

E. H. GREEN.

Axle.

No. 11,063.

Patented June 13. 1854

Fig. 1.

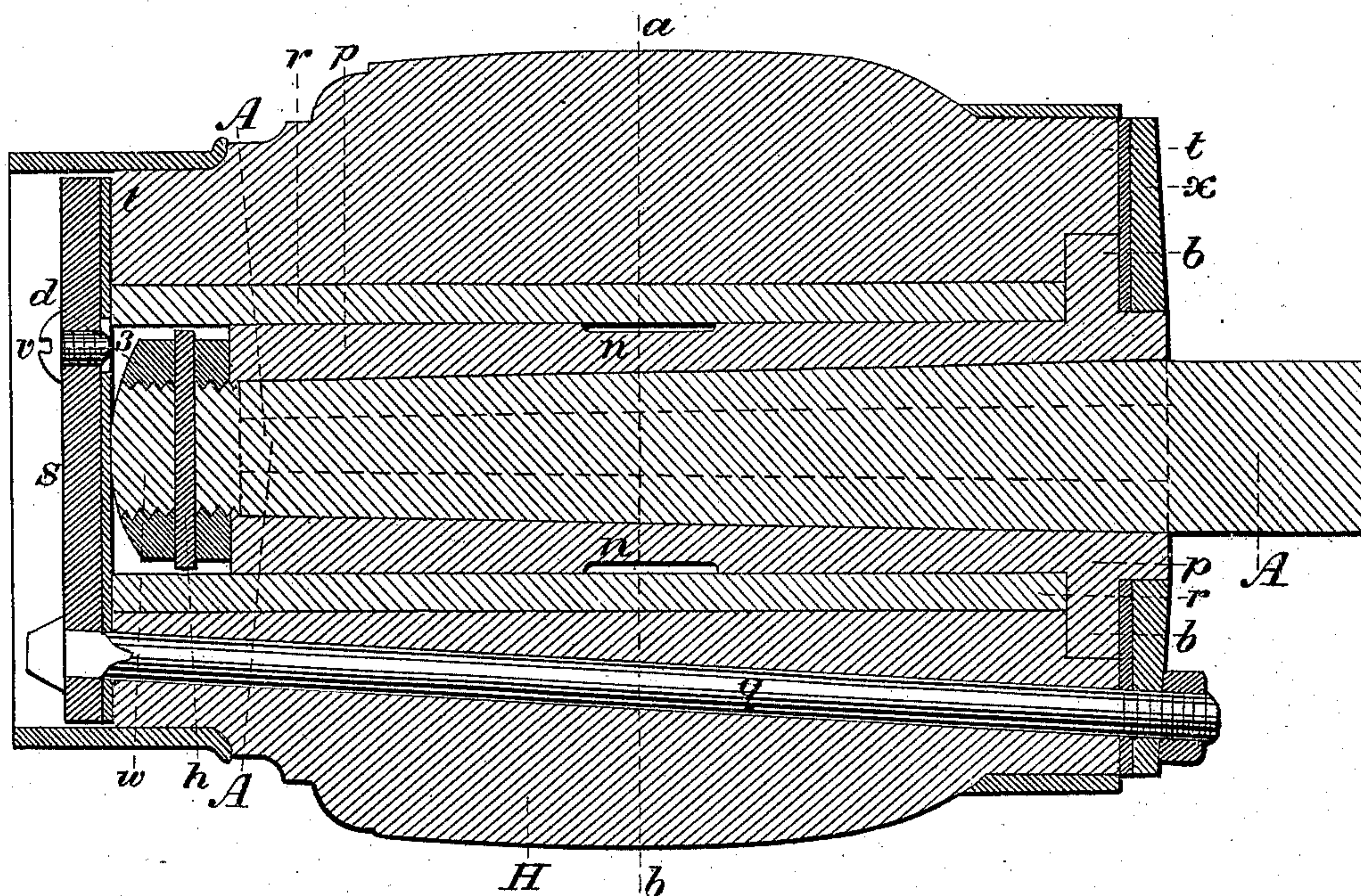
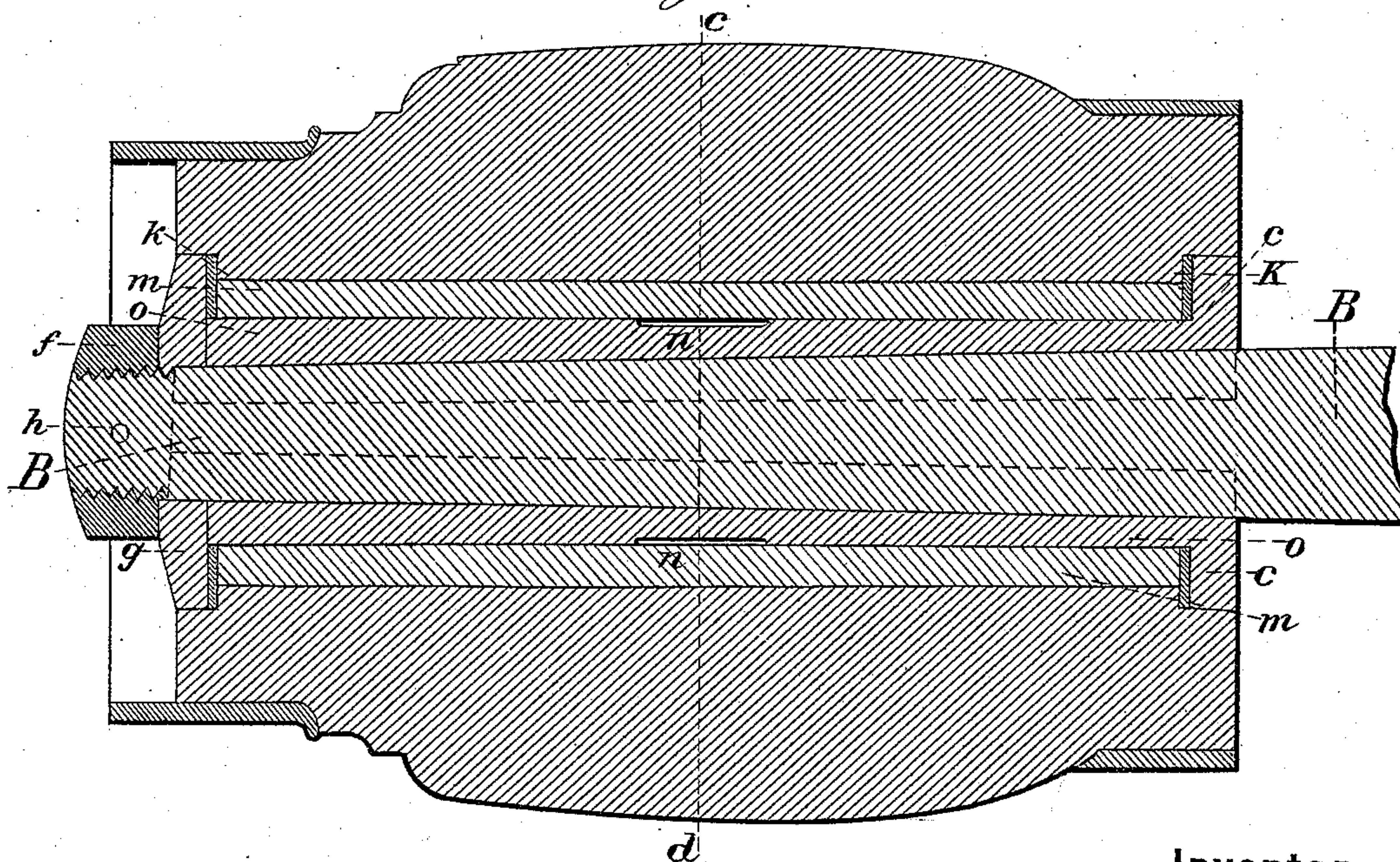


Fig. 4.



Inventor:

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Fig. 2.

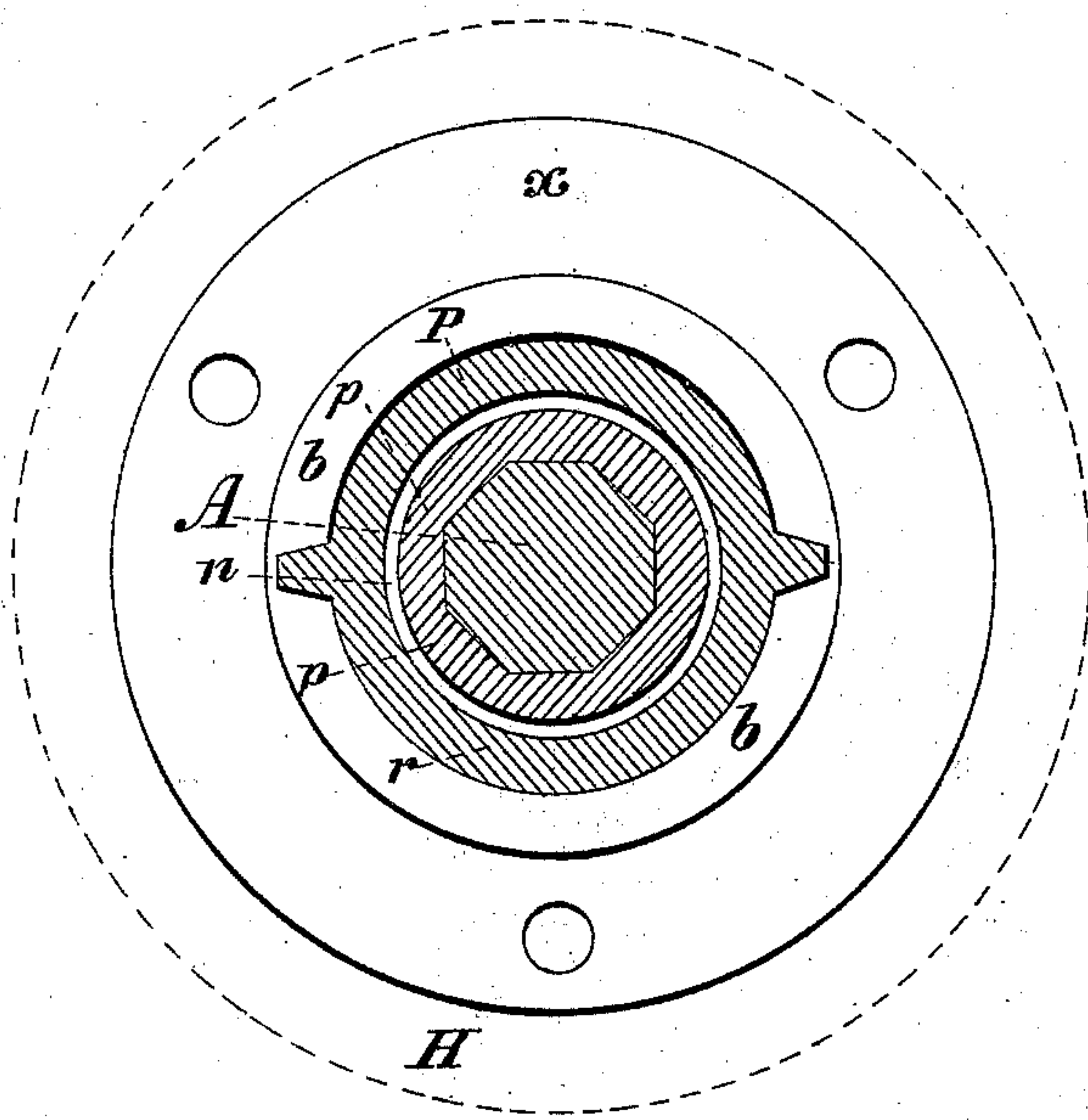


Fig. 3.

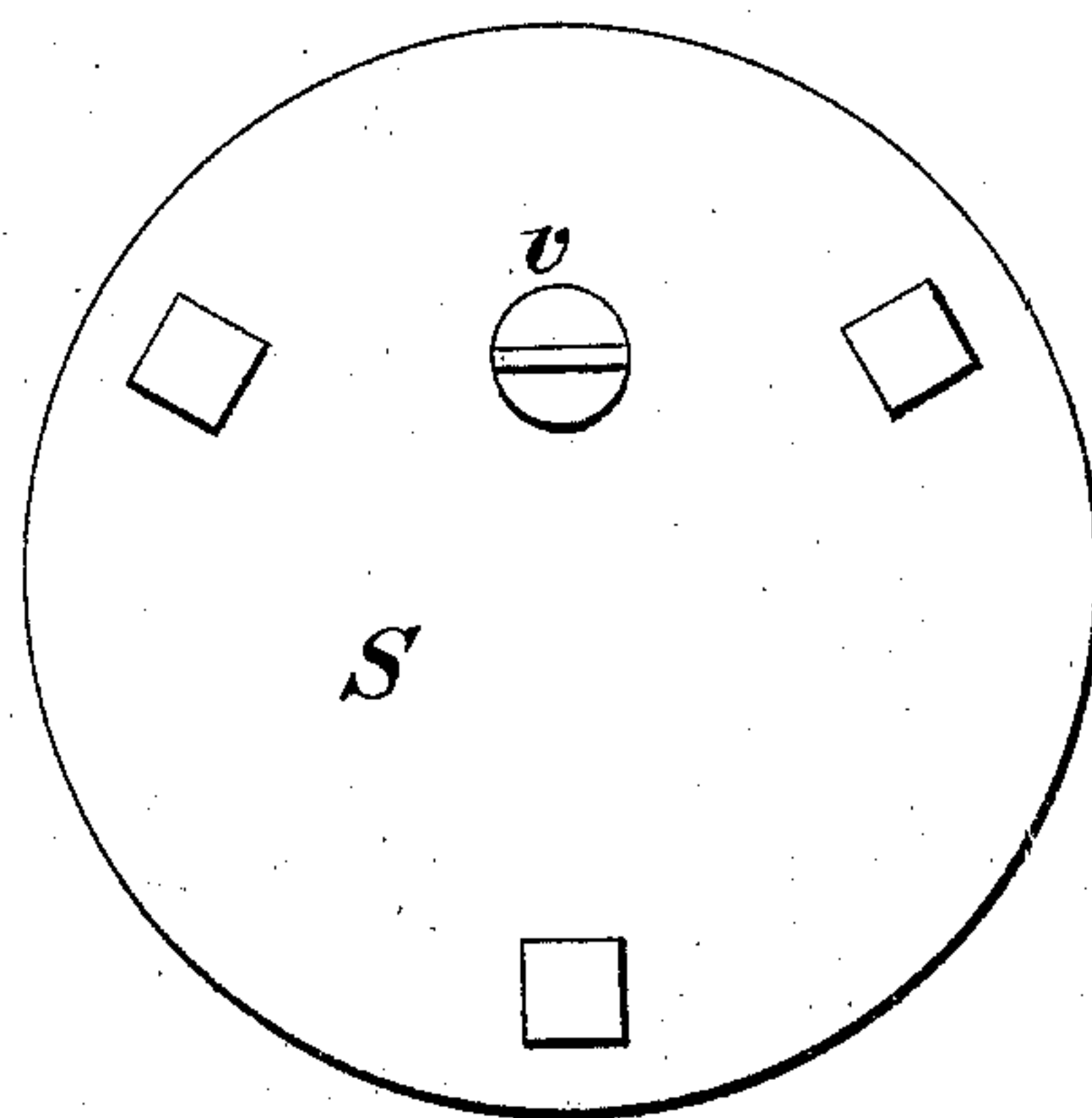
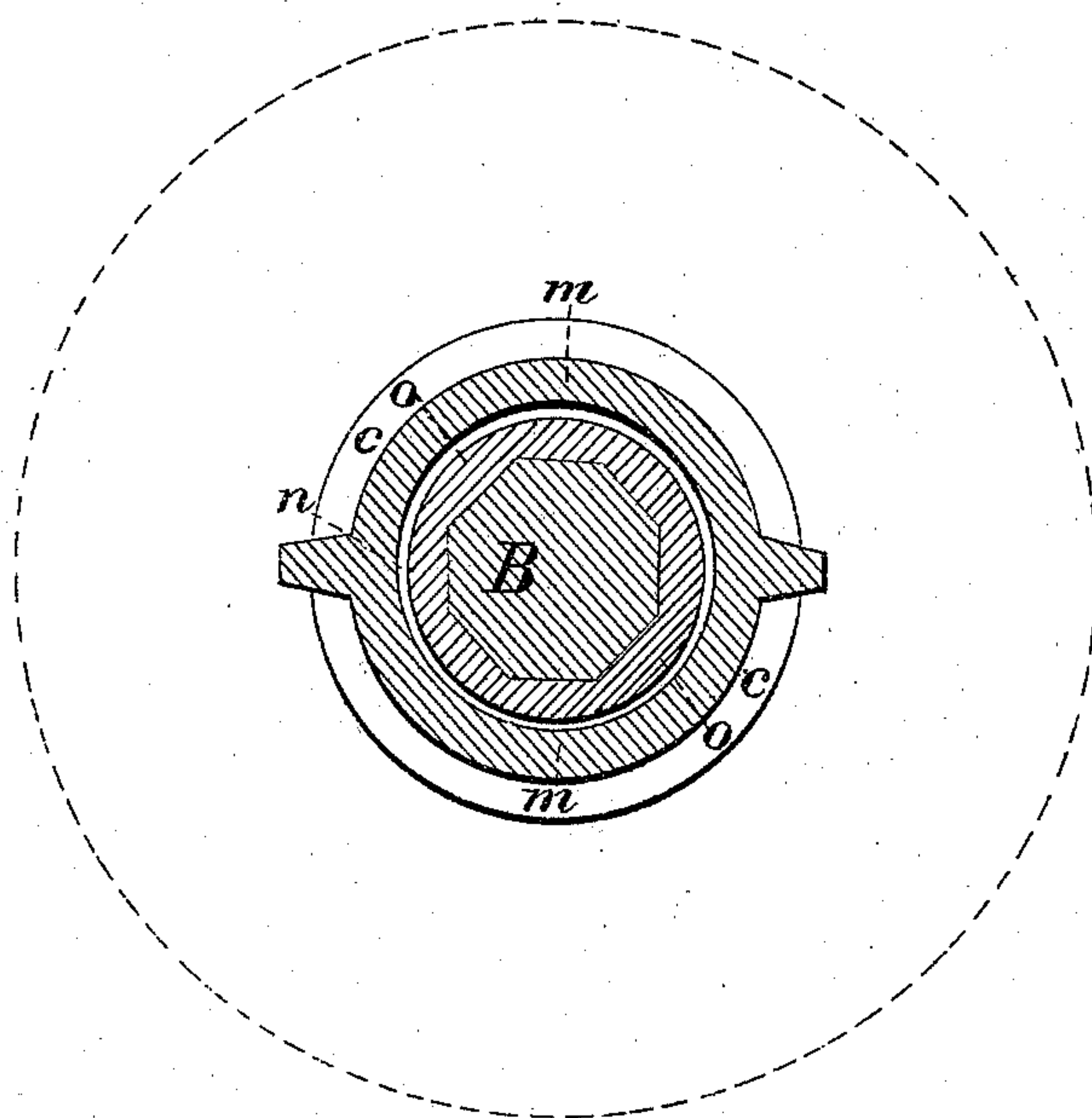


Fig. 5.



Inventor.

E. H. Green

UNITED STATES PATENT OFFICE.

ELI H. GREEN, OF BALTIMORE, MARYLAND.

CARRIAGE-AXLE.

Specification of Letters Patent No. 11,063, dated June 13, 1854.

To all whom it may concern:

Be it known that I, ELI H. GREEN, of the city of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Carriage-Axles; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawings, which exhibit my improvements as applied to two different kinds of axle-boxes and axles, Figure 1 being a longitudinal section of my close oil box and back washer arrangement. Fig. 2, a cross section of the same, and Fig. 3, the front plate or cap, which is shown in section at *s* Fig. 1. Figs. 4, and 5, are similar sections of my improved common axle.

The same letters are used to designate the same parts in all the figures of each arrangement.

The nature of my invention in the construction of removable sleeve axles, consists in giving such form to the wrought bar constituting the arm and to the cast sleeve forming the bearing surface of the pipe box of the hub: that the greatest amount of strength shall be obtained with the least expenditure both of cast and wrought metal, while the cost of, is reduced and facility of production is materially increased, and the expensive part and one requiring renewal may be considered a new article of commerce, as the cast sleeves can be manufactured and finished complete in large quantities at a machine shop, and then sold at low rates to blacksmiths who desire to make the wrought iron axle for their reception.

A second improvement is in the admirable adaptability of the removable sleeve, to the oil tight box known as the mail coach patent, as the facility with which the lock plate or broad washer *x* on the inside of the hub may be removed from the arm, by the withdrawal of the sleeve and hurter attached thereto, thus obviating the necessity of cutting the axle hitherto required—it further offers a ready means of taking off the wheels, without the drawing of a single bolt as the sleeve, hurter, plate and hub may be detached from the arm.

To enable others skilled in the art to make and use my invention, I will now describe its construction and use, with its advantages.

I construct my axletrees of wrought bar iron, of proper size or dimensions, for the

strength required, and by plain hammering, I form the arm or spindle into an octagonal or eight square shape, having, also, a slight taper as shown at *A A* Fig. 1, and *B B* Fig. 4, in both of which figures the cants or squares are shown by dotted lines; using one of the cast metal covers or sleeves *o o* Fig. 4, and *p p* Fig. 1, as a guide while forging the arms. My axles are therefore finished, so far as the journal or arms are concerned, at the forge, saving also the trouble and expense of laying or steeling the arms, and of finishing by the turning lathe; which latter expensive, and very frequently inconvenient, process, is indispensable in the making the different kinds of solid axles now in use; which is a consideration of vast importance in the manufacture and repairing of cranked axles, which are generally very heavy, and, from their angular form, difficult to manage, rendering repairs very expensive, and in those cases where the turned arms have to be repaired the expense is nearly equal to the cost of new axles, an expense which my improvement would completely obviate. These cranked axles are now coming into extensive use for carts and drays, as well as for omnibuses, from the fact that they permit the bed of the vehicle to occupy a lower position than can be obtained by the use of straight axles, they consequently afford greater facility in loading and unloading as well as greater safety in transportation for the center of gravity being comparatively low the vibration is consequently less.

The covers or sleeves *p p* Fig. 1, and *o o* Fig. 4, of the arms, I form of cast iron or brass, the inner surface of which should be, as nearly as possible, the frustrum of a true octagonal pyramid, which is easily accomplished by casting it on a core of that form; and the cover, so formed, will fit the arm or spindle of the axle equally well in any position, although the arm itself might not be perfectly true. These covers have also a collar *b b* Figs. 1, and 2, and *c c* Figs. 4, and 5, cast of the same piece on their inner or back end, and they are turned in a lathe on an octagonal mandrel, to the proper form and finish, corresponding to the solid turned arms now in use. They are then put on or over the octagonal arms of the axles and secured by nuts on the ends, as shown at *d* Fig. 1, and *f* Fig. 4. The nut *f* in Fig. 4, serves also to secure the hub of the wheel to

the axle, by means of the iron washer *g* this washer has an octagonal hole through it, corresponding to the cross section of the wrought iron part of the arm B B so as to resist the action of the wheel and effectually prevent the removal of the nut *f* by that means, but to prevent the removal of these end nuts *d* Fig. 1, and *f* Fig. 4, by any means, when not required, they may be secured by split pins or wires, as shown at *h* and *h* Figs. 1, and 4, *k* and *k'* Fig. 4, are leather washers, which are interposed between the axle box *m m* and the end collar *c* and washer *g* to prevent rigidity and noise between it and the axle box. In Figs. 1, 2, 4, and 5, *n* is a small recess turned in the sleeve for oil, as is usual in the solid axles.

The advantages of my improvements over the present methods of constructing and using axles are first, any common blacksmith, with tolerable facilities, can make or repair these axles without a turning lathe, or other appendage of a machine shop, as the sleeves or covers being separate and detached from the arms or axles will be manufactured and on sale as boxes and other things in that line now are.

A second advantage of this improvement, is, that when one side of this cast metal sleeve or covering is so worn as to need renewal, it may be placed in a new position on the spindle or arm, from the increased number of sides, and thus present an unworn portion of its surface to the box; an operation which can be performed in a few minutes, virtually producing a renewal of the journal of the axle without any expense. This is of very great importance, as it saves the trouble, expense and delay which is unavoidable in repairing solid axles.

This mode of making iron axles will very much cheapen their manufacture and especially of the cranked form, the expense of repairing which, heretofore, has very much retarded their more general adoption, notwithstanding the many desirable advantages which they afford over the common straight axles.

A third advantage is, that the use of my movable cover or sleeve for the wearing parts of axles, when properly made, enables me to use the back fastening or broad washer *x*, Figs. 1 and 2, on the back of the hub, commonly called the mail coach patent, without being compelled, as in the old way with solid axles having the collar (or hurter) *b* welded on, to cut the axle in two parts in order to get this broad washer *x* off or on, in case of repairs; by my improved method of construction, I remove the broad washer *x* by simply removing the sleeve *p p*, which is fastened or secured to the axle by the nut *d*, Fig. 1, and is replaced by the same process, and is fixed and held to its place by the collar or hurter *b*, Fig. 1, cast

of the same piece with the sleeve *p p*, which cover or sleeve is kept on the arm of the axle by the nut *d* as before stated, being secured against its front end. This is of importance and produces a new and useful effect, inasmuch as it enables me to remove the wheel from the axle without removing the bolts *q*, Fig. 1, which pass through the hub H, which must be done in the old plan of using these useful axle fastenings.

A fourth advantage is, should oil close boxes be desired, I have but to adopt the method of closing the front part of the box by the plate or cap *s*, Figs. 1 and 3, which is held firmly against the outer end of the box *r r*, Fig. 1, with an intervening packing of leather or other yielding substance *t* and *t'* to make an oil-tight joint, all held firmly together by bolts *q* passing through the hub H as seen at Fig. 1. To avoid the necessity of removing this cap or front plate *s* to replenish the box with oil, I tap a small screw *v*, Figs. 1 and 3, through the cap plate *s*, which can be removed by a common screw driver, when the oil may be poured in and the screw replaced without further trouble.

The fifth and last advantage, I shall mention of this arrangement is, that by making the end of the axle of proper form and its nut of proper dimensions the axle will bear against the end plate *s* or against any intermediate substance that may be placed between the end of the axle and the said front plate *s* and if intermediate substances are used, they ought to be elastic or yielding. The axle thus having an end bearing as shown at *w*, Fig. 1, will reduce the friction as well as unpleasant jarring, and noise of the axle and the box.

I am aware it is not new to form axles with a square arm and corresponding opening in the sleeve as that has been patented to Phillips & Maher in 1828, but in that case the advantage of producing the greatest strength with the quantity of metal employed is not obtained, neither does the margin of the sleeve approach the regularity of thickness I have obtained.

I am also aware that it is not new to form axles with round arms and corresponding openings in the sleeves, see patent of H. F. Phillips, 1841, but it must be borne in mind that this requires the expense of the turning lathe in forming the arm, and chucking the box to make a fit, and also the objection of the round arm permitting the sleeve to turn thereon; all the advantage of this form I embrace, as it is not absolutely requisite to have all the sides of my box to fit as any three secures the sleeve. I therefore do not claim the mere axle with a shifting sleeve; but

What I do claim as my invention and desire to secure by Letters Patent is—

1. The construction of axles for carriages

wherein the arms and intermediate bar
space be of wrought iron and the arms
thereof formed of eight or more sides fitting
into a corresponding hollow of cast sleeve,
5 the surface of which may be turned for a
bearing in the manner substantially as
shown and described.

2. I also claim the combination of the cast
sleeve carrying the hurter, with the mail

coach patent box as set forth, for the pur- 10
pose of obviating the necessity of cutting
the axle to remove the broad washer, as set
forth in the foregoing specification.

ELI H. GREEN.

Witnesses:

M. L. LACEY,
JOHN COCHRANE.