

J. S. ELLIOTT.

Machines for Grinding Cylindrical Surfaces.

No. 157,744.

Patented Dec. 15, 1874.

Fig. 1.

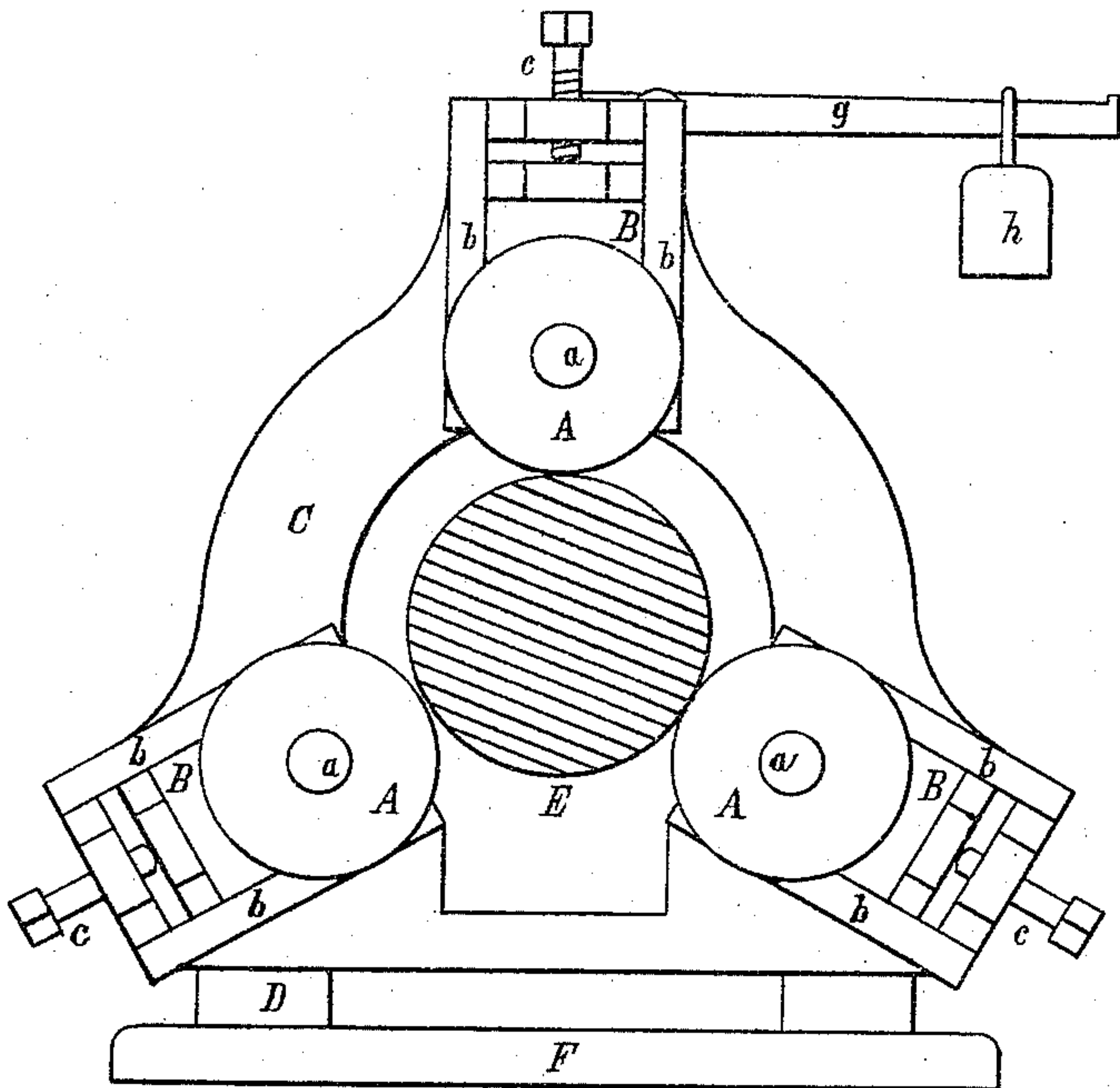


Fig. 2.

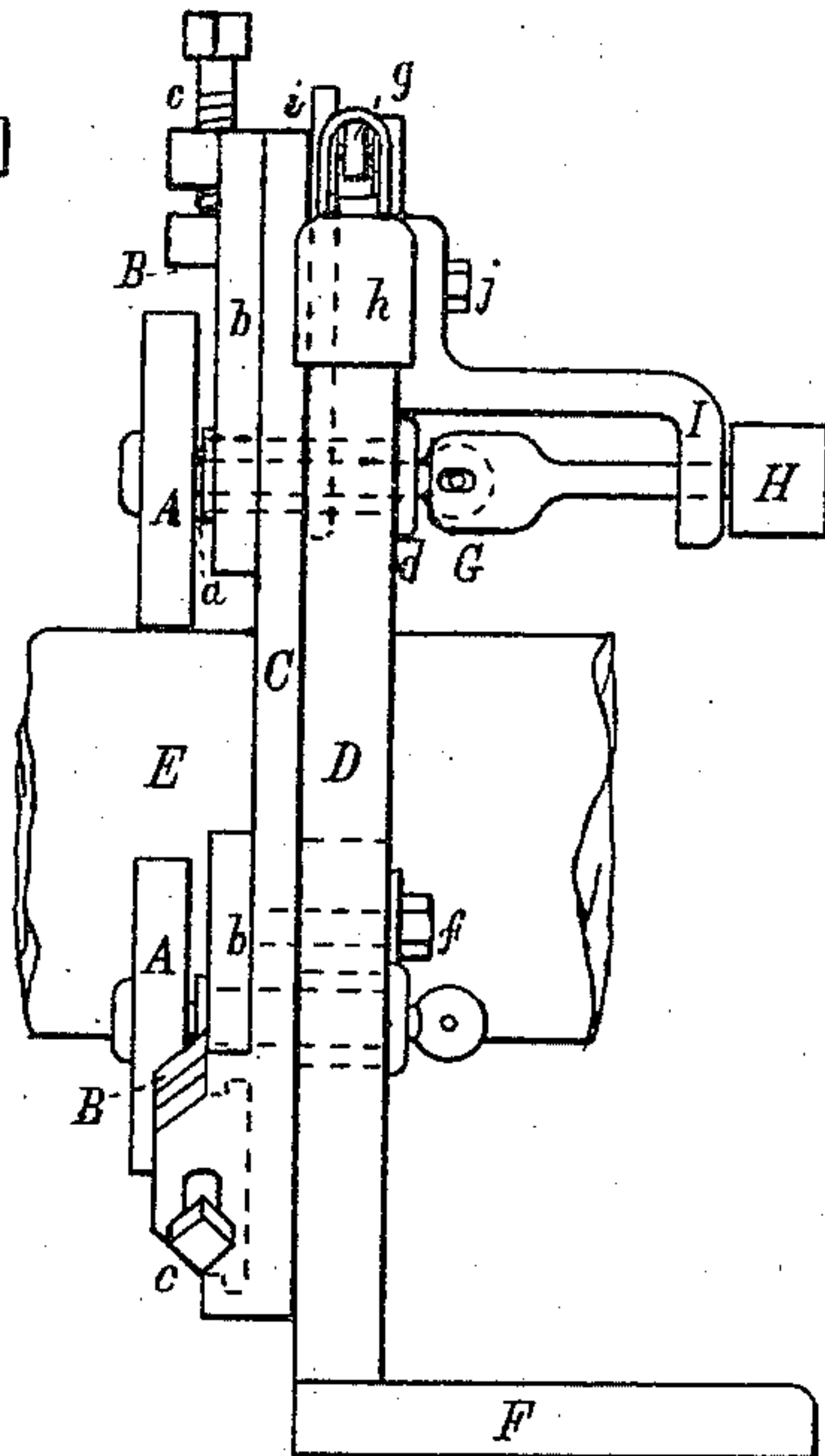
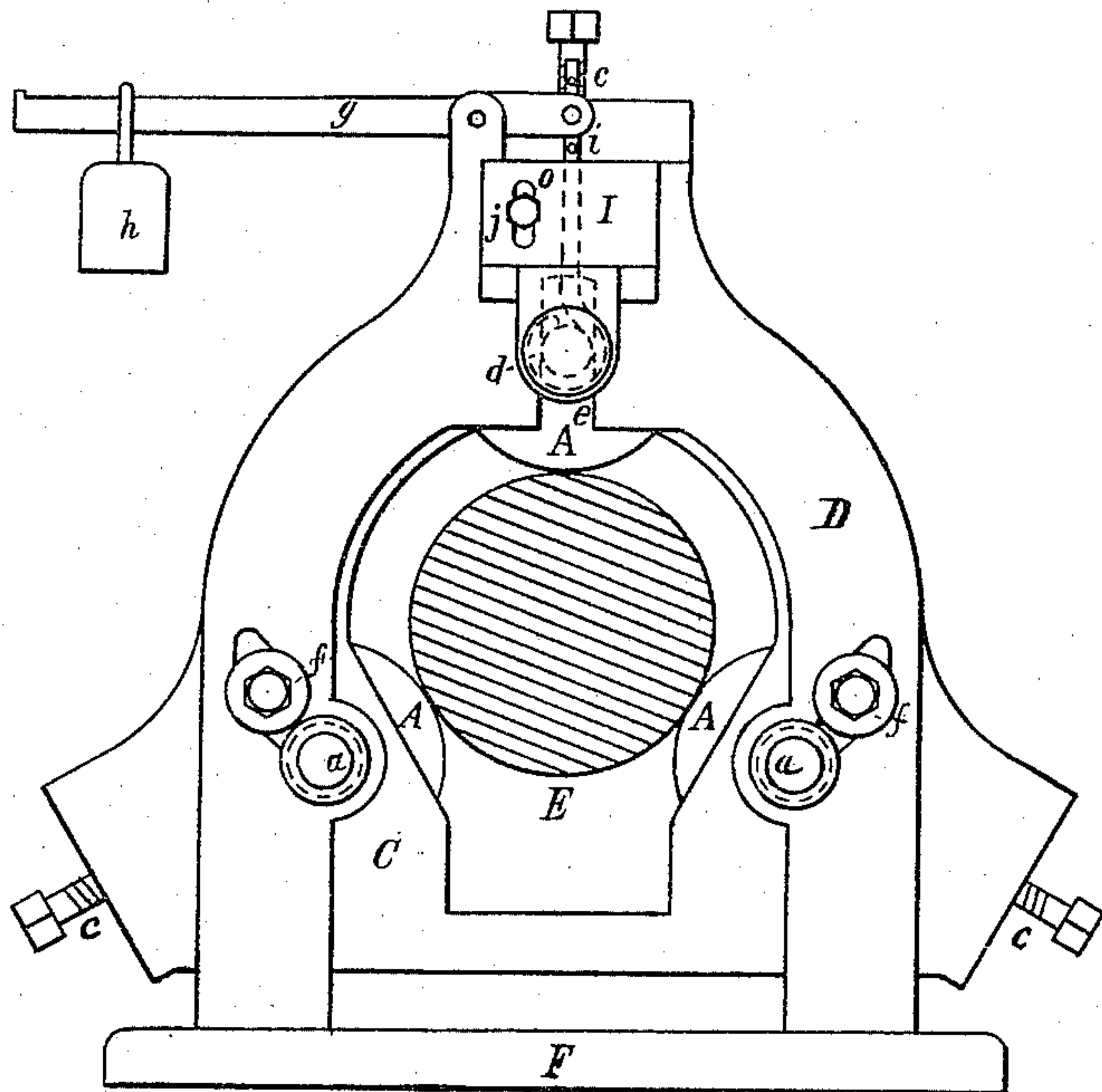


Fig. 3.



Witnesses;

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# UNITED STATES PATENT OFFICE.

JOSIAH S. ELLIOTT, OF CHELSEA, MASSACHUSETTS.

## IMPROVEMENT IN MACHINES FOR GRINDING CYLINDRICAL SURFACES.

Specification forming part of Letters Patent No. 157,744, dated December 15, 1874; application filed October 19, 1874.

*To all whom it may concern:*

Be it known that I, JOSIAH S. ELLIOTT, of Chelsea, State of Massachusetts, have invented a Machine for Grinding Cylindrical Surfaces, of which the following is a specification:

My invention relates to a machine for grinding cylindrical surfaces; and has for its object such an arrangement of grinding-wheels in reference to each other, and such a combination of the grinding-wheels with a movable frame and its support, that said wheels will grind evenly, being free to move in all directions in a plane transverse to the cylinder placed between them, their movement depending on the surface to be ground.

Figure 1 is a front elevation of a machine embodying my invention. Fig. 2 is a side, and Fig. 3 a rear, view of Fig. 1.

I prefer to use three grinding-wheels, A A A, and they will operate best placed at equal distances on the circumference of a circle, as shown. These wheels are connected rigidly to shafts *a a a*, which pass through bearings fixed firmly to the slides B B B. These slides are held to the frame C by, and are free to move along, the guides marked *b*. The object of this motion is to allow the wheels to be adjusted to a proper position relative to each other and to the required size of the cylinder to be ground by means of the set-screws *c c c*, as readily seen. The frame C is so placed against the supporting-frame D, and the frame D is so set in reference to the cylinder E to be ground, that the wheels A A A will be in a plane transverse to said cylinder. The cylinder E is made to revolve by any suitable well-known machinery, which it is not necessary here to illustrate or explain, and the frame D may be connected with the framework of said machinery in any ordinary way, either rigidly, the cylinder E being made to move longitudinally as it is ground, or acting as a carriage, and moving longitudinally along the cylinder E, in either case held in the position set forth by a suitably-constructed base, F. The frame C, carrying with it the grinding-wheels, as indicated, is free to move in all directions in the plane transverse to the cylinder E, having a vertical movement, guided by a stud, *d*, fixed firmly therein, and moving

in a slot, *e*, in the frame D, and also swinging about said stud as a pivot. Any of these movements will be slight, and the frame C is held quite snugly to the frame D by screws *f f*, which screw into the frame C after passing through slots in frame D, to allow of the movements mentioned.

The frame C may be held to frame D by other equivalent device to that shown.

To overcome the weight of the frame C and grinding-wheels, which might cause an undue pressure of the upper wheel upon the surface ground, I balance said weight by means of the lever *g* and counterpoise *h*. The frame C is connected with the lever *g* by means of a rod, *i*, which is pivoted at one end to the lever, and passes at the other end about the stud *d*.

It will be clearly seen that, the parts being constructed and arranged as described, there being given the proper revolution to the cylinder to be ground and to the grinding-wheels, and the cylinder or the grinding-machine having the proper longitudinal motion, the cylinder will be ground evenly and brought to the required size throughout with the suitable adjustment aforesaid.

While giving the necessary revolution to the grinding-wheels by means of belts, I overcome any undue irregularity in the movement or pressure of the grinding-wheels, caused by the weight or uncertain motion of the belts, by interposing at a convenient point in each shaft, connecting a grinding-wheel with its driven pulley, a universal joint, as the ball-and-socket joint shown at G. Not to obscure the drawing, only the pulley and universal joint connected with one (the upper) wheel are shown, the operation of which is readily understood. The pulley H, with its shaft, is supported by the stand I, having the slot *o*, and held to the frame D by the screw *j*, to allow the grinding-wheel to be raised or lowered for different sizes of cylinders. A similar arrangement is used with the pulleys and shafts connected with the other grinding-wheels. The rod *i* has an adjustment with the lever *g* for the same purpose.

I claim as my invention—

1. Wheels A A A for grinding cylindrical surfaces, arranged about the cylinder to be

ground, and free to move in all directions in a plane transverse to said cylinder, their movement depending on the surface to be ground, substantially as hereinbefore set forth.

2. The combination of the grinding-wheels A A, slides B B B, and frame C, the whole being counterbalanced by means of the lever *g*

and counterpoise *h*, and the frame C being connected with the frame D, all substantially as hereinbefore described.

JOSIAH S. ELLIOTT.

Witnesses:

JOHN C. COOK, Jr.,

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