W. MURCHEY.

MACHINE FOR BORING, TAPPING, &c.

APPLICATION FILED NOV. 6, 1905.

907,163. Patented Dec. 22, 1908.

Fig. 1.

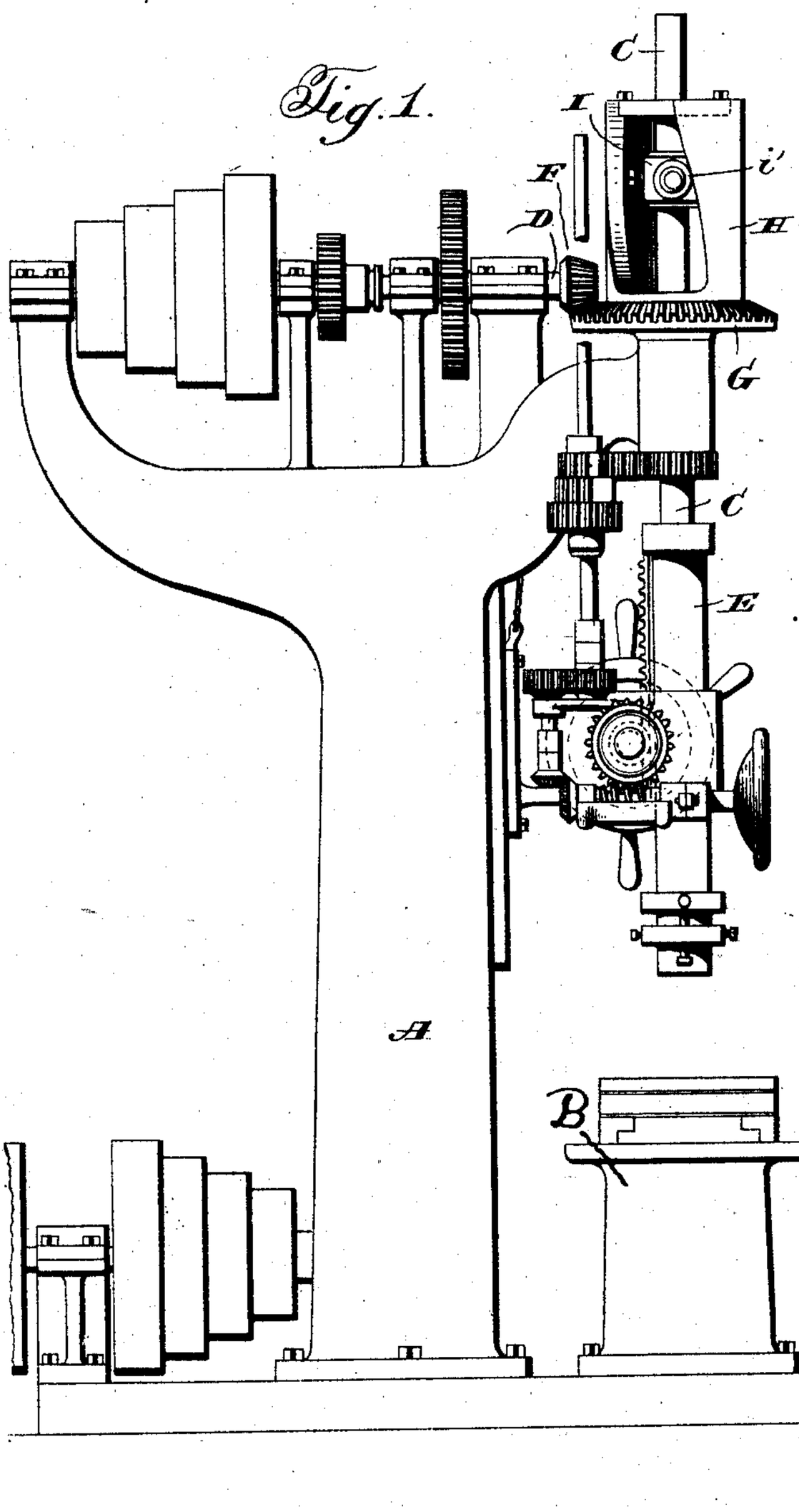


Fig. 2.

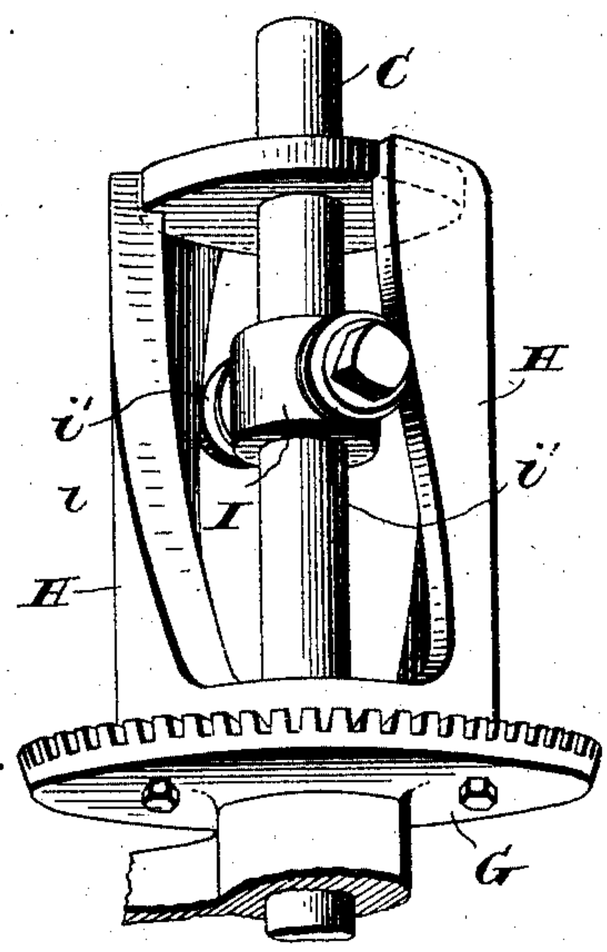
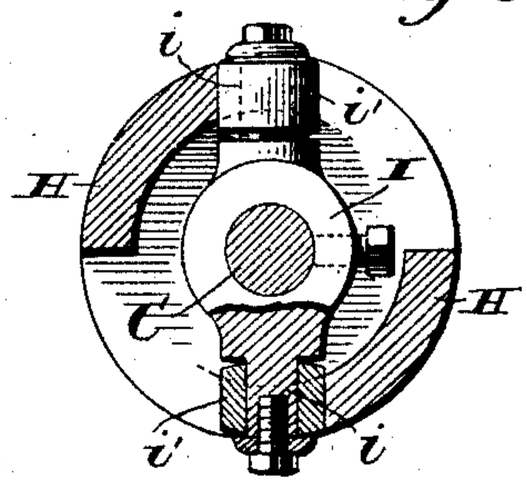


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM MURCHEY, OF DETROIT, MICHIGAN.

MACHINE FOR BORING, TAPPING, &c.

No. 907,163. Specification of Letters Patent. Patented Dec. 22, 1908.

Application filed November 6, 1905. Serial No. 286,070.

To all whom it may concern:

Be it known that I, WILLIAM MURCHEY, of Detroit, in the county of Wayne and in the State of Michigan, have invented a certain new and useful Improvement in Machines for Boring, Tapping, &c., and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a boring, drilling and tapping machine embodying my invention; Fig. 2 is a detail view, in perspective, of my spindle-rotating and feeding mechanism; and Fig. 3 is a horizontal section of said mechanism.

My invention relates to machine for boring, tapping, etc., and my object is to eliminate the great friction which has characterized the spindle-driving mechanism of such machines, as heretofore constructed, and to this end,—my invention consists in the mechanism having the construction substantially as hereinafter specified and claimed.

To illustrate my invention, I show a boring, drilling and tapping machine of well-known construction, which need not be described in detail, it being sufficient to say that it consists of a frame A, a chuck or work-supporting bed or table B, a vertical spindle C, a spindle driving counter-shaft D mounted in bearings at the top of the frame, a tube or sleeve E through which the spindle passes, and spindle-feeding mechanism which acts upon said tube or sleeve, and which may be operated by hand or power.

On the counter-shaft D is a bevel pinion F which meshes with a bevel gear G mounted on a bearing on the top of the frame A concentric with the spindle and carried by and rising from the bevel gear G is a shell H, having the appearance of a hollow cylinder with diametrically opposite longitudinally extending slots that have a spiral form, so that the walls or sides of the slots constitute cam surfaces, whose inclination is rearward with reference to the direction of rotation of the shell with the bevel gear. The upper end of the shell is closed by a disk or head, perforated for the passage of the spindle, and within the shell the spindle has secured to it a collar I having diametrically opposite arms *i*, upon each of which is preferably mounted a roller *i'*, the roller being supported by the arm in such position that it is in one of the spiral slots and in the path of and will be engaged by the one or the other of the spirally extending edges of sides of the slot, according to the direction of rotation of the cylindrical shell. The cylindrical shell, being rotated by the bevel gear, it will be seen that the engagement of one of the spirally extending edges or sides of a slot with a roller *i'* will cause the revolution of the spindle, and, if the direction of revolution of the spindle is for doing work, the action of the spirally extended edge or wall will, by reason of its downward and rearward direction with reference to the direction of its own rotation, exert a downward pressure upon the roller, and thus force the spindle downward, thus supplementing the feeding action of the ordinary feed mechanism and eliminating that degree of friction which is unavoidable in machines of this description where the spindle is revolved by the engagement with a radial arm or projection thereon of a surface that is parallel with the axis of the spindle. When the spindle is to be revolved and lifted from the work, the spirally extending edge or side of the slot opposite that which acts to cause the spindle to do its work is brought into use by a reversal of the direction of revolution of the bevel gear, and by its engagement with the roller *i'*, which reverses the direction of revolution of the spindle, and as the direction of the now-engaging spirally-extending edge or side, is rearward and upward with reference to the direction of revolution of the cylindrical shell, the spindle is subjected to a lifting pressure.

It will be understood, of course, that the rollers on both arms of the collar are engaged at the same time, and I preferably employ two, because of the balanced or equal application of power upon the spindle that is thereby secured. While I prefer to have the two spiral or cam-like surfaces for acting upon each roller, yet I deem it within the scope of my invention to use but one such surface, if, for instance, it should be considered unnecessary to exert a lifting effect upon the spindle in withdrawing it from the work, and I desire it understood that, though I have illustrated and described these surfaces as carried by or formed upon a hollow cylinder or shell, it is unimportant how these surfaces are provided, the essential thing, as far as the broad aspect of the invention is concerned, being a surface that inclines rearwardly with reference to the direction of its revolution, so that it will exert upon the spindle a pressure or force having the compound

result of revolving the spindle and at the same time moving it in an axial direction.

Having thus described my invention, what I claim is:—

1. In a machine for boring, tapping, etc. the combination of a rotatable and axially movable tool spindle, an arm or projection connected therewith, a rotatable part having a surface that engages such arm or projection to rotate the spindle and move it axially and that inclines rearward with reference to the direction of rotation, so that, as the spindle moves axially, said arm tends to move out of contact with said inclined surface, whereby friction between them is lessened, and means to rotate said rotatable part.

2. In a machine for boring, tapping, etc., the combination of a rotatable and axially movable spindle, an arm or projection connected therewith, a rotatable part having a surface that engages such arm or projection to rotate the spindle and move it axially during the feeding operation of the spindle, while performing its work, which surface inclines rearward with reference to the direction of its rotation, so that as the spindle moves axially, it tends to move out of contact with the said inclined surface, whereby friction between them is lessened, means to rotate said part, and spindle feeding means in addition to said inclined surface.

In testimony that I claim the foregoing I have hereunto set my hand.

WILLIAM MURCHEY.

Witnesses:
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