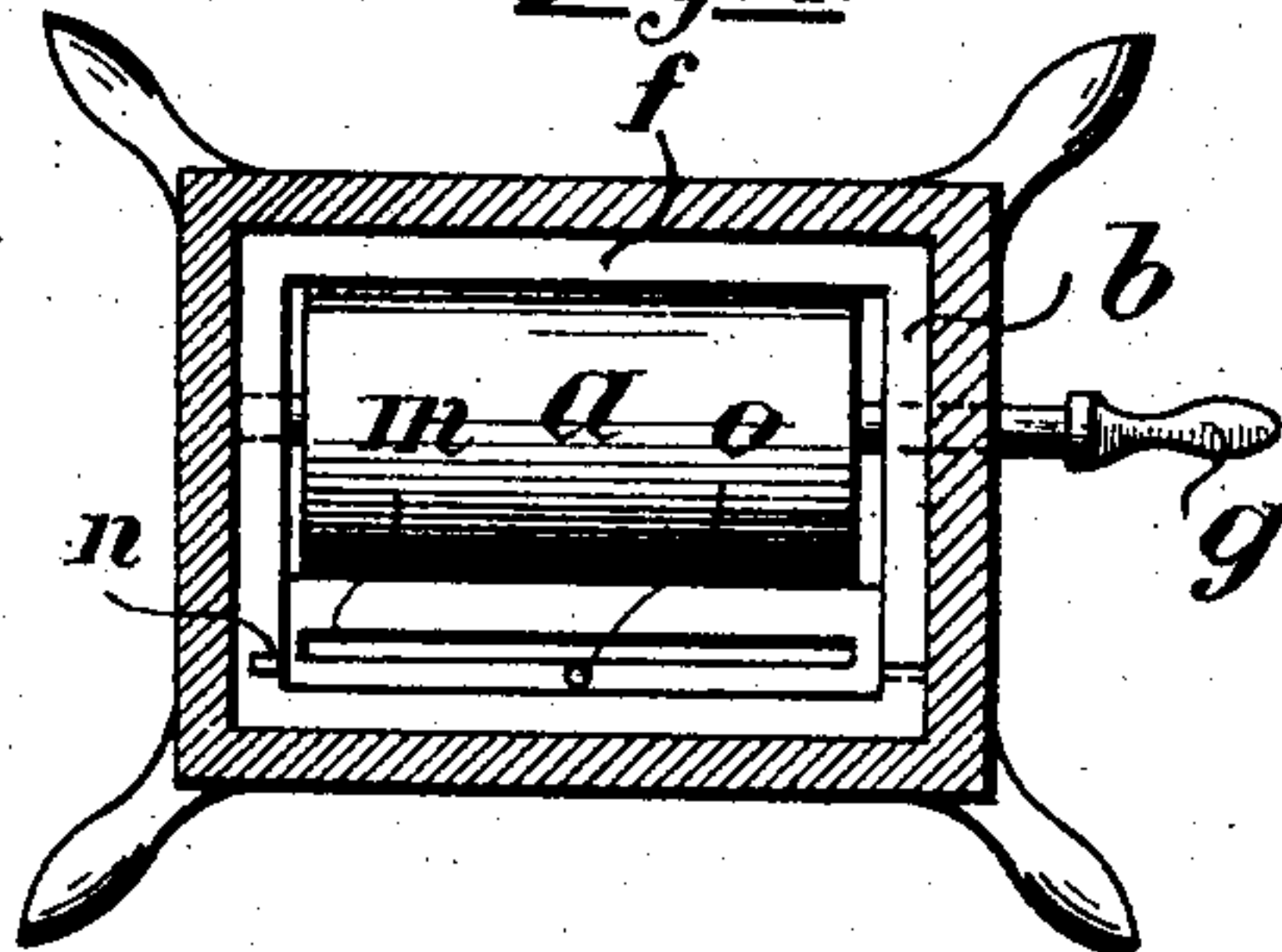


Fig. 5.

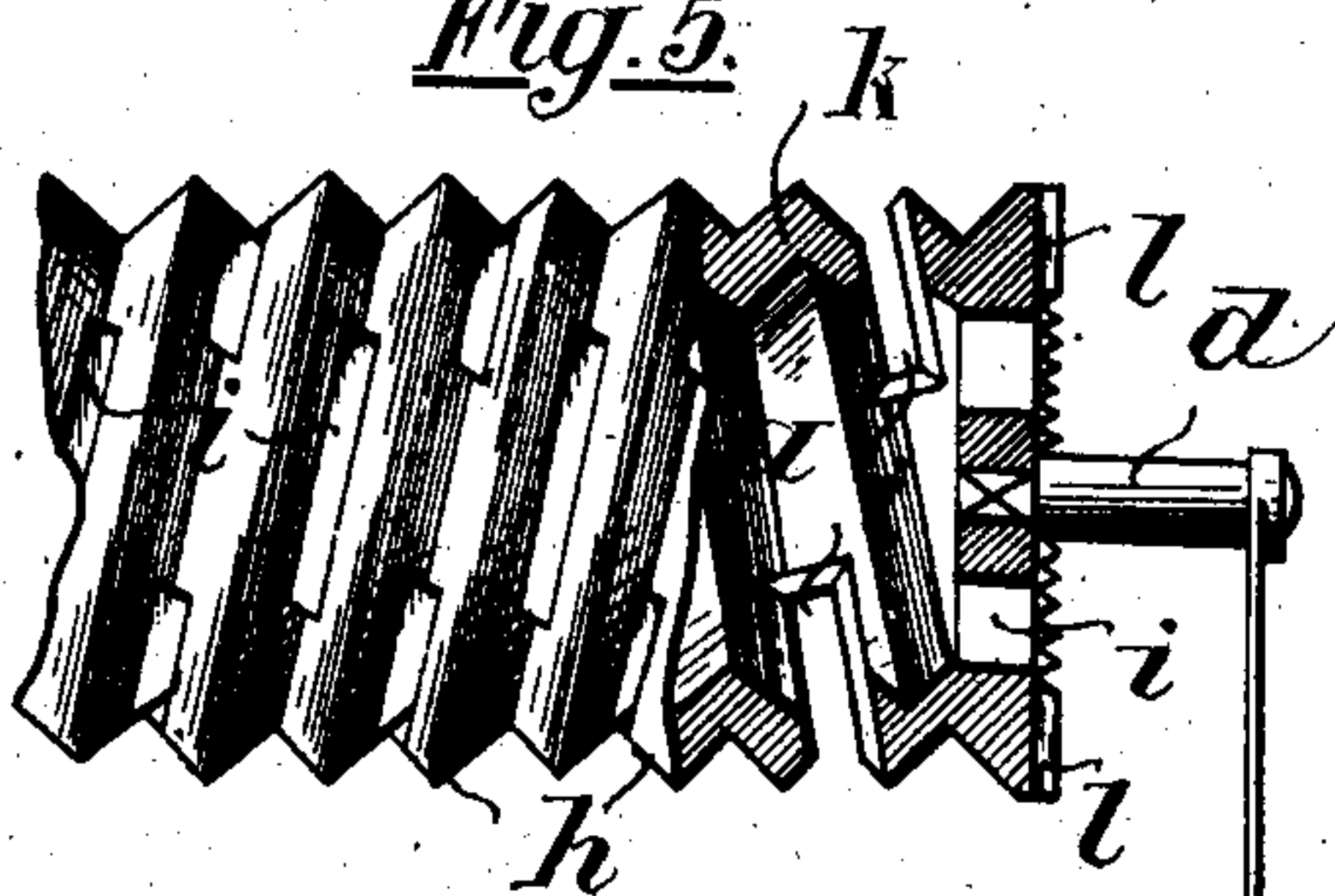
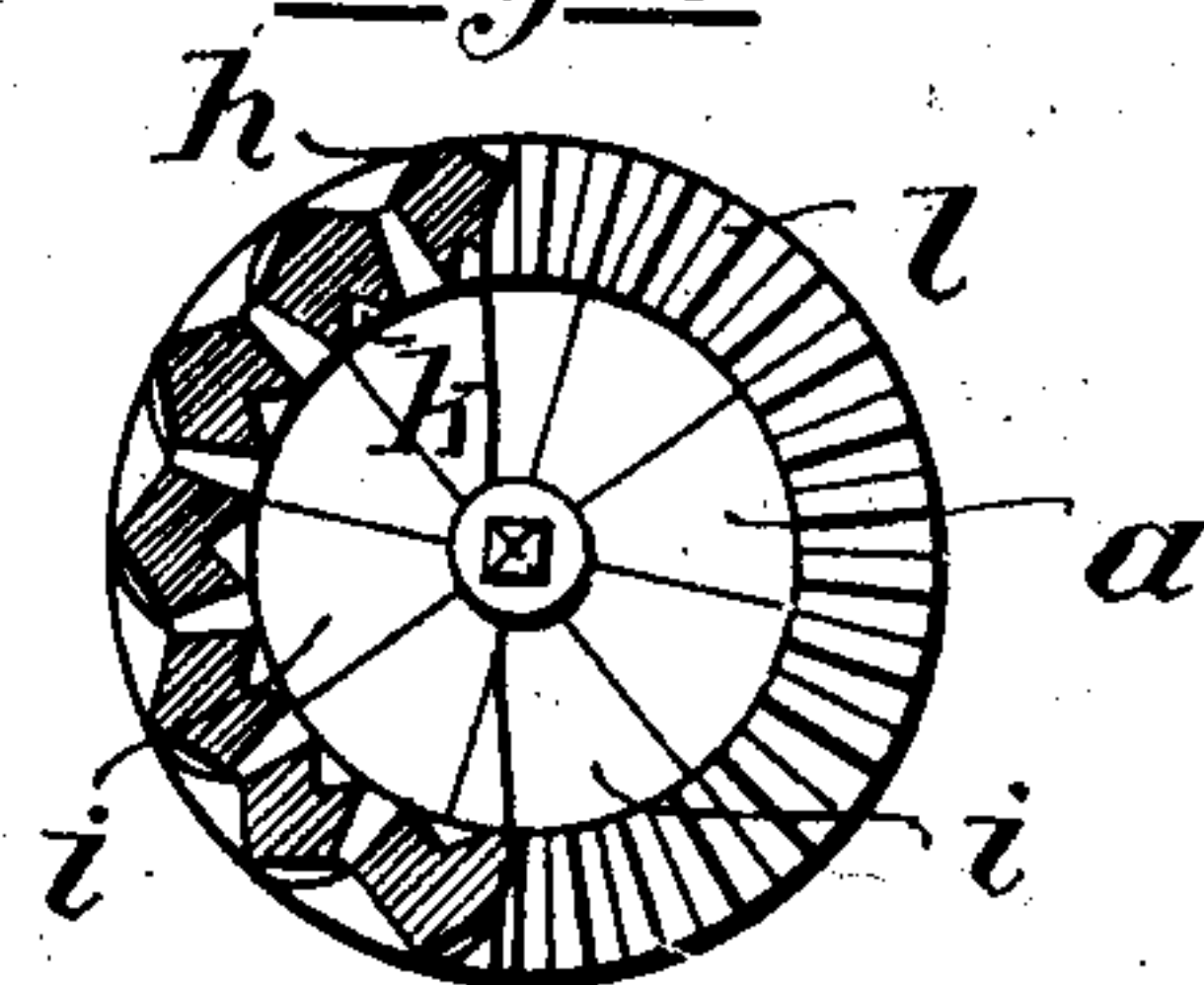


Fig. 6.



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2 SHEETS—SHEET 2.

Fig. 7.

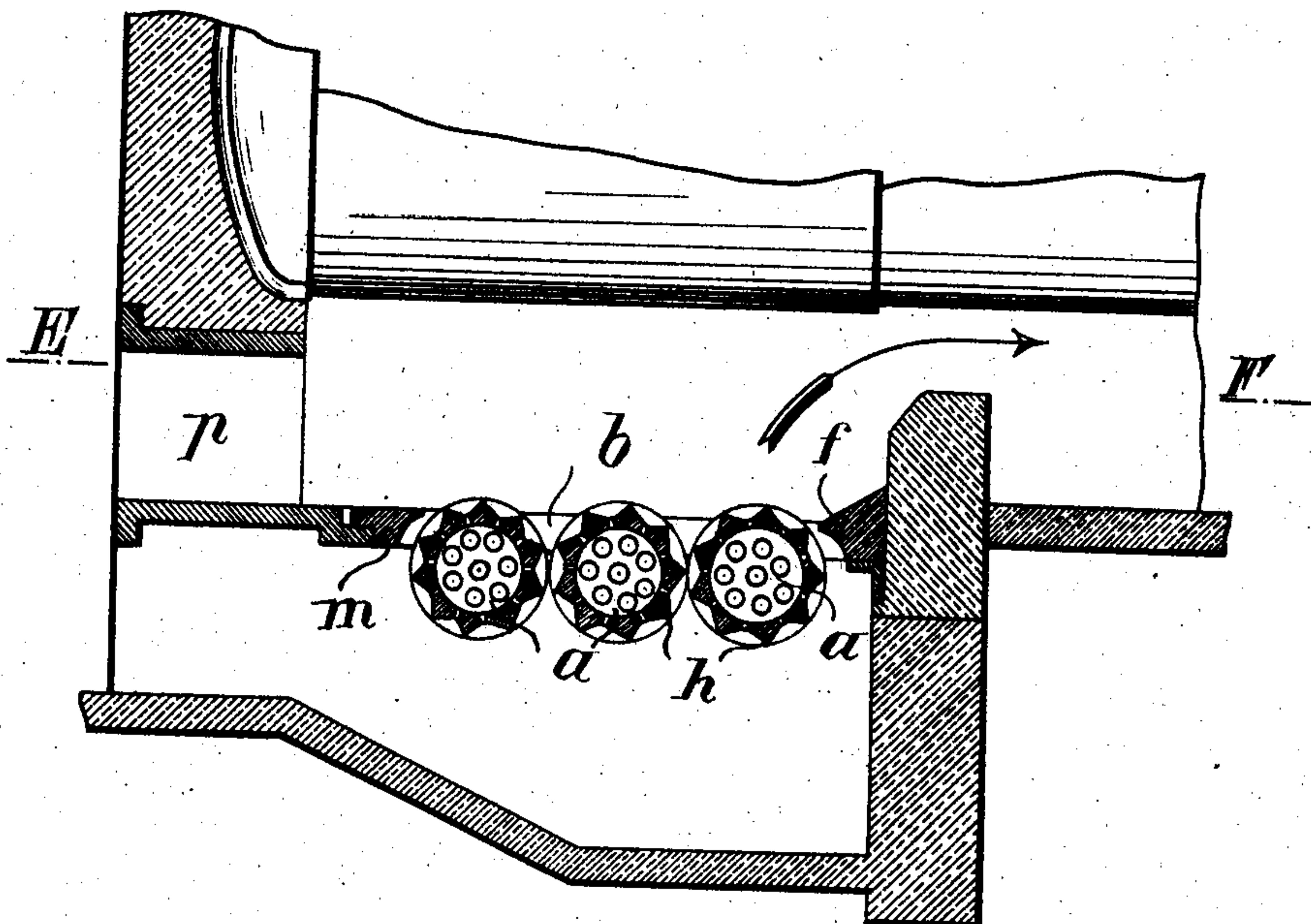
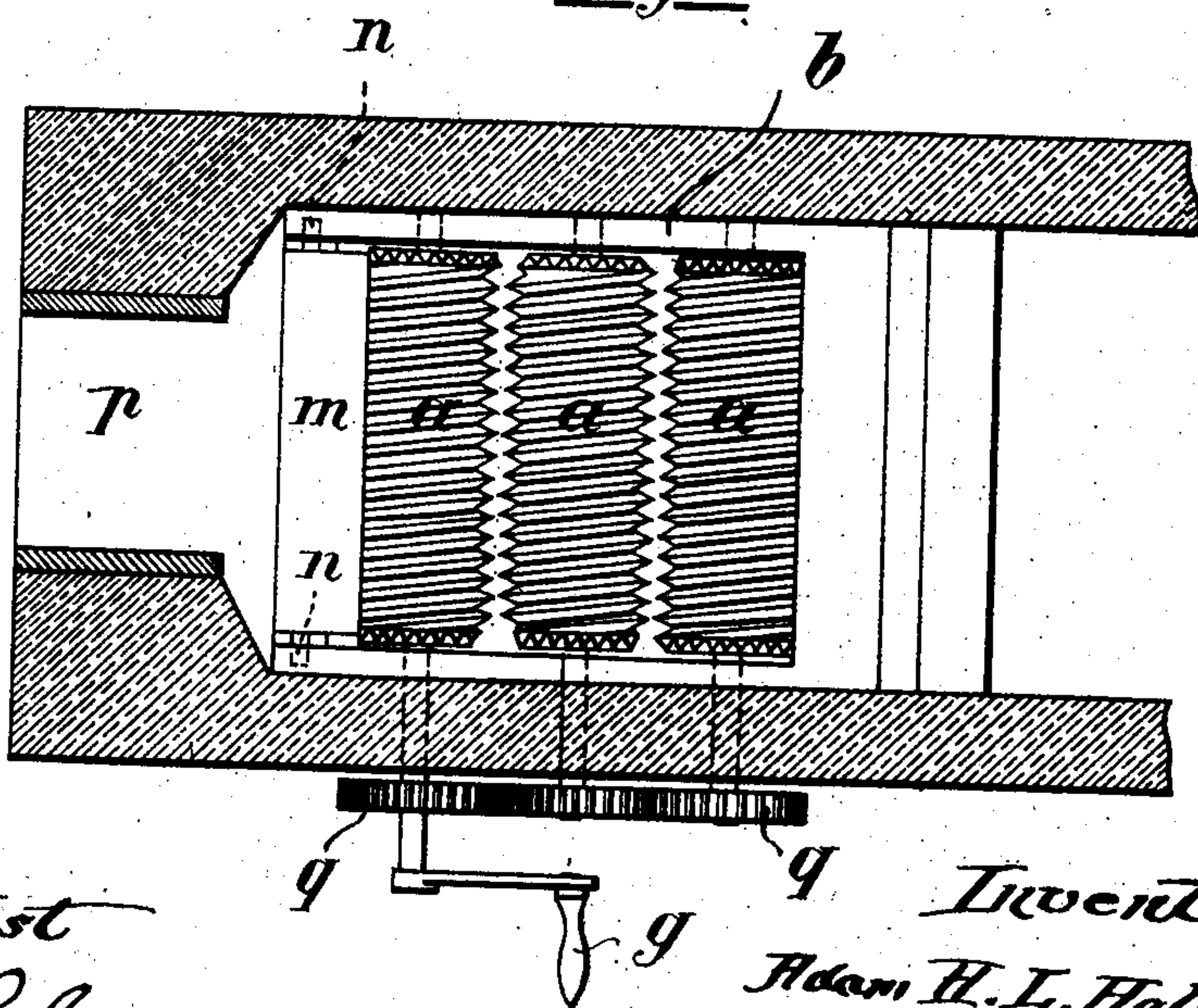


Fig. 8.



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UNITED STATES PATENT OFFICE.

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ROTATABLE-GRATE FURNACE.

No. 835,022.

Specification of Letters Patent.

Patented Nov. 6, 1906.

Application filed February 28, 1906. Serial No. 303,561.

To all whom it may concern:

Be it known that we, ADAM HEINRICH LUDWIG HALLASCHKA and KARL ALFRED GRIMM, subjects of the German Emperor, residing at Cassel, in the Kingdom of Prussia and Province of Hesse-Nassau, Germany, have invented certain new and useful Improvements in a Rotatable-Grate Furnace, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to a rotatable-grate furnace which may be employed in stoves of every description, beneath steam-boilers, and for all other purposes, and presents the advantage that by actuating the rotatable-grate furnace from without the fuel can be well poked and freed from the ashes and slags. Also by consecutively exposing other parts of the rotatable-grate furnace to the action of the fire the life of the grate can be lengthened. According to its size the rotatable-grate furnace may consist of one or several parallel rollers, which are preferably grooved and perforated, also serrate on both sides, and are arranged to be turned from without. The one or several rollers are disposed within a frame, near the front portion of which a detachable grate-bar is disposed, so that by lifting the latter a large opening may be formed through which the ashes and slags or all the fuel can be better discharged.

We will now proceed to describe our invention with reference to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section through the lower part of a German stove and a rotatable-grate furnace disposed therein. Fig. 2 is a vertical cross-section through the same. Fig. 3 is a horizontal sectional view of a form having a hollow roller. Fig. 4 is a horizontal section through the same on the line C D in Fig. 2. Fig. 5 shows part of a grooved and perforated roller, partly in elevation and partly in section. Fig. 6 is on the left a cross-section through the same and on the right an end view of the same. Fig. 7 is a longitudinal section through a rotatable-grate furnace beneath a steam-boiler, and Fig. 8 is a horizontal section through the same on the line E F in Fig. 7.

Similar letters of reference refer to similar parts throughout the several views.

A rotatable-grate furnace of the smallest size and simplest construction is shown at Figs. 1 to 4, which represent a German stove. We do not further describe the construction of the latter, as it is immaterial. A frame *b* of convenient shape is disposed in the fire-space of the stove close to the walls of the latter, also two plates or supports *c c* are disposed, in which the shaft *d* of a smooth roller *a* is mounted to turn. The roller *a* is solid and is provided with several longitudinal channels *r r*, which are inclined with regard to the shaft *d* or may be placed spirally. To prevent the ashes and slags or parts of the fire from blocking up the space between the roller *a* and the frame *b*, the top surface of the latter is preferably placed above the axis of the roller *a* intermediate of its radius. The rear portion of the frame *b* is preferably beveled off at *f*, so as to permit the ashes and slags to slide off through the space between this frame portion and the roller *a* into the ash-pit. Close to the front portion of the frame *b* a detachable slotted grate-bar *m* is disposed, which is preferably provided with two pins or projections *n n* for engaging in corresponding recesses in the two side portions of the frame *b*. Thereby the grate-bar *m* is prevented from shifting in the cross direction. It is provided with a knob *o* or the like by means of which it can be seized and lifted. A hand-crank *g* is fastened at the external end of the shaft *d* and can be locked by means of any known device *s*. This rotatable-grate furnace is operated as follows: The combustible is introduced into the fire-chamber from above or through the door-opening *p*, as the case may be, and the fire is kindled as usual. When during the combustion of the fuel ashes and slags are formed or if the condition of the fire requires it, the hand-crank can be turned through a convenient angle or once or several times and in one or both directions, as the circumstances may render it necessary, so that the fuel is stirred and mixed, also freed from the ashes and slags, which drop through the spaces between the roller *a*, the frame *b*, and the detachable grate-bar *m*. Air is constantly supplied to the fire from the ash-pit through the inclined or spiral channels *r r* in the roller *a*, also through the slot of the grate-bar *m* and through the spaces between the roller *a*, the frame *b*, and the grate-bar *m*. It will be

seen that the supply of air cannot be stopped, as the inclined or spiral channels *r r* are not likely to be blocked up by reason of their inclination and all the ashes and slags can be discharged by merely turning the hand-crank *g*. The device *s* may be employed for locking the hand-crank to prevent the roller *a* from inadvertently moving. For discharging a large quantity of ashes and slags or the whole fuel under circumstances it may be preferable to seize the detachable grate-bar *m* at its knob *o* and to remove it, so that a large opening will be left between the roller *a* and the front portion of the frame *b*, through which opening the mass can drop into the ash-pit.

For larger grate-surfaces it is preferable to make the roller *a* hollow and to provide it with spiral grooves *h* on its outside, also with spiral grooves *k* on its inside; further, with a plurality of conveniently-disposed air-openings *i i*, and at last with preferably radial teeth *t* on the end faces along the peripheries, as is clearly shown at Figs. 5 and 6. The spiral surfaces of the roller serve to break up any slag and shift it lengthwise of the roller as the latter turns. Further, the teeth *t* at the sides will equally break up any slags in the spaces between them and the side portion of the frame *b* and force them downward. At last all ashes and slags which may have dropped through the upper openings *i* into the cavity of the roller *a* and cannot at once escape through the lower openings *i* will be conducted longitudinally through the internal spiral grooves *k* until they drop either through air-openings *i* or at the side of the roller *a*.

Figs. 7 and 8 show a larger rotatable-grate furnace beneath a steam-boiler and provided with three grooved and perforated rollers *a a* of the construction shown at Figs. 5 and 6 and described above. These three rollers may be geared with each other in any known manner—for example, by means of the three gear-wheels *q q*, (shown at Fig. 8,) so that they can be simultaneously turned. The frame *b* is modified in its shape in accordance with its size, and its projecting rear portion is provided with an inclined surface *f*, the same as before. The detachable grate-bar *m* is shown without any longitudinal slot; but this is immaterial. The two pins or projections *n n* of this detachable grate-bar *m* also engage in corresponding recesses in the two side portions of the frame *b* to prevent the grate-bar from shifting in the cross direction. A single hand-crank *g* is provided for simultaneously turning the three rollers *a a* by means of the three gear-wheels *q q*. The operation of this large rotatable-grate furnace is substantially the same as before. By turning all the three rollers *a a* with the aid of the hand-crank *g* the fire can be thoroughly poked and in an easy manner.

Also the advantage is obtained that the three rollers *a a* are prevented from wasting too rapidly, as they can be turned to present other portions to the action of the fire. A locking device of any known construction may be provided to prevent the three rollers *a a* from inadvertently turning during the charge of the furnace.

The rotatable-grate furnace may be varied in many respects without deviating from the spirit of our invention.

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

1. The combination with a stove or furnace of a frame located therein including a rear fixed bar and a front substantially horizontally-disposed bodily-removable bar supported at its opposite end edges, a roller journaled beneath the bars having a portion of its periphery projecting thereabove and located in close juxtaposition thereto, and means for rotating the roller, substantially as described.

2. In a furnace, the combination with a frame surrounded by the furnace-walls and having an inclined upper surface on its projecting rear portion, of a horizontal hollow roller with serrate ends and being spirally grooved and perforated and leaving narrow spaces along the rear and the two side portions respectively of said frame, two pins on said horizontal hollow roller in its axis and mounted in said frame to turn, a detachable grate-bar adjacent to the front portion of said frame and leaving a narrow space along said horizontal hollow roller and engaging in recesses in the two side portions of said frame, and means for turning the one of said two pins and thereby said horizontal hollow roller from without, said horizontal hollow roller projecting a little above the upper surfaces of said frame and the inclined surface of the projecting rear portion of the latter sloping downward toward it.

3. In a furnace, the combination with a frame surrounded by the furnace-walls and having an inclined upper surface on its projecting rear portion, of a horizontal hollow roller having serrated sides and an internally and externally grooved cylindrical wall, said wall and the end wall of the roller being provided with perforations, said roller being located in the frame to leave narrow spaces along the rear and two side portions respectively of said frame, two pins on said horizontal hollow roller in its axis and mounted in said frame to turn, a detachable grate-bar adjacent to the front portion of said frame and leaving a narrow space along said horizontal hollow roller and engaging in recesses in the two side portions of said frame, and means for turning the one of said two pins and thereby said horizontal hollow roller from without, said horizontal hollow roller projecting a little above the upper surfaces

of said frame and the inclined surface of the projecting rear portion of the latter sloping downward toward it.

4. In a furnace, the combination with a
5 frame surrounded by the furnace-walls and having an inclined upper surface on its projecting rear portion, of a plurality of horizontal hollow rollers with serrate ends and placed parallel and adjacent to each other
10 and mounted in said frame to turn, they being spirally grooved and perforated and leaving narrow spaces along the rear and the two side portions respectively of said frame, a detachable grate-bar adjacent to the front
15 portion of said frame and leaving a narrow space along the front one of said plurality of horizontal hollow rollers and engaging in recesses in the two side portions of said frame, and means for turning said plurality of horizontal
20 hollow rollers from without, said horizontal hollow rollers projecting a little above the upper surfaces of said frame and the inclined surface of the projecting rear portion of the latter sloping downward toward them.

25 5. In a furnace, the combination with a frame surrounded by the furnace-walls and having an inclined upper surface on its pro-

jecting rear portion, of a plurality of horizontal hollow rollers with serrate ends and placed parallel and adjacent to each other 30 and mounted in said frame to turn, they being spirally grooved externally and internally and perforated in the mantle and in the sides and leaving narrow spaces along the rear and the two side portions respectively of said 35 frame, a detachable grate-bar adjacent to the front portion of said frame and leaving a narrow space along the front one of said plurality of horizontal hollow rollers and engaging in recesses in the two side portions of said frame, 40 and means for turning said plurality of horizontal hollow rollers from without, said horizontal hollow rollers projecting a little above the upper surfaces of said frame and the inclined surface of the projecting rear portion 45 of the latter sloping downward toward them.

In testimony whereof we have affixed our signatures in presence of two witnesses.

ADAM HEINRICH LUDWIG HALLASCHKA.
KARL ALFRED GRIMM.

Witnesses:

PAUL SCHMIDT,
ERNEST RECH.