

(No Model.)

3 Sheets—Sheet 1.

J. H. GOWAN.

CAR WHEEL BORING AND TRUING MACHINE.

No. 285,123.

Patented Sept. 18, 1883.

Fig. 1

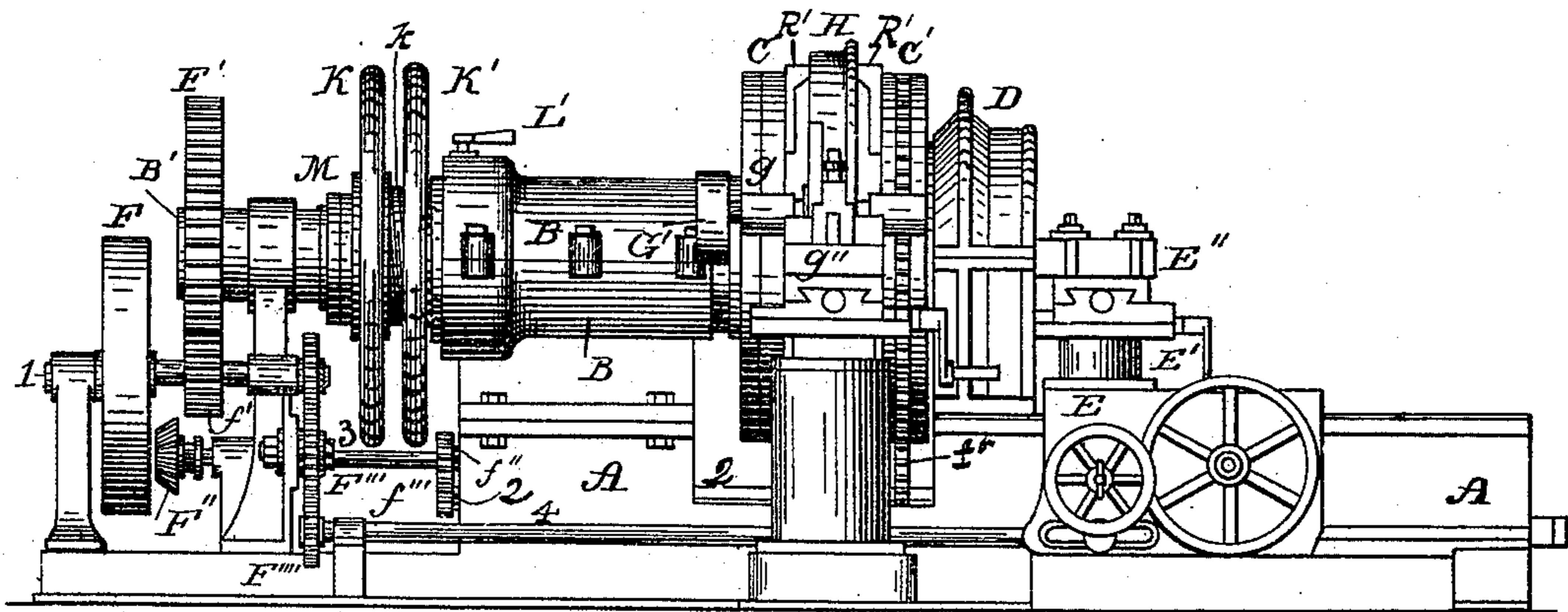
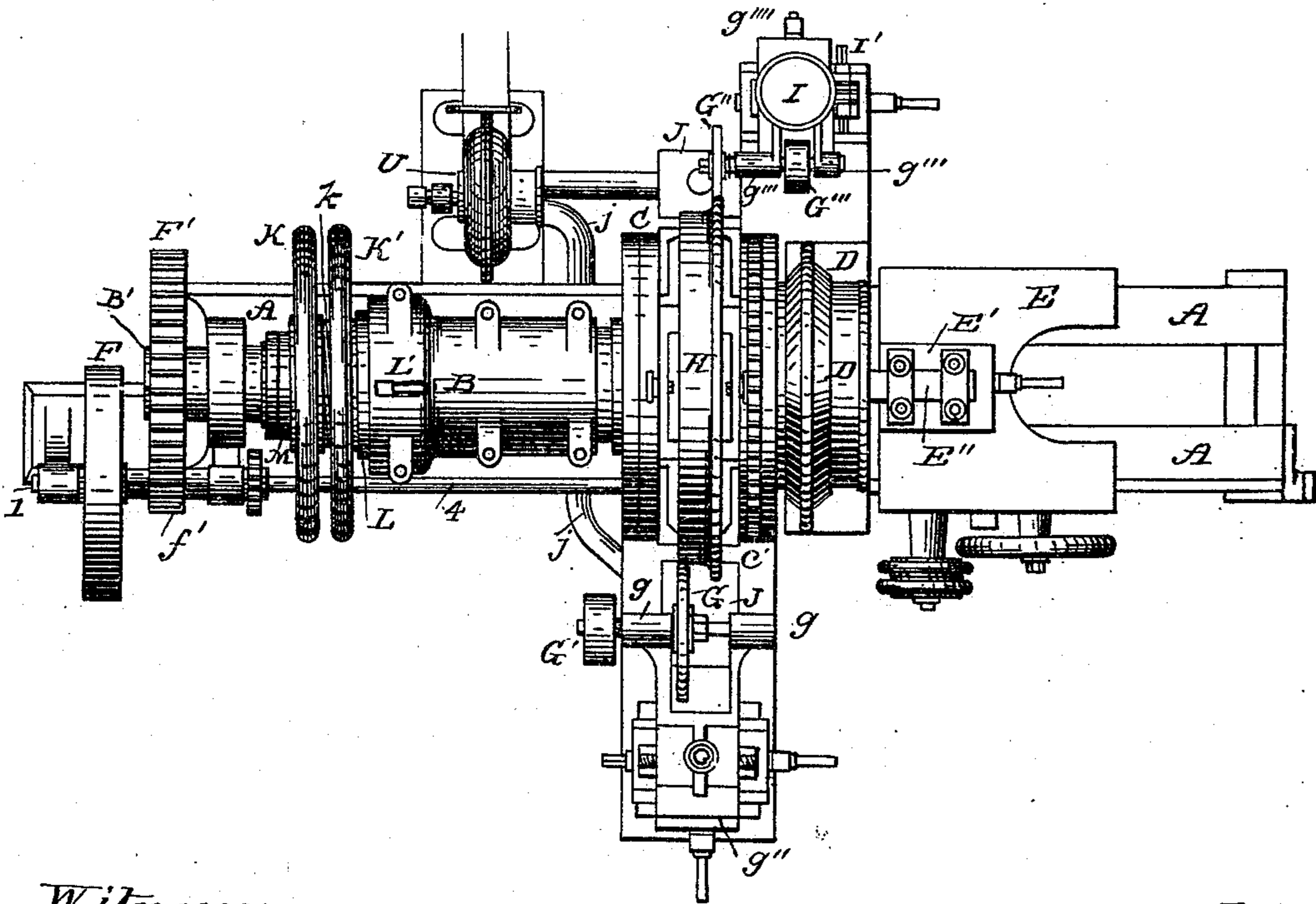


Fig. 2.



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Fig. 3.

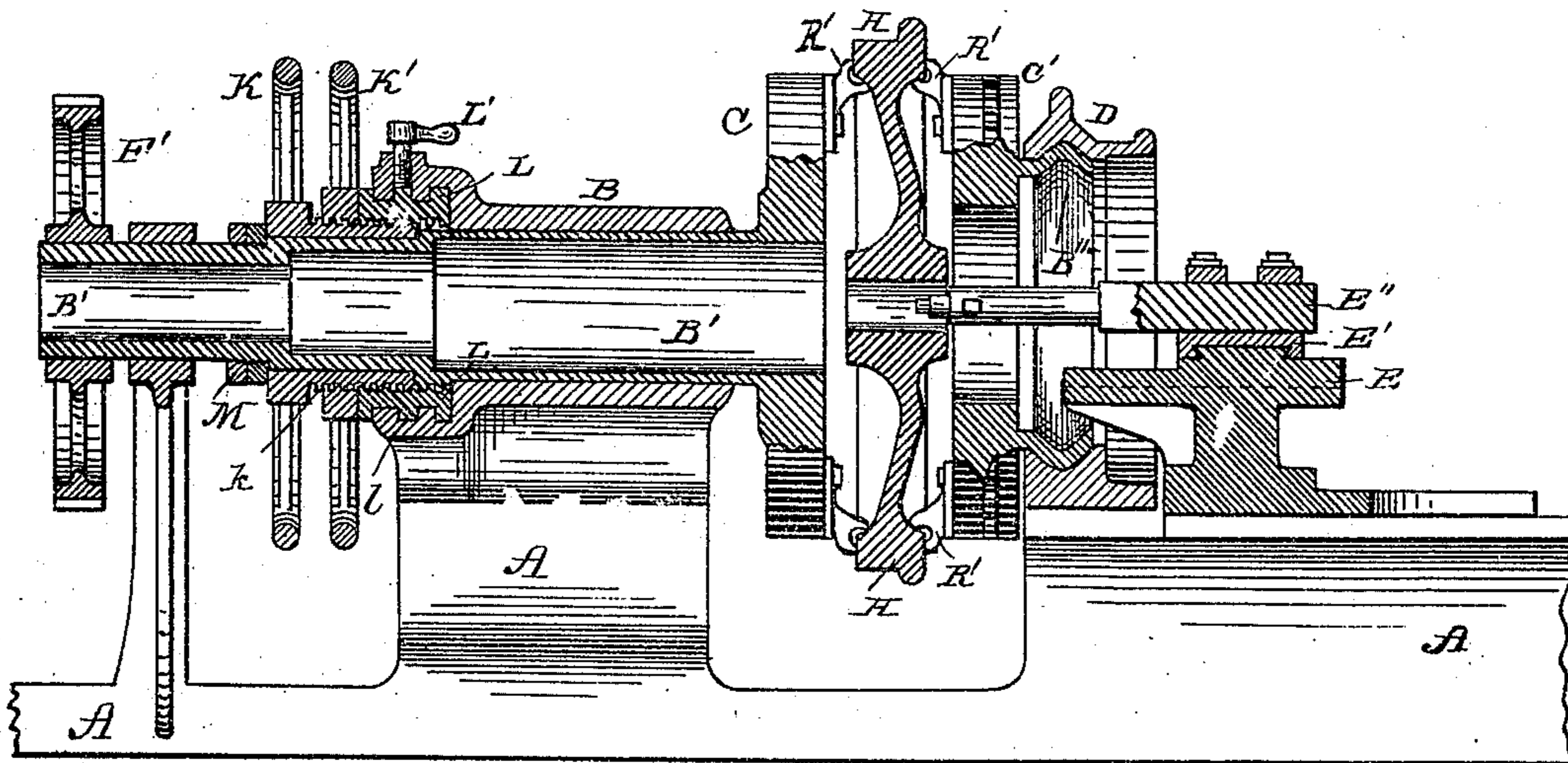
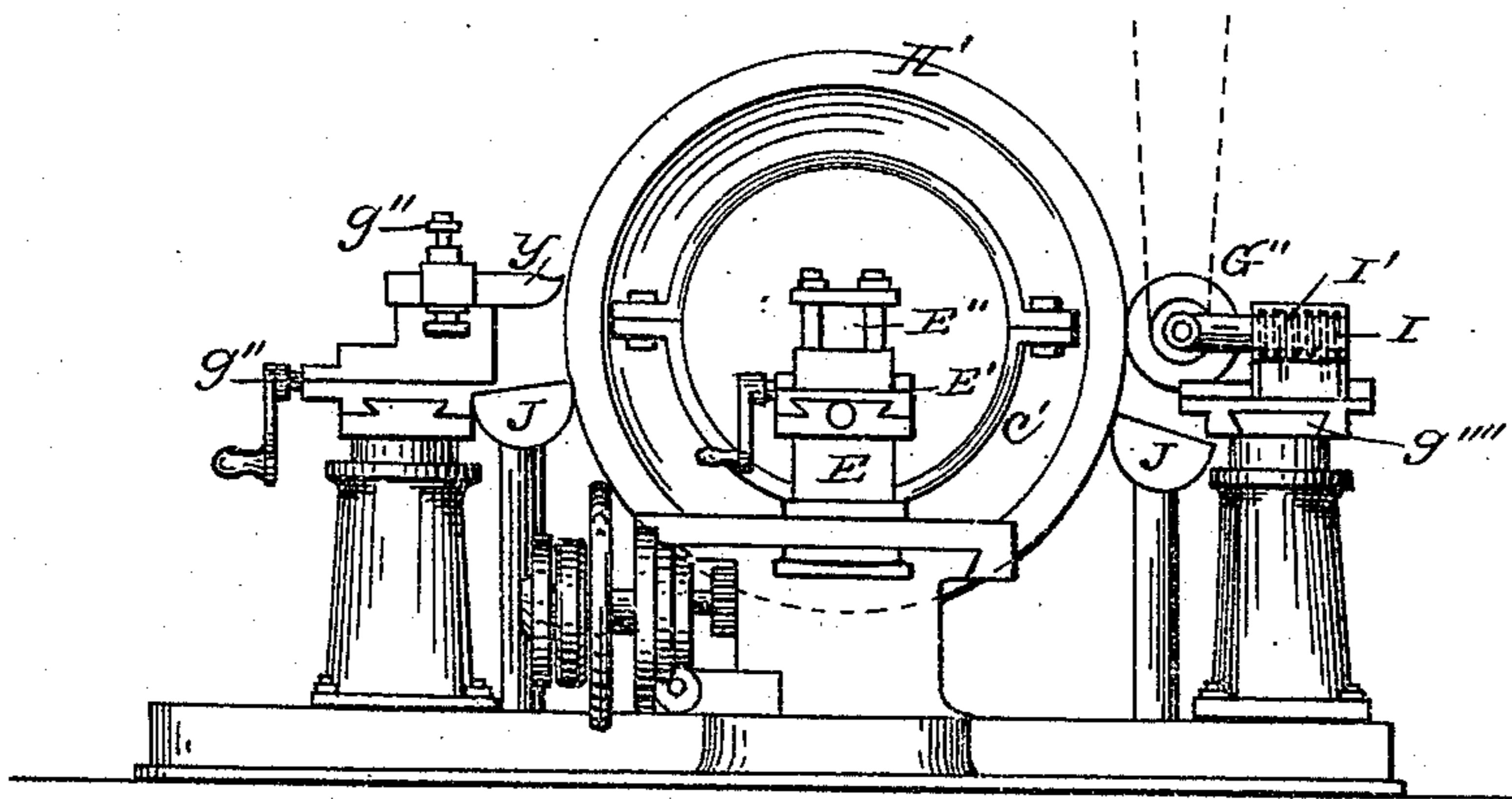


Fig. 4.



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Fig. 5.

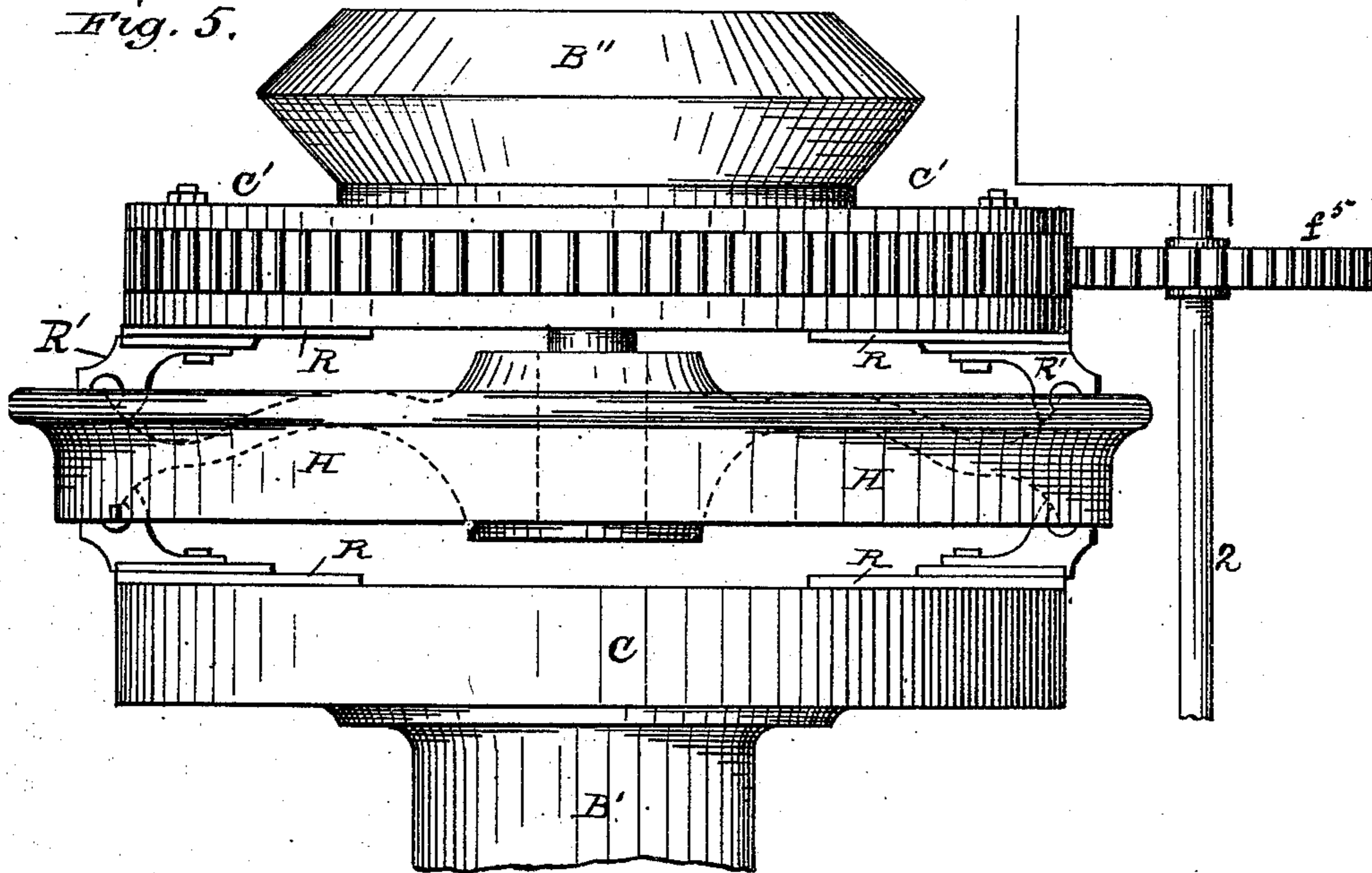


Fig. 6.

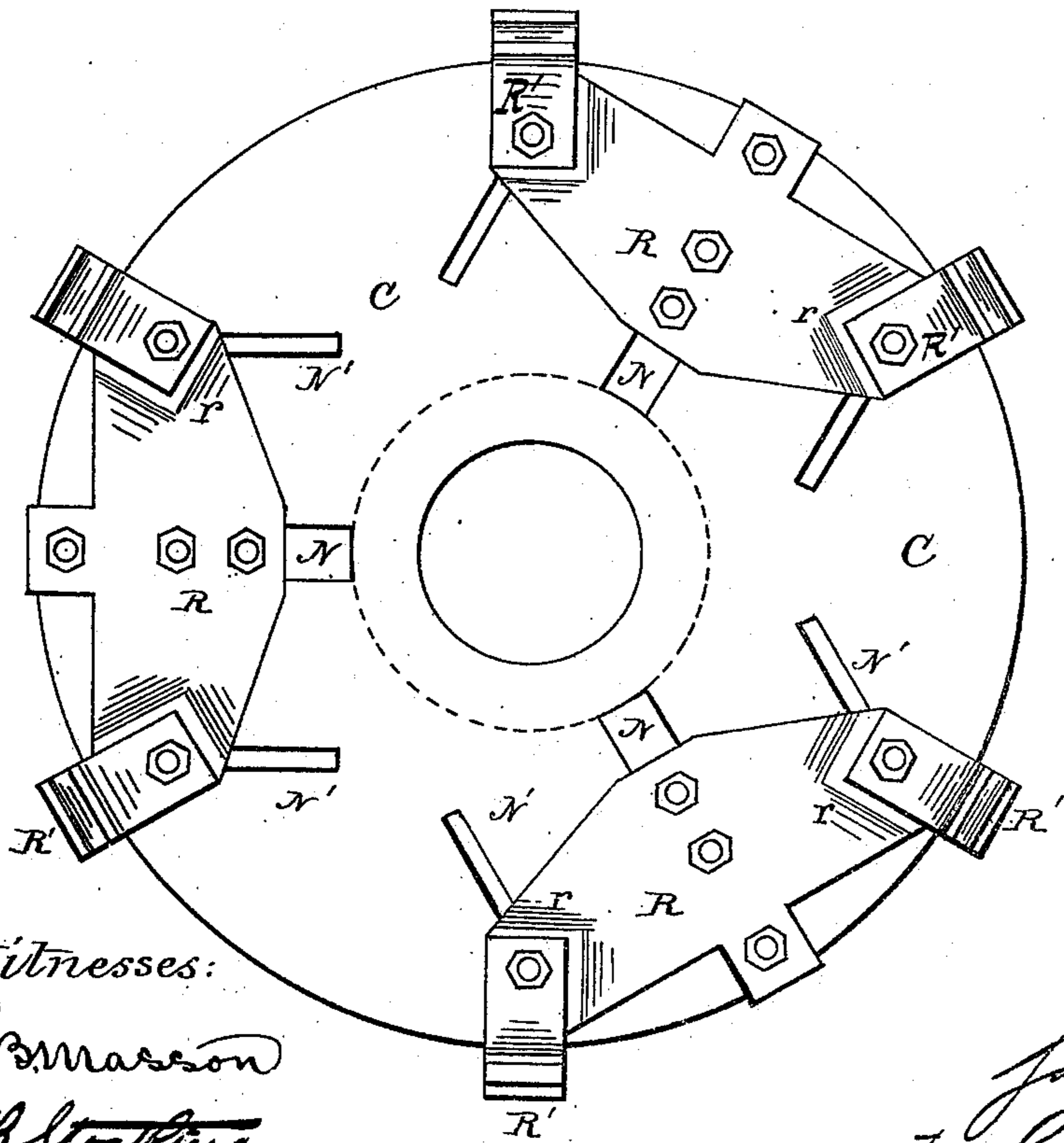
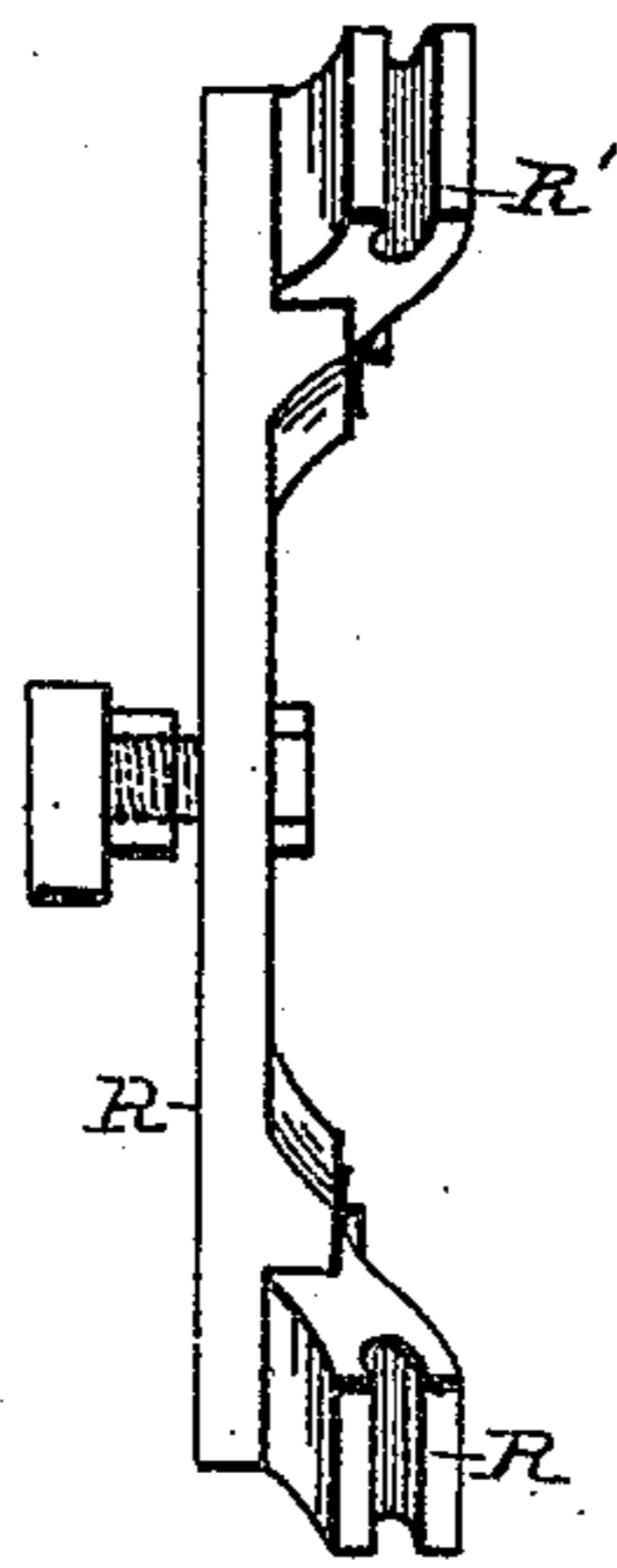


Fig. 7.



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UNITED STATES PATENT OFFICE.

JAMES H. GOWAN, OF CHICAGO, ILLINOIS, ASSIGNOR OF A PART TO AUGUSTUS O. HALL, GEORGE H. PEEKÉ, AND WILLIAM P. BLACK, ALL OF SAME PLACE.

CAR-WHEEL BORING AND TRUING MACHINE.

SPECIFICATION forming part of Letters Patent No. 285,123, dated September 18, 1883.

Application filed February 27, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES HENRY GOWAN, of the city of Chicago, in the county of Cook and State of Illinois, have invented an Improved Car-Wheel Boring and Truing Machine, of which the following is a full, clear, and correct description.

This invention relates to an improvement in the preparation of car-wheels for service; and it consists in the combination of mechanical parts, hereinafter set forth, which are designed to bore, true, and balance car-wheels prior to being adjusted to their axles, such boring, truing, and balancing being accomplished by one machine, at one operation, and by one attendant.

It being an admitted fact that a chilled-iron wheel varies from a true disk by reason of irregular shrinkage in casting, it is equally a fact that wheels of every construction are more or less similarly defective, and that to insure a full mileage therefrom, and to overcome the rapid wear and tear of the track and rolling stock, the wheel, before going into service, should be made perfectly round, concentric with the axle-bearings, balanced, and free from peripheral defects. To meet such required conditions it becomes necessary at the initial point of work in preparing a wheel for its axle to grasp and hold the same in a manner and by mechanism differing from the method and mechanism ordinarily employed for holding the same, then to do the work of boring and truing while it is held in such position. The usual method of boring a car-wheel is as follows: The wheel being placed upon the boring-mill, the dogs of a three-dog universal chuck grasp and hold it by its tread while the boring-bar works through its hub. The dogs being equidistantly located from the center of the chuck, and moving inwardly at the same rate of speed, and the wheel being of variable radii, the dog, antagonizing therewith at its longest radial point, drives the wheel in the opposite direction until caught by the other dogs, its geometrical center being thereby carried away from the position which it should occupy with reference to the center of

the mill and chuck and the center described by the boring-bar. The hub being bored while thus located in an incorrect position, the wheel, when pressed upon its axle, instead of being concentric with the journal-bearings and balanced, becomes a cam, which, when at work, is forced to raise vertically at every revolution the entirety of the weight of the car, or so much thereof as may be depending thereon, for a distance equal to the difference between the longest and shortest radial distance which it is out of true. In addition to the great damage done to the axle-journals, journal-bearings, body of the car, and road-bed, resulting from the reciprocating and pounding action thus produced, the brake-shoe, when applied to a wheel out of true, is likely to catch it by its longest radial point, locking it rigidly while the car is in motion and compelling it to slide upon the track, the effect of which is to cut a flat spot upon its tread, at or near the point of its shortest radius, of such length as to warrant and oftentimes necessitate the removal of such wheel from under the car, so as to avoid the checking of the track by the sharp edges of such flattened spot, and the great and dangerous strain upon the axle, destruction of its journal-bearings, and possible breakage of the wheel and wreckage of the car under which it is running. If, after pressing the wheel upon its axle, its perimeter should be turned or ground, so as to make the same concentric with its axle-journals, the wheel would necessarily be still out of balance, for the reason that its rim being of a regular thickness and the wheel describing an oval with relation to its axle center, the turning or grinding tool would remove all that portion of metal extending outside of a true circumferential line drawn from the shortest radial point, thus leaving the rim thickest and heaviest at such point, and giving to the wheel a seriously objectionable centrifugal action when in rapid revolution. It is therefore obvious that to locate a wheel correctly for boring it should be grasped in such manner as will in the first instance hold the same as concentrically as possible, equalizing any radial variations which may exist

by throwing such irregularities toward the center, and that if, while held in such position, its perimeter be turned or ground without disturbing the regularity of the diameter of the rim throughout its circumference, such wheel, so bored and trued, will be as concentric and as evenly balanced as is possible to make the same. By the use of my invention not only are such essential objects attained, but it, embodying the requisites of a boring-mill, car-wheel-grinding machine, and tire-lathe, proves an important economical factor in the matter of time, labor, shop room, and expense.

In the accompanying drawings, Figure 1 is a side elevation of my machine; Fig. 2, a plan view of same; Fig. 3, a side elevation, partly in section; Fig. 4, an end elevation, showing abrading-wheels and a boring bar at work; Figs. 5, 6, 7, enlarged details of the chucking mechanism.

A is the bed-plate; B, the head-stock, through which works a hollow spindle, B', carrying a disk or chuck, C.

D is the tail-stock, in which works a hollow spindle, B'', preferably having a V-shaped bearing-surface, and carrying a disk or chuck, C'.

E is a carriage supporting a slide-rest, E', which carries a boring-tool, E''.

K is a loose hand-wheel working over the spindle B', being held longitudinally in position upon said spindle by a collar, M, and being provided on one side of its hub with a sleeve extension, k, the exterior surface of which is screw threaded.

L is an internally-threaded bush, which engages with the threaded surface of the sleeve extension k, is provided with thrust-collars l, and is secured to the head-stock B by suitable annular grooves adapted to receive such collars.

K' is a hand lock-wheel screw-threaded on the inner side of its hub, and working over the sleeve extension k of hand-wheel K, and between said hand-wheel and the projecting end of bush L.

I' is a hand set-screw working through the head-stock B and upon the bush L when it is desired to prevent the bush from turning.

G is an abrading-wheel rotated by the belt-pulley G'; the spindle of which works in suitable bearings, g, supported by the slide-rest g'.

G'' is an abrading-wheel rotated by the belt-pulley G'', its spindle working in bearings g'', projecting from a pivoted head, I, which is held by the slide-rest g'', and operated by the worm I', which engages with a segmental gear formed on its periphery.

J J are hoppers located below the abrading-wheels G G'', and are connected by suitable piping, j j, to an exhaust-fan U.

F is the driving-pulley, keyed to a shaft, 1, to which is also keyed a pinion, f', which meshes with a gear-wheel, F', fixed to the spindle B'.

F'' is a pinion fixed to the end of shaft 3,

which, being driven by engagement with the hub or rim of the driving-pulley F, imparts motion through the gear-wheel f'', keyed to the other end of said shaft, to the gear-wheel f''', fixed to the end of shaft 2, a pinion, f'', at the other end of said shaft 2 meshing with a gear formed on the perimeter of disk or chuck C'. The gear-wheel F'', fixed to the end of shaft 4, is actuated by the driving-pulley F through the intermediate gear-wheel, F'', and a gear-wheel keyed to the end of shaft 1, the shaft 4, by suitable auxiliary mechanism, being connected to and operating the carriage E, which carries the boring-tool slide-rest E'. The disks or chucks C C' are provided with radial slots N, and parallel thereto with T-grooves N'.

In the slots N work ordinary slide-blocks, O, which engage by their rear faces with the usual internal dog or slide-block operating mechanism of a chuck. (See Figs. 5 and 6.)

To each slide-block O is attached a plate, R, provided at each end with a dog, R', which are preferably adjustably connected thereto by bolts, as shown, the heads of which may be made to work in said grooves, so as to form supplemental anti-vibrating bearings for such plates. The dogs, being adjustably connected to the plates R, may be removed, and longer or shorter dogs substituted therefor, when it is desired to chuck wheels of greater or less diameter.

The operation of my machine is as follows: Hand set-screw L' is set hard upon the bush L, to prevent the same from turning, hand-wheel K being revolved. Its screw-threaded sleeve extension k unscrews from the bush L, and the spindle B' is moved longitudinally in its bearing B, causing the chuck C to recede from the chuck C'. A car-wheel being elevated to the proper height and position with relation to the chuck C', a reverse revolution of the hand-wheel K causes the spindle B' and its chuck C to advance toward chuck C' until the car-wheel H can be caught between the chucks by their dogs R'. The dogs, moving outwardly and universally, and catching the wheel rigorously by the inner side of its rim, preferably at six points, equalize any radial differences which may exist, and locate the wheel in the correct position for boring. The locking strain of the set-screw L' being then removed from bush L, and the lock-wheel K' being set hard against the projecting end of the bush, the machine is put in motion by the pulley F, the spindle B', with its hand-wheels K K', bush L, and chuck C, acting together and being actuated by the pinion f' through the gear-wheel F', while the chuck C' is simultaneously put in revolution at the same rate of speed by the pulley F through the pinion F'', and the gearing and shafting acting in conjunction therewith, and the boring-tool E'', held by slide-rest E', is carried forward by the carriage E, through the spindle B' and its chuck C', to its work upon the hub of revolving car-wheel H. The abrading-wheel G or G'', or both, being

then started at work upon the periphery of the car-wheel, all dust arising therefrom is drawn into the hopper J or hoppers J J and through the piping *j j* by the exhaust-fan U.

5 The arrangement of the pivoted head I and its auxiliary mechanism described admits of the wheel G'' being worked at any desired angle upon the tread or flange of the car-wheel.

While I prefer employing two abrading-
10 wheels upon some classes of work, I do not limit myself to the use of such number, as in truing steel-tired wheels I use a turning-tool to advantage in the slide-rest *g''* in lieu of the abrading-wheel G, the abrading-wheel G'' following it, if desired, as a finishing-tool after
15 the rougher work of such turning-tool, my machine being adapted to receive and prepare any and all classes of wheels for their axles. Neither do I limit myself to the exact arrange-
20 ment of the gearing and shafting which imparts motion to the chucks C C' and the carriage E, as various alterations may be made therein without interfering with the essential features of my machine.

25 Having thus fully described my invention, what I claim as new and original, and desire to secure by Letters Patent, is—

1. The combination of the head and tail stocks B D, carrying coacting revolving disks
30 or chucks C C', arranged and operating substantially as and for the purpose described.

2. The combination of tail-stock D, carrying revolving disk or chuck C', and head-stock B, carrying revolving and horizontally-movable
35 disk or chuck C, arranged and operating substantially as and for the purpose described.

3. The combination, with the head-stock B

and driving mechanism F' f', of the spindle B', hand-wheels K K', and bush or thrust-bearing L, substantially as and for the purpose de- 40 scribed.

4. The combination of the head and tail stocks B D, revolving disks or chucks C C', and boring bar or tool E'', arranged and oper- 45 ating substantially as and for the purpose described.

5. The combination of the disks or chucks C C' and abrading-wheels G G'', substantially as and for the purpose described.

6. The combination of the disks or chucks 50 C C', boring bar or tool E'', and abrading-wheels G G'', all arranged and operating substantially as and for the purpose described.

7. The combination of the head and tail stocks B D, disks or chucks C C', carriage E, 55 and slide-rest *g''*, substantially as and for the purpose described.

8. In combination, the abrading-wheel G'', movable disk I, provided with peripheral teeth, and the worm I', for operating the same, 60 substantially as and for the purpose described.

9. In combination, the head and tail stocks B D, disks C C', abrading-wheels G G'', hoppers J J, exhaust-fan U, and a suitable sys- 65 tem of piping for connecting said hoppers and fan, substantially as and for the purpose described.

10. The duplex dog-plate R, provided at each end with a dog, R', substantially as and for the purpose described.

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Witnesses:

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