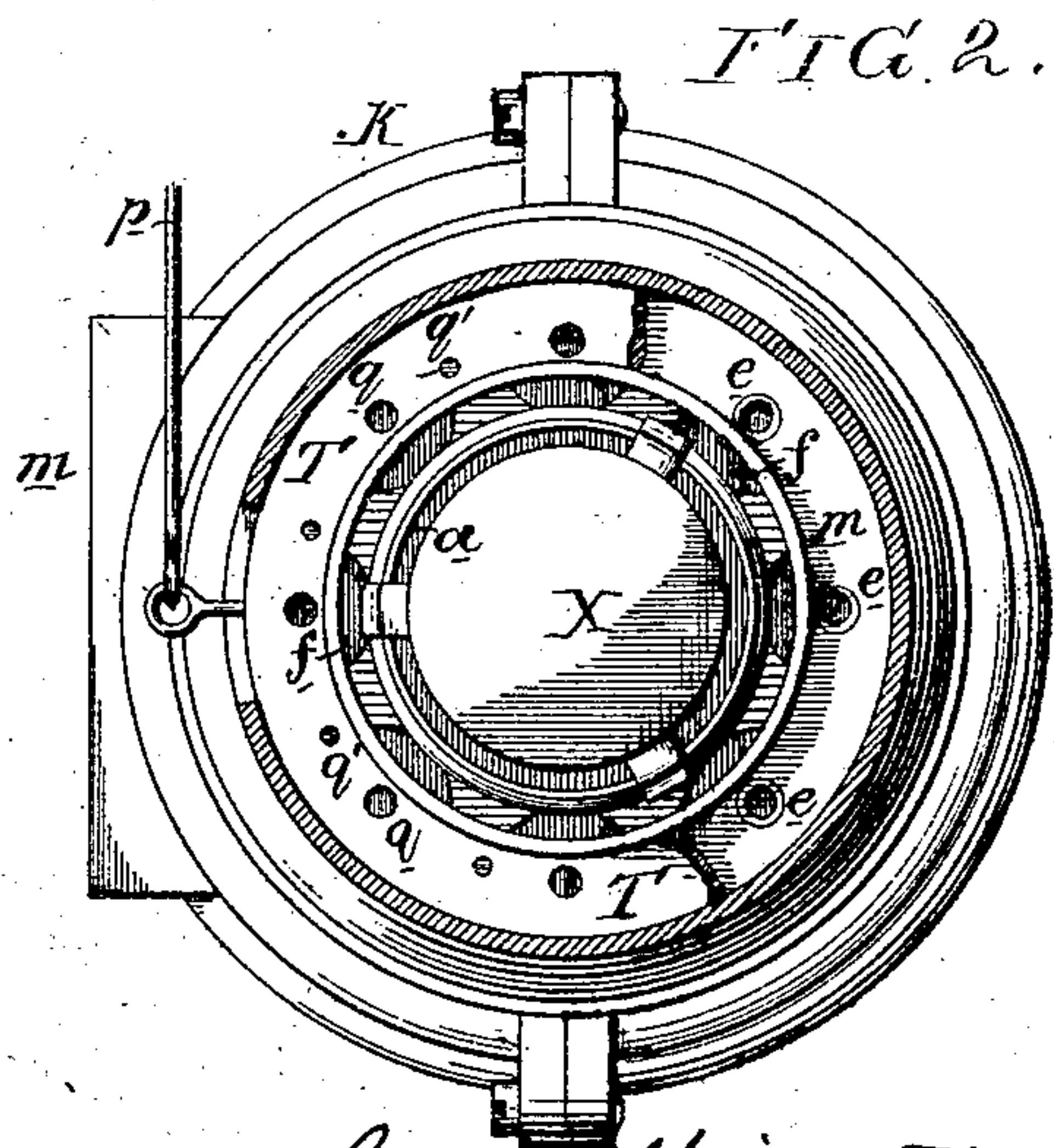
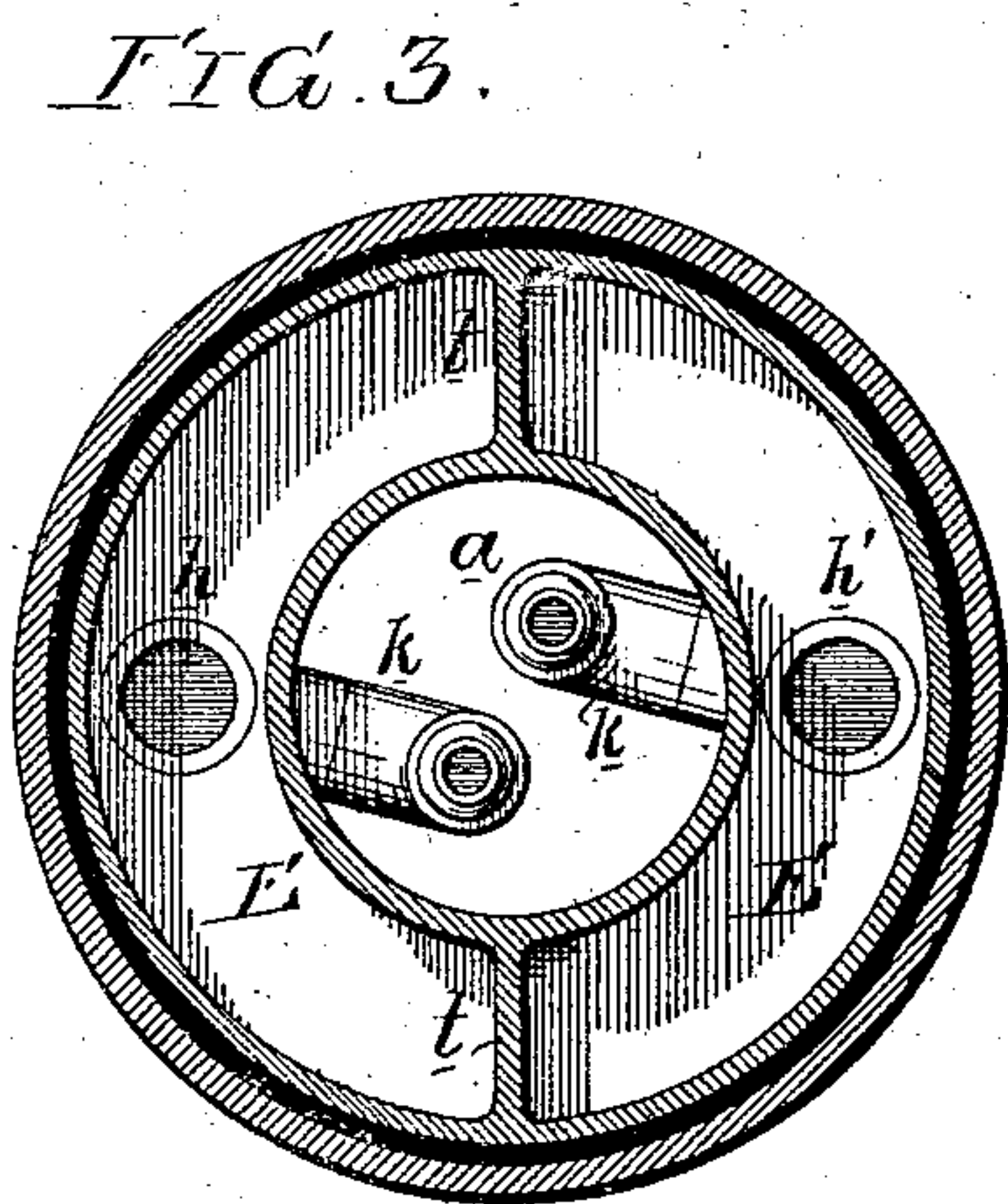
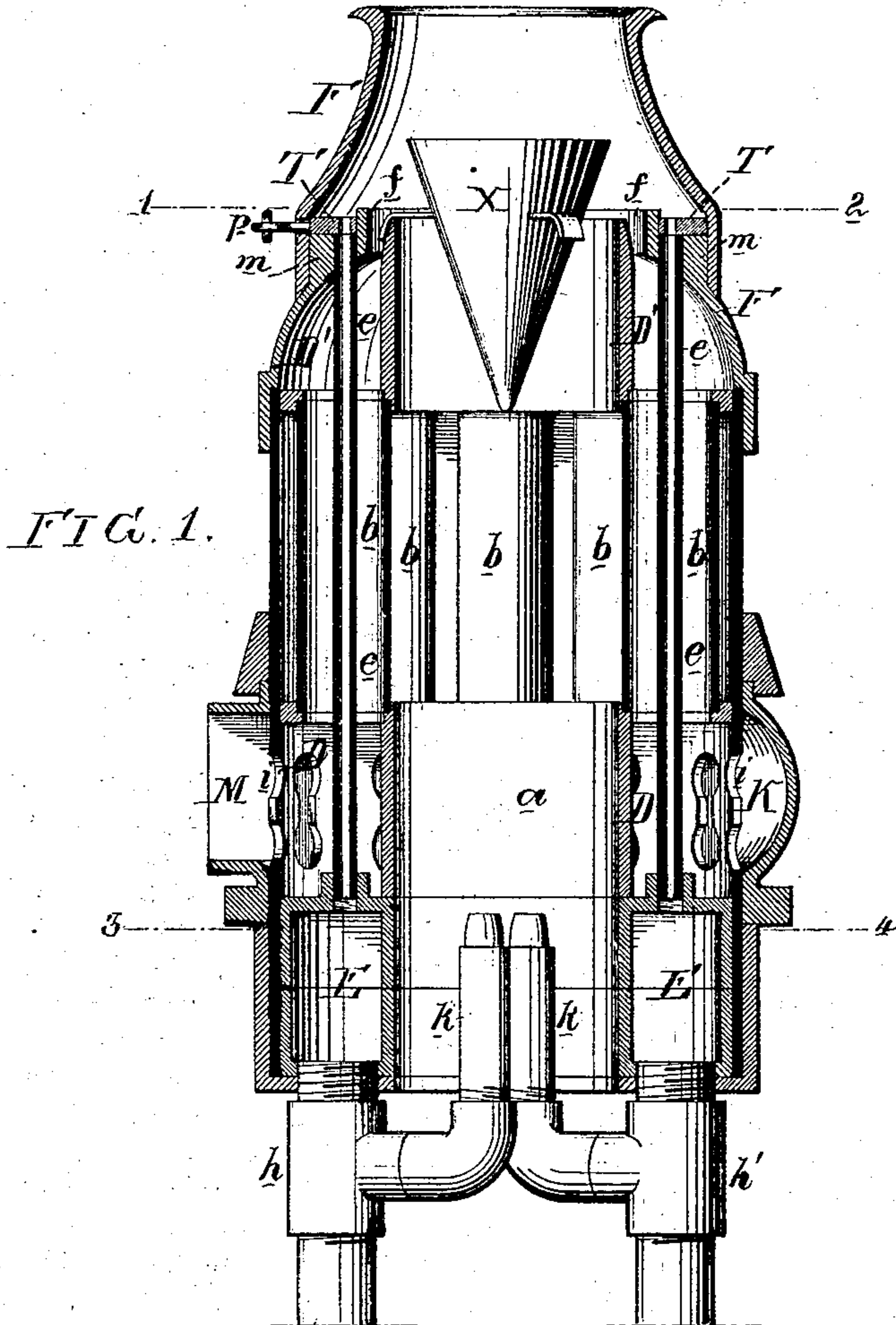


G. WINGATE.

Draft-Producing Apparatus.

No. 153,413.

Patented July 21, 1874.



Witnesses, Hubert Howson
Thomas McIlvain

George Wingate
by his attys.
Howson and Son.

UNITED STATES PATENT OFFICE.

GEORGE WINGATE, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN DRAFT-PRODUCING APPARATUS.

Specification forming part of Letters Patent No. **153,413**, dated July 21, 1874; application filed April 23, 1874.

To all whom it may concern :

Be it known that I, GEORGE WINGATE, of Boston, Suffolk county, State of Massachusetts, have invented certain Improvements in Draft-Producing Apparatus, of which the following is a specification :

My invention relates to improvements in the draft-producing apparatus for which Letters Patent were granted to me on the 11th day of November, 1873, and on the 3d day of February, 1874, the said improvements, which are fully described hereafter, being adapted especially to locomotives, steam fire-engines, &c., and their object being mainly to improve the draft and permit the same to be controlled by the attendant engineer.

In the accompanying drawing, Figure 1 is a sectional elevation of the improved apparatus; Fig. 2, a sectional plan on the line 1 2, Fig. 1; and Fig. 3, a sectional plan on the line 3 4, Fig. 1.

The apparatus has a central passage, *a*, for the products of combustion, and an annular steam-chamber, *E*, at or near its base, above which is an air-chamber, *D*, surrounded by an adjustable annular casing, *K*, communicating with the air-chamber through a number of openings, *i*, and provided with a large inlet, *M*, which can be turned in any direction in order to face the wind. A series of vertical tubes, *b*, which are directly exposed to the products of combustion in the passage *a*, connect the air-chamber *D* with an upper chamber, *D'*, which communicates at the top with the central passage *a*, through a narrow annular aperture, *f*, and a series of steam-pipes, *e*, extend from the chamber *E* into and through the said air-tubes *b*.

Air enters the chamber *D*, and, in passing upward through the pipes *b*, is heated and rarefied both by the steam in the pipes *e* and by the gases in the passage *a*, so that it emerges from the annular aperture *f* under a considerable degree of pressure, and by producing a partial vacuum in the upper portion of the stack induces an upward draft through the passage *a*. In these respects the apparatus is substantially the same as that for which the aforesaid Letters Patent were granted to me.

The exhaust-steam from the engine is con-

ducted into the chamber *E* through two pipes, *h h'*, each of which has a branch, *k*, terminating in a nozzle within the lower portion of the central passage *a* of the stack. The steam-pipes *e* extend upward into an internal projection, *m*, of the cap-piece *F*, upon which rests an annular perforated valve or damper, *T*, shown in Figs. 1 and 2. This valve can be operated by the engineer through the medium of a rod, *p*, and has two sets of holes, *q* and *q'*, of different diameters, either of which can be brought directly over the steam-pipes, or the latter can be entirely closed by the plain portion of the valve. By means of this valve a greater or less quantity of steam can be caused to pass through the pipes *e*, or the latter can be entirely closed, in which case the whole of the exhaust steam will be caused to enter the lower portion of the stack through the branches *k*. In this way the draft can be regulated as desired.

By opening the pipes to their full extent, the steam is permitted to pass uninterruptedly upward, and a moderate draft will be the result. By contracting the openings at the tops of the pipes the force of the steam-blast will be increased, and this will result in an increased draft.

The valve should only be closed when it is desired to eject sparks and cinders from the stack by a blast from the branches *k*, or when there is but little steam in the boiler.

An inverted conical deflector, *X*, which is suspended within the upper portion of the stack at a point about opposite the annular opening *f* and upper ends of the steam-pipes *e*, serves to direct the heated products of combustion from the passage *a* to a point directly over the said annular aperture and steam-pipes, and thus considerably facilitates their ejection and improves the draft. The steam-chamber *E* is divided into two semicircular compartments by a transverse partition, *t*, Fig. 3, which serves to separate the steam emerging from the pipe *h* from that in the pipe *h'*. I have found that this division facilitates the operation of the apparatus, by preventing "back pressure" when steam is passing from one exhaust-pipe, and not from the other.

I claim as my invention—

1. The draft-apparatus, provided with air and gas passages and steam-pipes *e*, and with a valve for regulating the passage of steam from said pipes, the whole being arranged and operating substantially as described.

2. The combination of the steam-pipes *h h'*, their branches *k* extending into the lower portion of the stack, the steam-chamber *E*, pipes *e*, and valve *T*, all substantially as described.

3. The combination, with the steam-pipes *e* and aperture *f*, of the conical deflector *H* and cap *F*, arranged to form an annular exit-open-

ing above the said pipes and aperture, as specified.

4. The combination of the partitioned steam-chamber *E* with the supply-pipes *h* and *h'*.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE WINGATE.

Witnesses:

JOSEPH H. COTTON,
C. W. QUIMBY.