

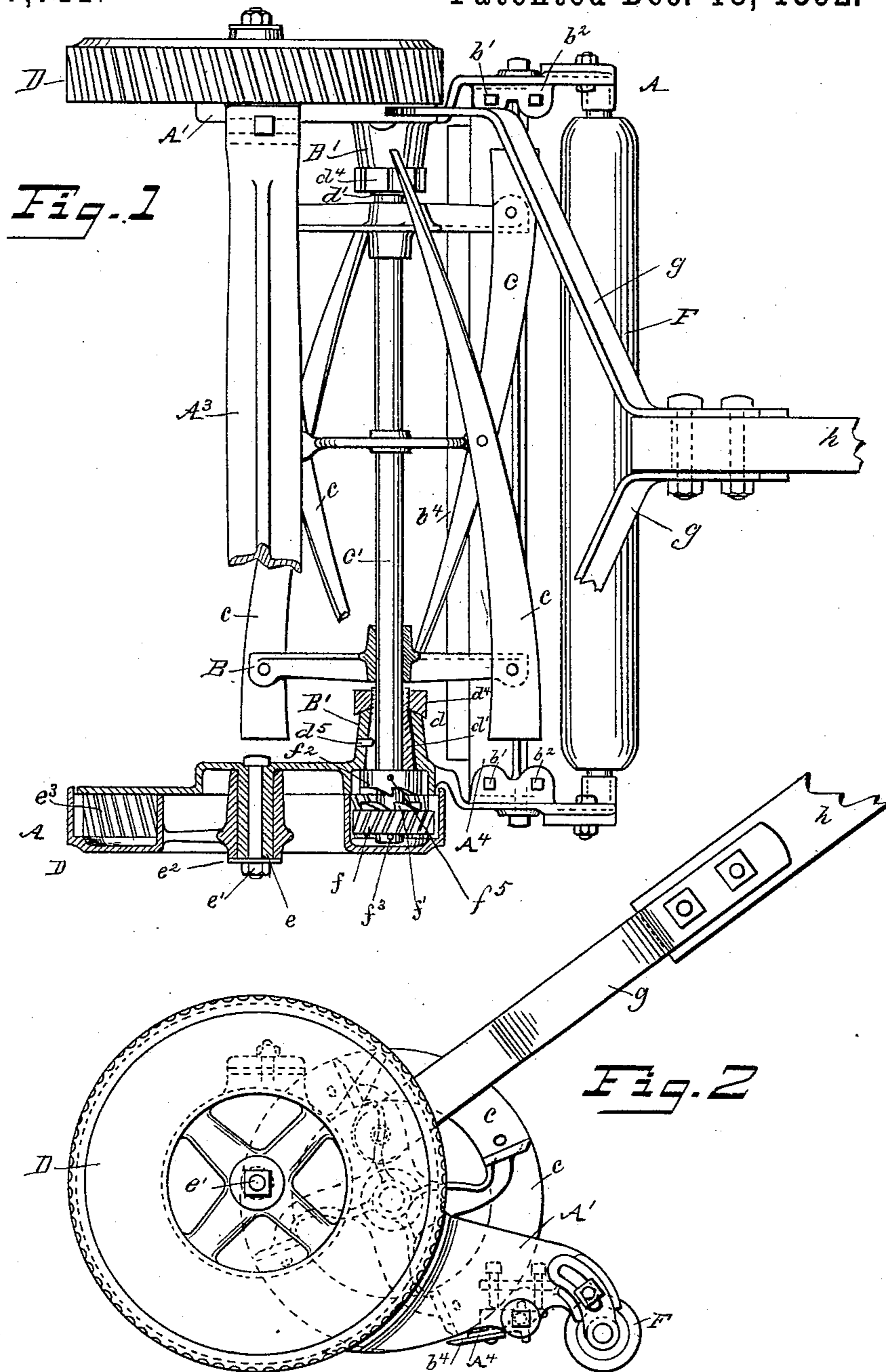
(No Model.)

3 Sheets—Sheet 1.

H. BROOM.
LAWN MOWER.

No. 487,711.

Patented Dec. 13, 1892.



Witnesses

Robert Weiskotten
H. O. Osborn

Inventor

Henry Broom
By Henry B. Shepherd
attys

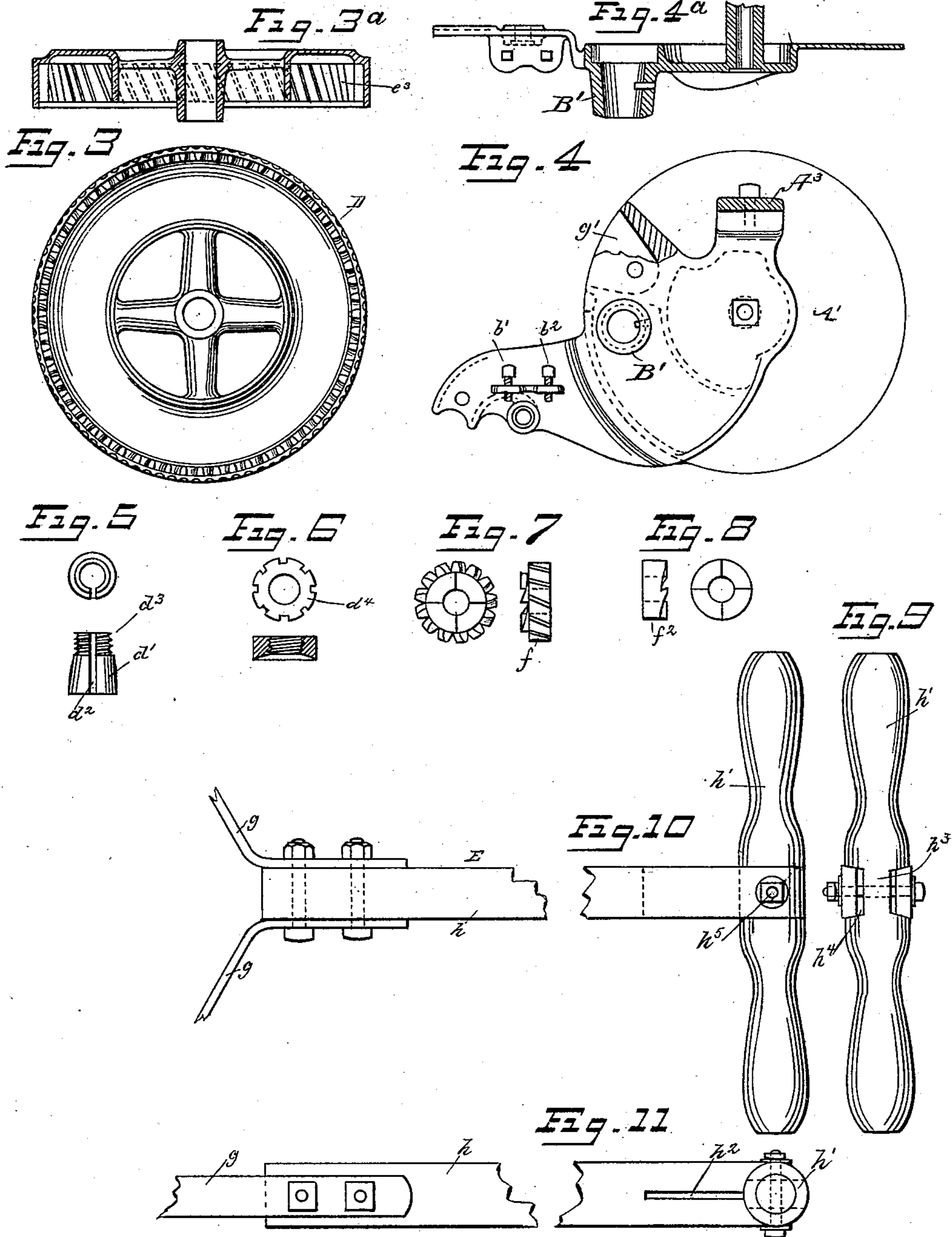
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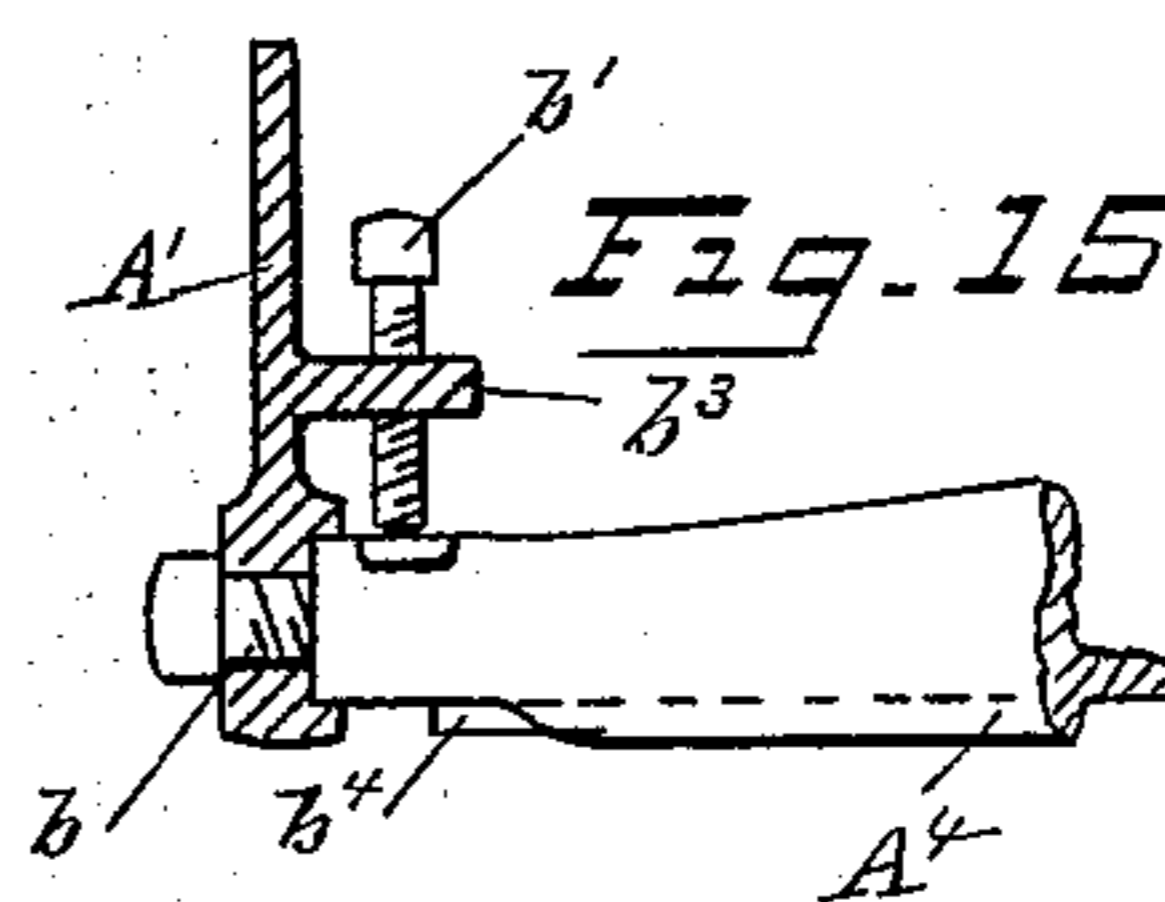
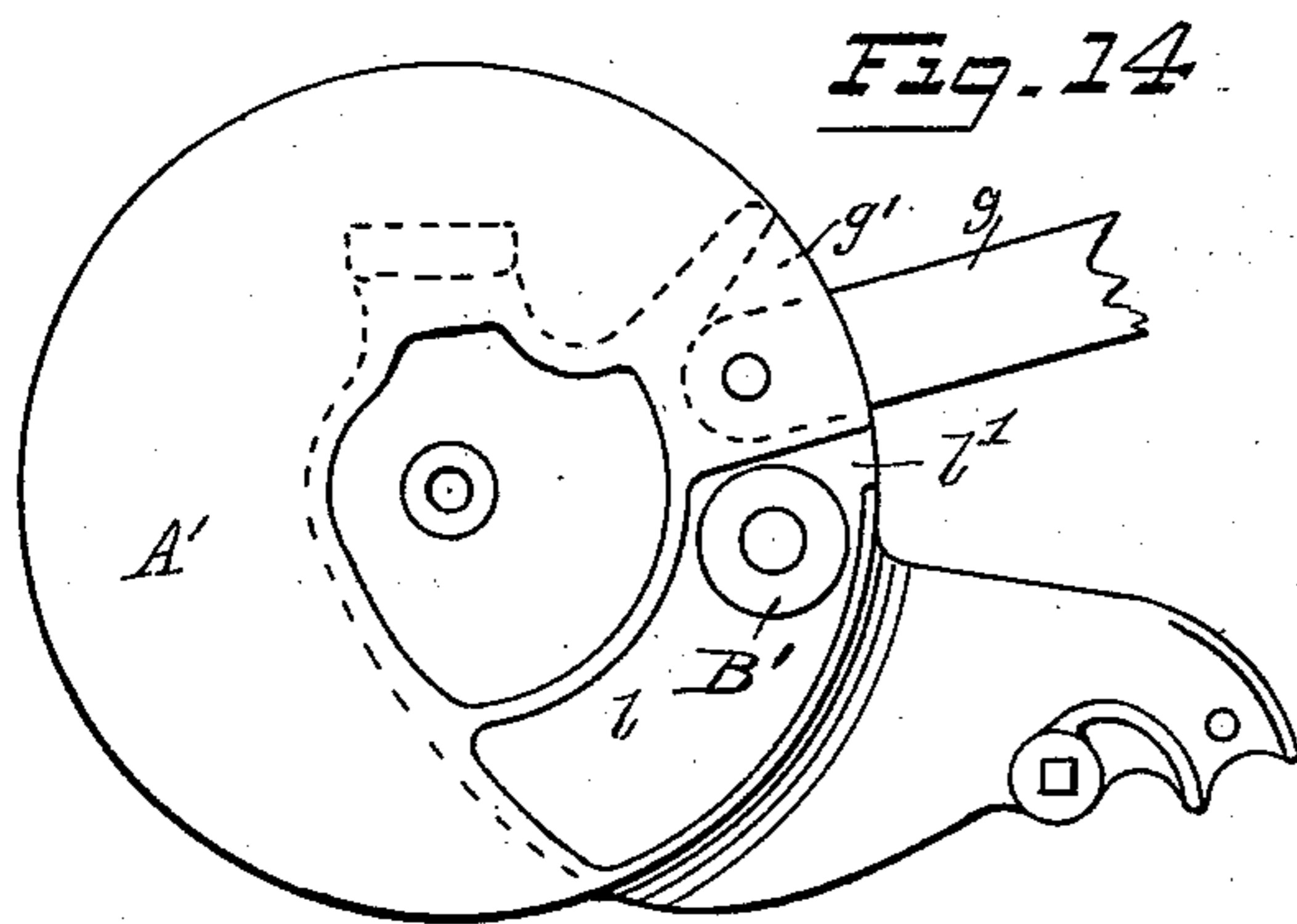
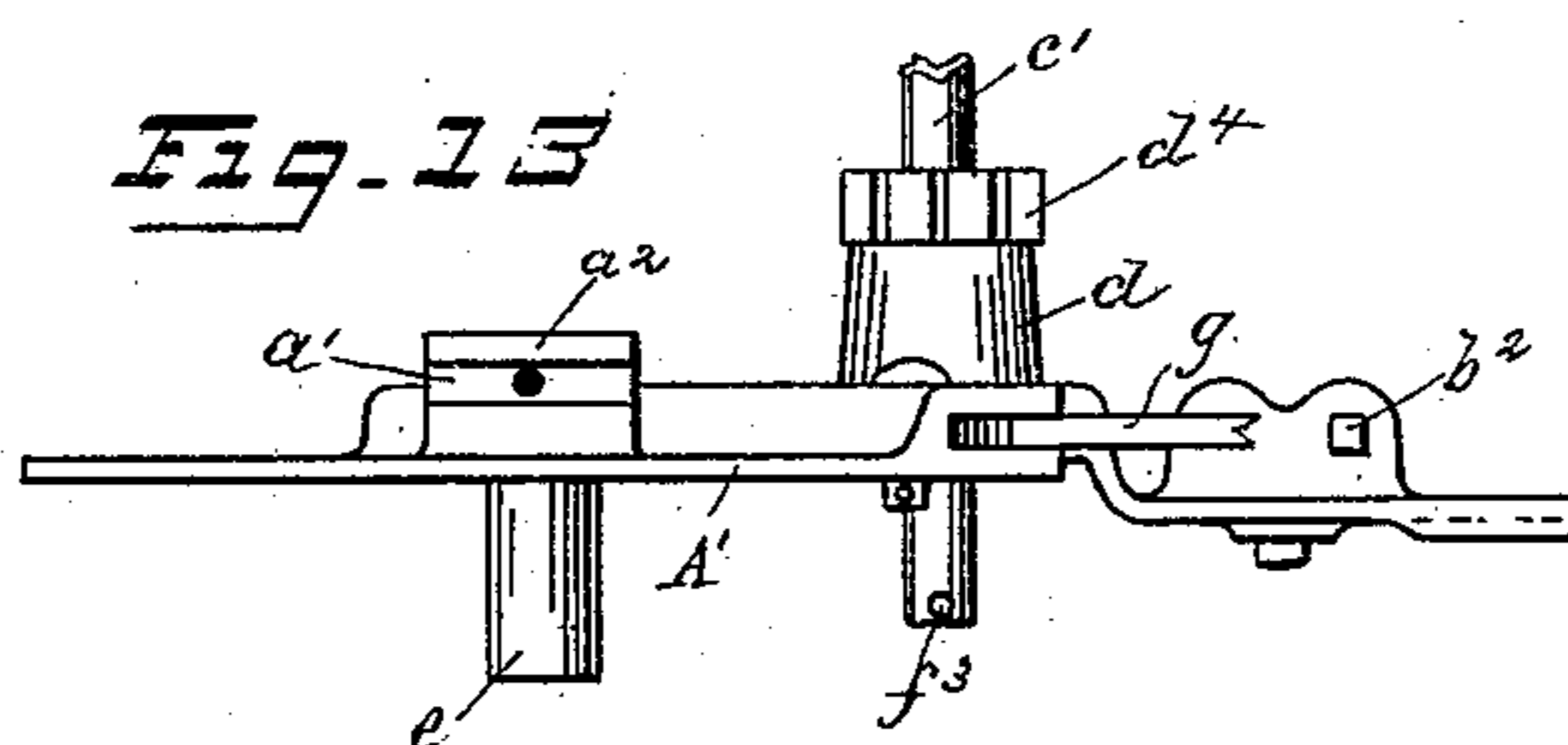
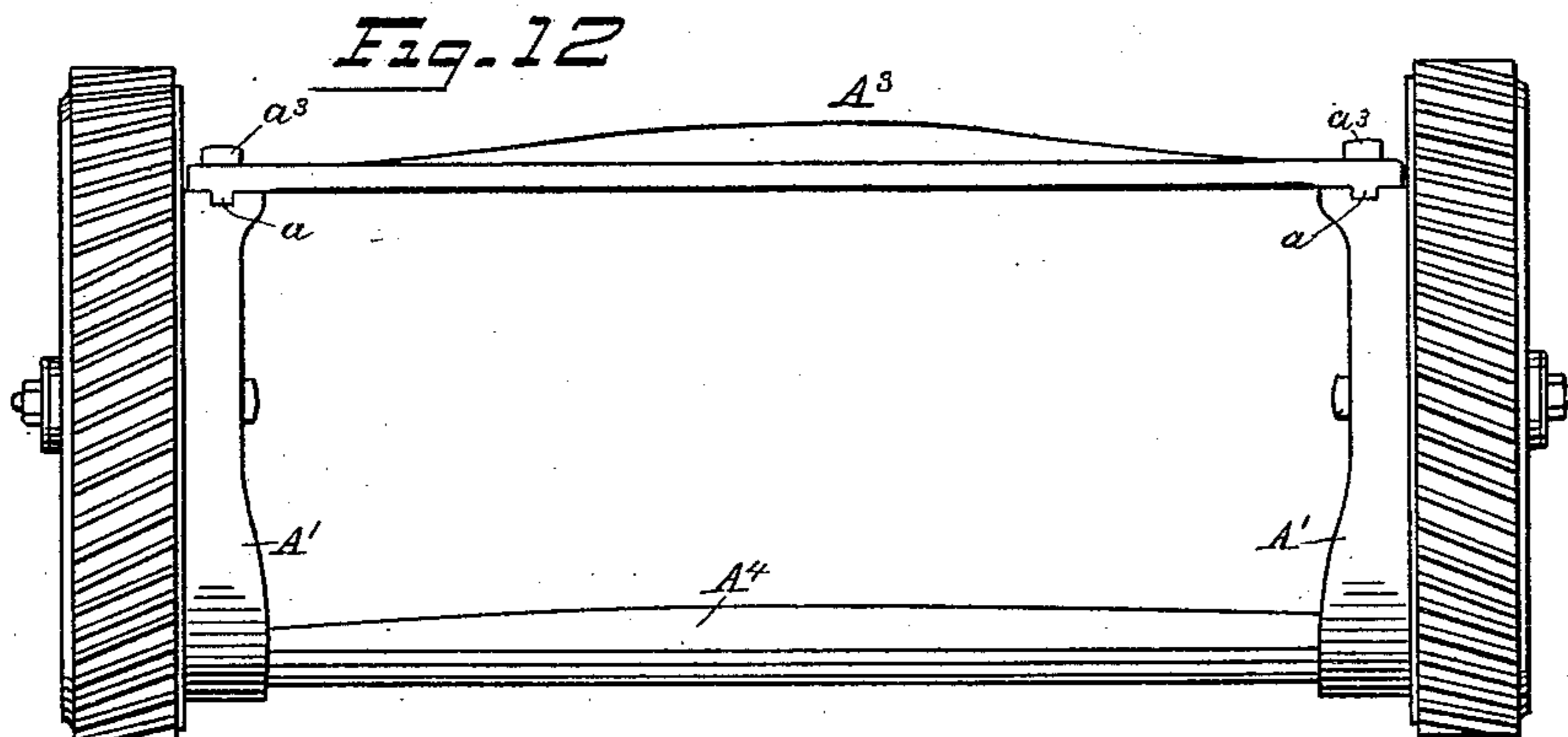
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WITNESSES

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UNITED STATES PATENT OFFICE.

HENRY BROOM, OF SPRINGFIELD, OHIO, ASSIGNOR TO AMOS WHITELEY, OF
SAME PLACE.

LAWN-MOWER.

SPECIFICATION forming part of Letters Patent No. 487,711, dated December 13, 1892.

Application filed May 20, 1892. Serial No. 433,771. (No model.)

To all whom it may concern:

Be it known that I, HENRY BROOM, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Lawn-Mowers, of which the following is a specification.

My invention relates to improvements in lawn-mowers; and its object is to provide a lawn-mower of simple and economic construction which shall be efficient in operation.

A further object of my invention is to provide means for operating the rotary cutter from the driving-wheels, so that when the machine is moved in one direction the driving-wheel will be positively engaged and when moved in the opposite direction will be positively disengaged with the cutter by means of screw-shaped teeth on the driving-gears.

A further object of my invention is to simplify and strengthen the frame of the machine and provide means for readily adjusting the operating parts contained therein.

A further object of my invention is to provide a novel construction of the handle through which the motive power to drive the machine is imparted.

My invention consists in the various constructions and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of a machine embodying my invention, some of the parts being broken away in section to more clearly illustrate the same. Fig. 2 is an end elevation of the same. Figs. 3 and 3^a are respectively a side and sectional view of the driving-wheel. Figs. 4 and 4^a are respectively a side and sectional view of one of the end disks or frame-pieces. Figs. 5, 6, 7, and 8 are views in detail of parts of the shaft-bearing and clutches. Figs. 9, 10, and 11 are views in detail of the handle. Fig. 12 is a front elevation of the frame and the driving-wheels with the revolving cutter removed. Fig. 13 is a plan view of one of the side disks or frame-pieces. Fig. 14 is a side elevation of the same; and Fig. 15 is a detail view, partly in section, showing the method of supporting the normally-stationary cutter.

Like parts are represented by similar letters of reference in the several views.

In the said drawings, A A represent the main frame, which consists, essentially, of side disks or frame-pieces A', connected together at the top by a transverse bar A³ and at the bottom by the normally-stationary cutter A⁴. The transverse connecting-bar A³ is preferably formed on the under side at each end with projecting ribs or flanges *a*, adapted to fit in corresponding grooves or depressions *a'*, formed in projecting lugs *a*² on the inside of the side disks A'. This bar A³ is further perforated to receive a fastening bolt or screw *a*³, which passes through the same and through the lug *a*², and thus firmly unites the respective parts.

The cutter-bar or normally stationary cutter A⁴ is connected to the frame-disks A', preferably by means of a pivot-screw *b*, which extends through the end disks and screws into the end of said normally-stationary cutter.

Means are provided for adjusting the cutter-edge of the normally-stationary cutter in relation to the revolving cutter, preferably by adjusting-screws *b'* *b*², arranged on opposite sides of the pivot-screw *b* and passed through perforated screw-threaded lugs *b*³, so as to rest in contact with the top surface of said normally-stationary cutter, means being thus furnished so that by loosening one screw and tightening the other the normally-stationary cutter may be adjusted about the pivotal bearings formed by the pivot-screw *b* to raise or lower the cutting-edge.

Journaled in suitable bearings B' in the side disks A' and extending across the frame is the revolving cutter or reel B, provided with a suitable number of cutting-knives *c*, arranged about a central shaft *c'*, preferably spirally to effect a shearing movement in connection with the normally-stationary cutter, said stationary cutter being preferably formed of cast-iron and provided with a removable steel cutting-edge *b*⁴, which operates in connection with the cutting-edge of the respective wings or cutter-blade *c* of the rotary cutter B.

The bearings B', which support the respect-

ive ends of the reel-shaft c' , are formed in two parts—an outer inclosing casing d , preferably cast with the side disks A' , and an inner removable and adjustable bearing-sleeve d' , which fits therein. This bearing-sleeve d' forms the bearing proper and is bored out or otherwise formed on the inside to fit the shaft or trunnions of the reel of the revolving cutter, the outer periphery being formed with curved tapered sides—that is to say, the outer periphery is formed slightly curved in the nature of a globe, with the outer ends of said bearing-sleeves larger in diameter than the inner ends. These sleeves are further provided with a longitudinal slot d^2 , which extends the entire length thereof, forming a divided bearing. Each of these sleeves is formed at the inner end with a screw-threaded projecting portion d^3 , adapted to receive a corresponding threaded adjusting-nut d^4 , which screws onto the same. When in place in the outer box g , the screw-threaded portion d^3 of the bearing-sleeve projects from the end thereof, so as to receive a nut d^4 . The inner end of the outer casing or box d is formed convex, as shown in Fig. 1, the corresponding side of the adjusting-nut d^4 being correspondingly concave. The bearing-sleeve d' is held against revolution in the outer box or casing d by a small projecting stud or pin which extends into the slotted opening d^2 in said sleeve, so as to permit the adjustment thereof, but prevent the same from revolving. By this construction it will be seen that by tightening or loosening the adjusting-nut d^4 the inner bearing d' , by means of the tapered sides, will be closed or opened upon the shaft c' .

The curved sides, together with the concave and convex surfaces of the bearing-sleeve, outer box, and adjusting-nut, respectively, permit at the same time an adjustment of the inner bearing with reference to the outer box or casing to prevent the parts from becoming cramped or forced out of line in assembling or otherwise.

The frame is supported in the usual manner upon carrying-wheels D D' , journaled on suitable studs or sleeves e , formed integral on the end disks A' and preferably held in place by a fastening-bolt e' and washer e^2 .

To provide for transmitting the motion from the carrying-wheels D to the revolving cutter B when the machine is moving in a forward direction and to permit them to turn independently when the machine is moving in a backward direction, I employ a novel form of clutch and gear, as follows: The driving and supporting wheels D are formed on the inside with internal screw-shaped gear-teeth e^3 , adapted to engage with similar internal teeth on a pinion f , which is journaled loosely on the end of the reel and cutter-shaft c' , which is extended beyond the end disk and into the driving and supporting wheel. This pinion f is permitted a limited lateral movement upon the shaft and is provided on one side with a

series of ratchet-teeth or clutch projections f' , adapted when moved inwardly to engage with a clutch-collar f^2 , having similar teeth or projections and secured rigidly to the reel-shaft c' . It will be seen that by the above construction as the driving-wheels are moving in one direction the screw-shaped teeth will move the pinion f positively upon the reel-shaft in a lateral direction until the clutch projections engage with the clutch-collar f^2 , after which the further revolution of the driving-wheel, acting upon the pinion, will cause the reel to revolve with the wheels. When the motion of the machine is reversed, the pinion will by the action of the screw-shaped teeth be positively moved laterally until it comes against the stop-pin f^3 , at which point the clutch parts will be disengaged and run perfectly free and independent, and thus without noise.

I have shown the clutch-collar and the pinion arranged with ratchet-teeth adapted to engage in one direction only, which form of teeth would assist in producing a lateral movement of the pinion to disengage said clutch. This form of clutch, however, is not necessary when the screw-shaped teeth are used, as described, and any form of engaging projections may be used on the clutch-collar and pinion, respectively, which will cause the parts when engaged to operate together in a rotary direction.

It will be seen that the teeth on the driving-gears are practically sections of screw-threads, which, if continued, would encircle a cylinder corresponding to the driving-wheels extended. It is obvious that the pitch of these screw-threads, which constitute the respective driving-teeth, may be changed or modified to any desired degree, so as to produce a positive movement under any and all conditions to which the mower may be subjected.

The outer peripheries of the carrying-wheels D are preferably corrugated or serrated to prevent slipping. These corrugations or serrations are also preferably formed inclined or spirally arranged about said wheel, so that in passing over smooth hard surfaces all jolting or jarring, which would be occasioned by the contact of the successive projections, is obviated.

Means are provided for imparting motion to the frame and the moving parts through the medium of a handle E . This handle E is connected to the main frame or end disks through connecting or bail pieces g , the front ends of which extend into pockets g' in the side or frame disks A' . The bail-pieces g are pivotally secured in the pockets g' by a bolt or pin, which extends through the respective sides of said pockets and through the perforated ends of said bail-pieces. The pockets g' are formed slightly larger than the width of the bail-pieces to permit a limited vertical movement of the handle up or down. The

side walls of said pockets, however, fit snugly against the respective sides of said bail-pieces, and thus prevent lateral movement therein and furnish a side support for said bail-pieces, thus permitting the use of lighter material than when the bail-pieces are supported on one side only at the pivot connection.

The handle proper is preferably made of wood and consists of a straight bar h , bolted or otherwise secured at one end to the bail-pieces g and connected at the outer end to a cross-bar h' .

To provide for readily assembling the parts of the handle E , I preferably form the outer end of the bar h with a slotted opening h^2 , enlarged near the outer end to receive the central portion h^3 of the transverse bar h' . The bifurcated part of the bar h is beveled on each side, as shown in Fig. 9, and adapted to fit in tapered or beveled seats h^4 in said transverse bar h' . A fastening-bolt h^5 , extending through the respective parts, holds them firmly together and furnishes the means of tightening the same by drawing the beveled portions of the bifurcated bar into the beveled or tapered seats of the transverse bar or handle proper in case the parts should become loose by shrinkage or otherwise.

The side disks A' are each preferably formed on their outer faces with a curved elongated depression l , which forms a corresponding elevation on the inside of said disks opposite to the ends of the cutter c of the rotary cutter b . Within this depression l the clutch-collars f^2 are located and are preferably secured on the respective ends of the reel-shaft by a removable pin f^5 , which extends through said collar and shaft at one side of the end disks and just below the bail-pocket g' , the inner wall of which is a continuation of the inner wall of the depression l . I form an opening l' substantially opposite the clutch-collar, through which a punch or other suitable instrument may be inserted for removing the pin f^5 , and thus detaching the clutch-collar f^2 .

In the rear of the normally-stationary cutter I preferably provide a supporting-roller F in a well-known manner.

By the constructions thus described I provide a lawn-mower of simple construction in which are combined a simple frame and operating parts, all capable of ready adjustment. The arrangement of the driving mechanism embodying the screw-shaped gear-teeth and clutch mechanism produces a perfectly-noiseless clutch or driving connection which is positively moved in both directions, so that it will operate in any angular position of the machine, resulting from use on a hillside or otherwise, and which permits a perfectly-noiseless independent movement of the wheels and revolving cutter when the machine is moving in a backward direction in any angular or other position. The construction of the

handle described furnishes a simple and convenient arrangement which may be quickly and economically constructed, and at the same time permits of the parts being tightened to take up any play occasioned by shrinkage or otherwise.

Having thus described my invention, I claim—

1. In a lawn-mower, a revolving cutter-shaft and a driving-wheel, a loosely-mounted pinion on said revolving cutter-shaft, clutch mechanism adapted to connect said pinion with said revolving cutter-shaft, and screw-shaped teeth on said driving-gear and pinion, adapted to produce a positive lateral movement of said pinion when the driving-gear is moved in either direction, substantially as specified.

2. In a lawn-mower, a clutch-pinion having screw-shaped teeth adapted to engage in similar teeth in the driving-wheel, and thus produce a positive lateral movement of said pinion in opposite directions when the motion of said driving-wheel is reversed, and thus cause said pinion to connect and disconnect a driving connection, substantially as specified.

3. In a lawn-mower, a revolving cutter and a loosely-mounted pinion thereon, a clutch mechanism between said pinion and cutter, adapted to be connected by a lateral movement of said pinion, and screw-shaped teeth in said pinion, adapted to engage in similar teeth in the driving-gear, substantially as and for the purpose specified.

4. The combination, in a lawn-mower, with a rotary cutter and the main frame, of an outer cone-shaped sleeve on said main frame and an inner box having a curved cone-shaped exterior adapted to fit in a cone-shaped sleeve, said box being provided with a longitudinal opening at one side and with a screw-threaded portion at one end, and an adjusting-nut adapted to screw onto said box, having a concave face to fit on a corresponding convex seat at the end of said sleeve, and means, substantially as described, for holding said interior box against rotation in said sleeve, substantially as specified.

5. The combination, in a lawn-mower, with an outer cone-shaped sleeve and the interior box having a curved cone-shaped exterior to fit in said sleeve, a longitudinal opening in said box, and an adjusting-nut screw-threaded on the end of said box and bearing against the end of said sleeve, said sleeve having corresponding convex and concave parts, as specified, and a projecting pin through said sleeve into said longitudinal opening in said box, substantially as and for the purpose set forth.

6. In a lawn-mower, a handle formed of a straight bar and a cross-bar connected thereto, said straight bar being provided at its outer extremity with a slotted opening to form a bifurcated part which is beveled inwardly on each side, and a transverse bar

provided on opposite sides with a central depression having tapered or beveled seats to engage with the bifurcated part of said bar, substantially as specified.

- 5 7. A handle for lawn-mowers, consisting of a straight bar bifurcated at the end and adapted to receive a cross-bar inserted between forks formed by said bifurcation, the engaging parts of the respective bars being

provided with tapered seats, and means for clamping said parts together, substantially as specified.

In testimony whereof I have hereunto set my hand this 10th day of May, A. D. 1892.

HENRY BROOM.

Witnesses:

ELMER J. WHITELEY,
JOHN L. GILLIGAN.