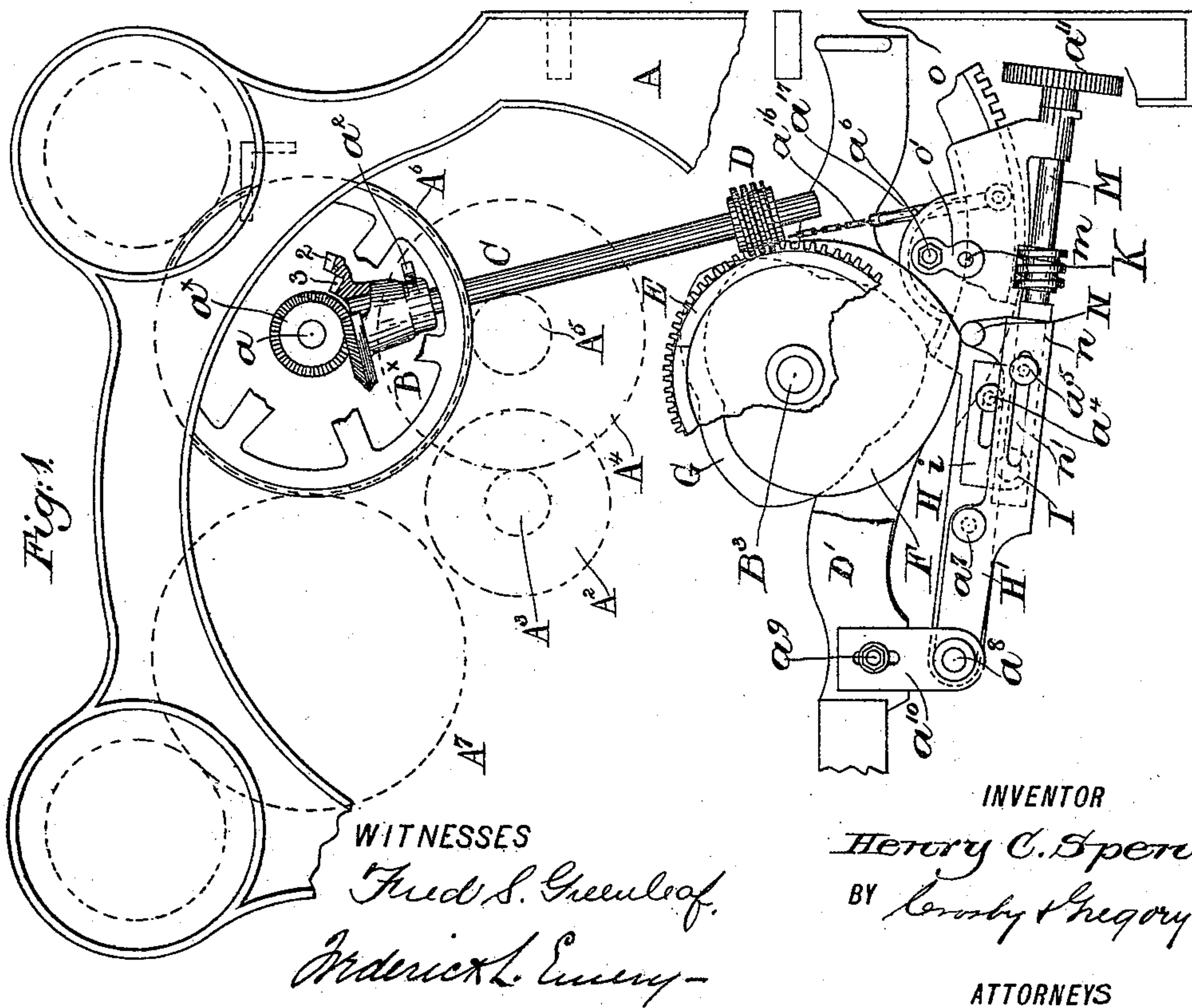
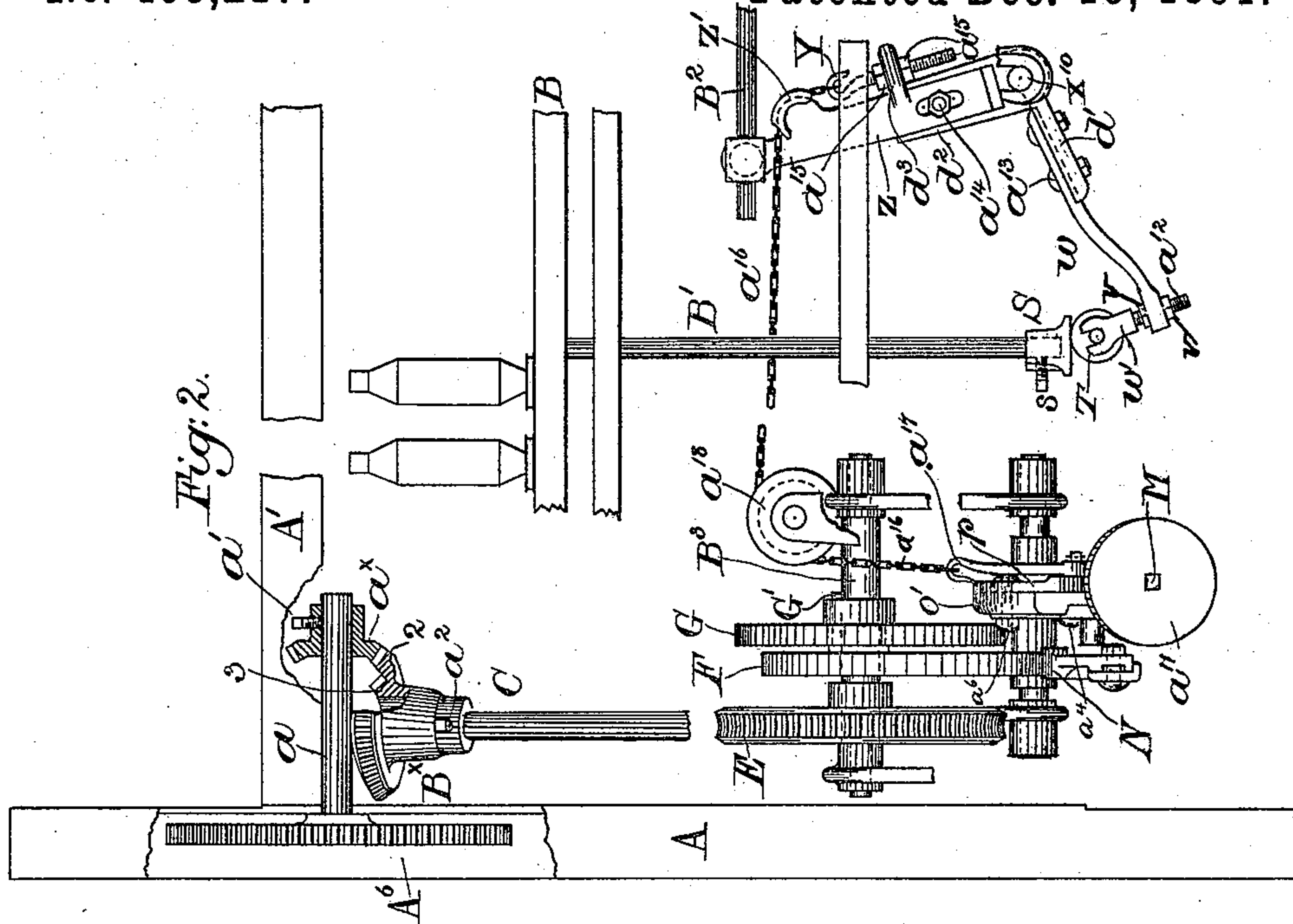


2 Sheets—Sheet 1.

COP BUILDING MECHANISM FOR SPINNING FRAMES.

No. 465,217.

Patented Dec. 15, 1891.



(No Model.)

2 Sheets—Sheet 2.

H. C. SPENCE.

COP BUILDING MECHANISM FOR SPINNING FRAMES.

No. 465,217.

Patented Dec. 15, 1891.

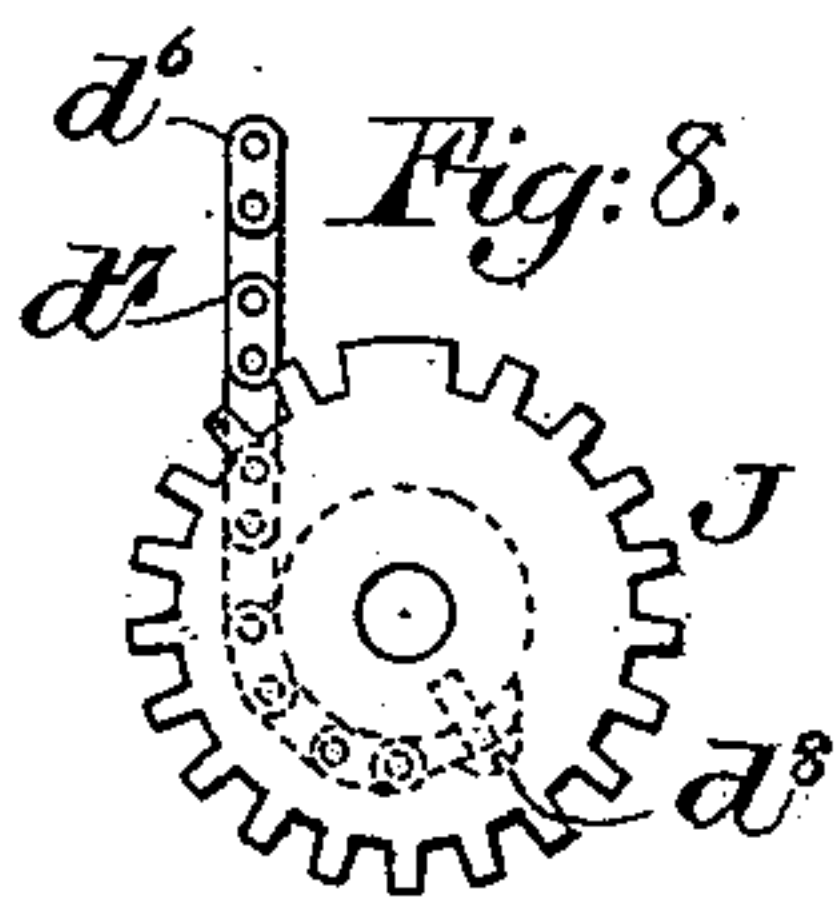
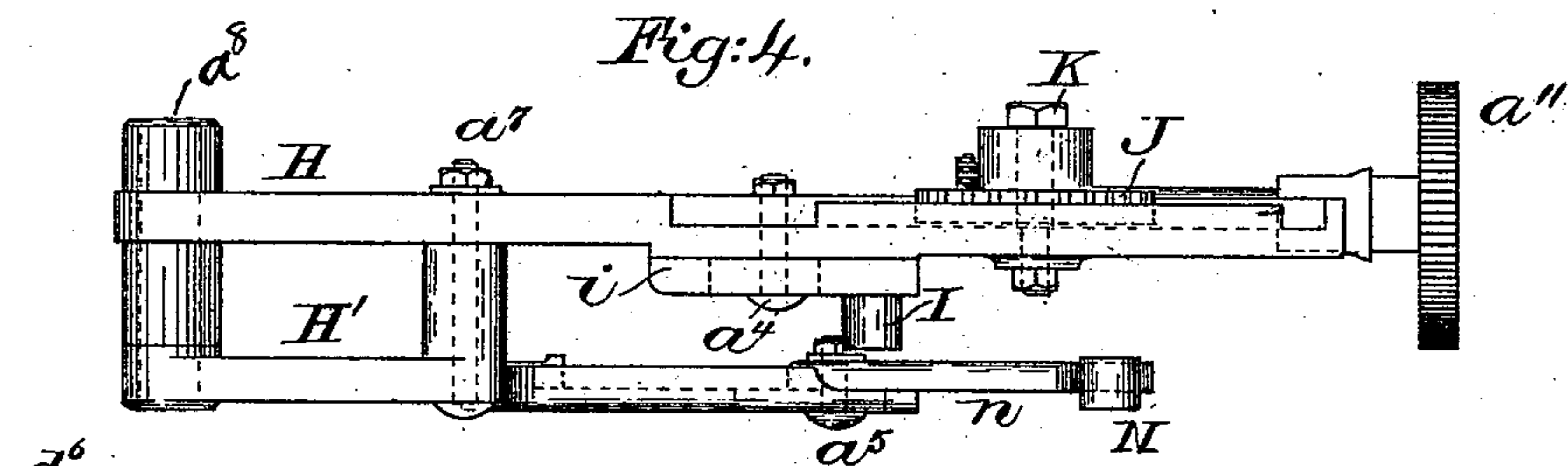
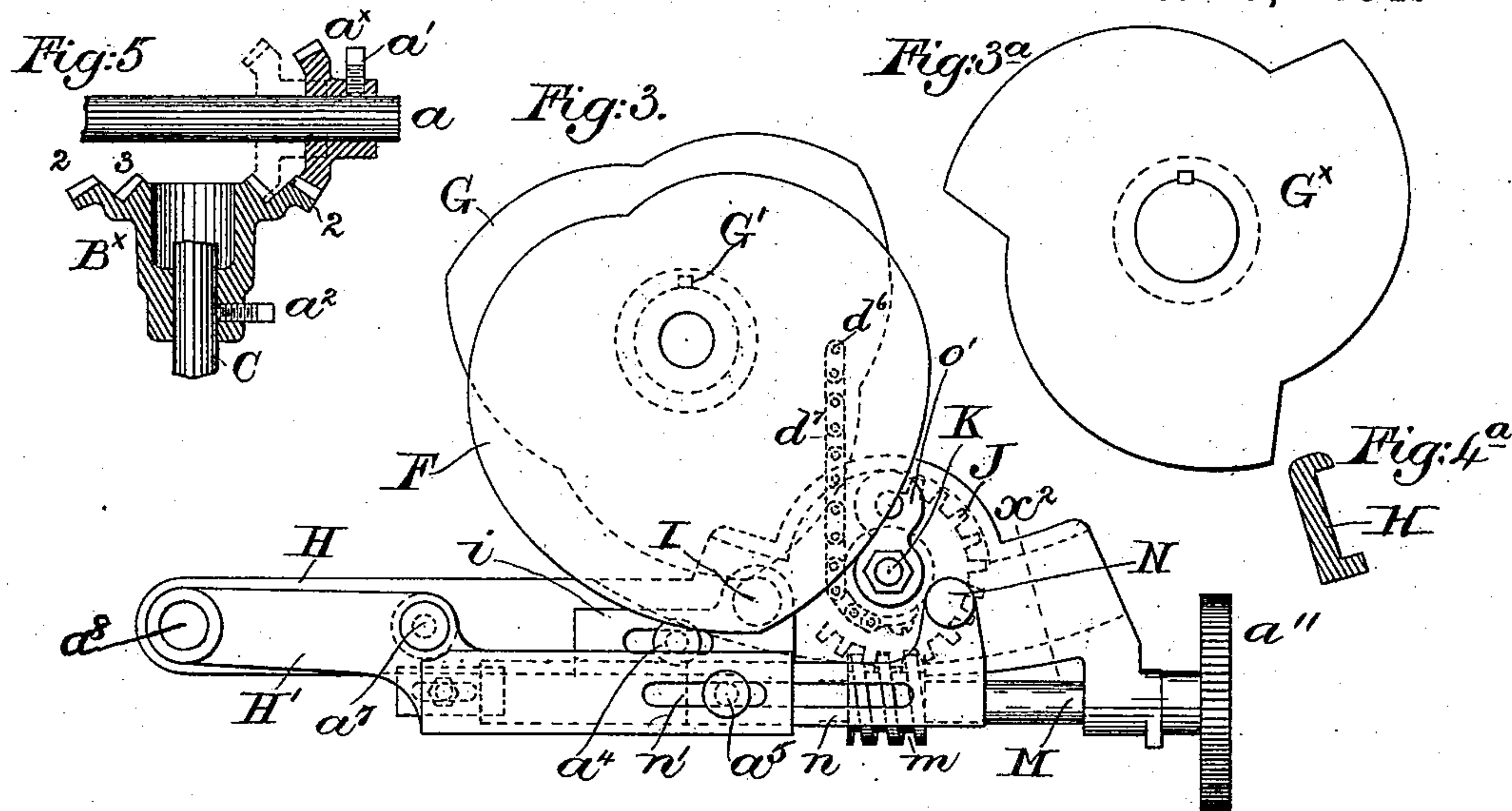


Fig. 6.

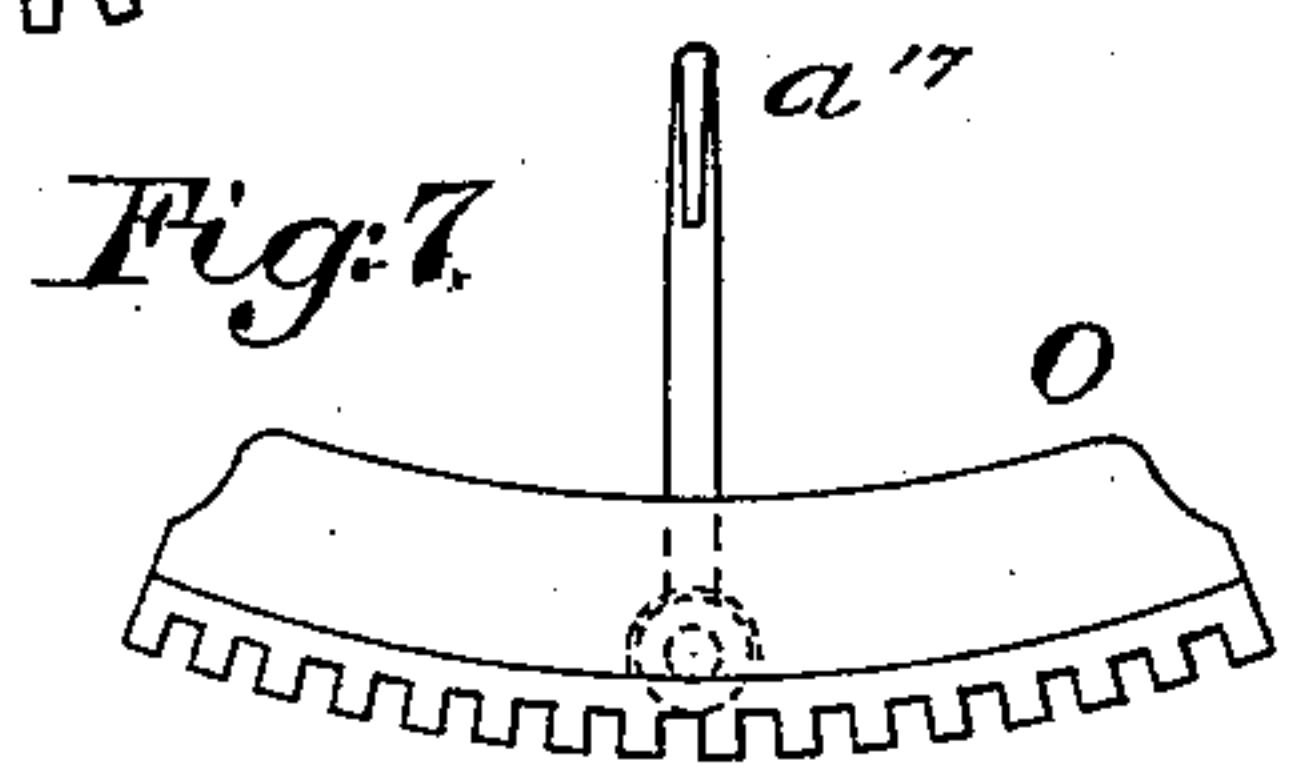
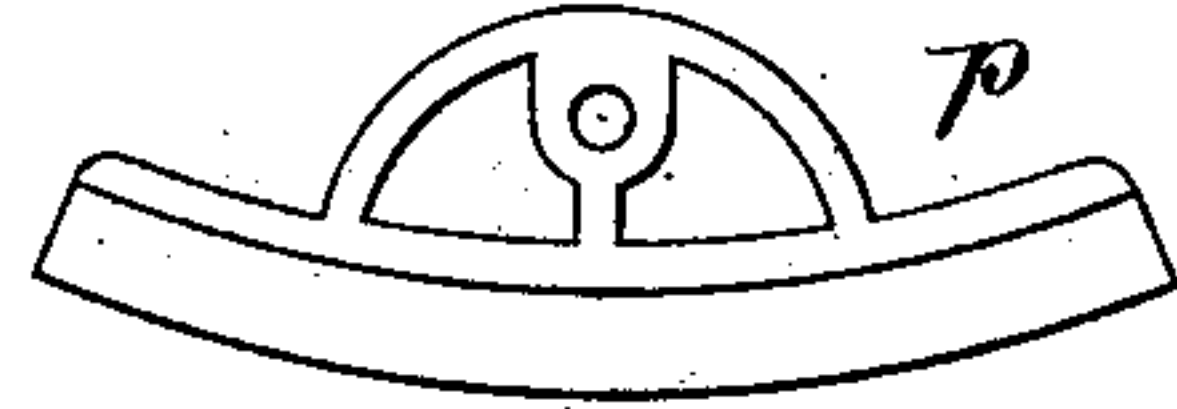
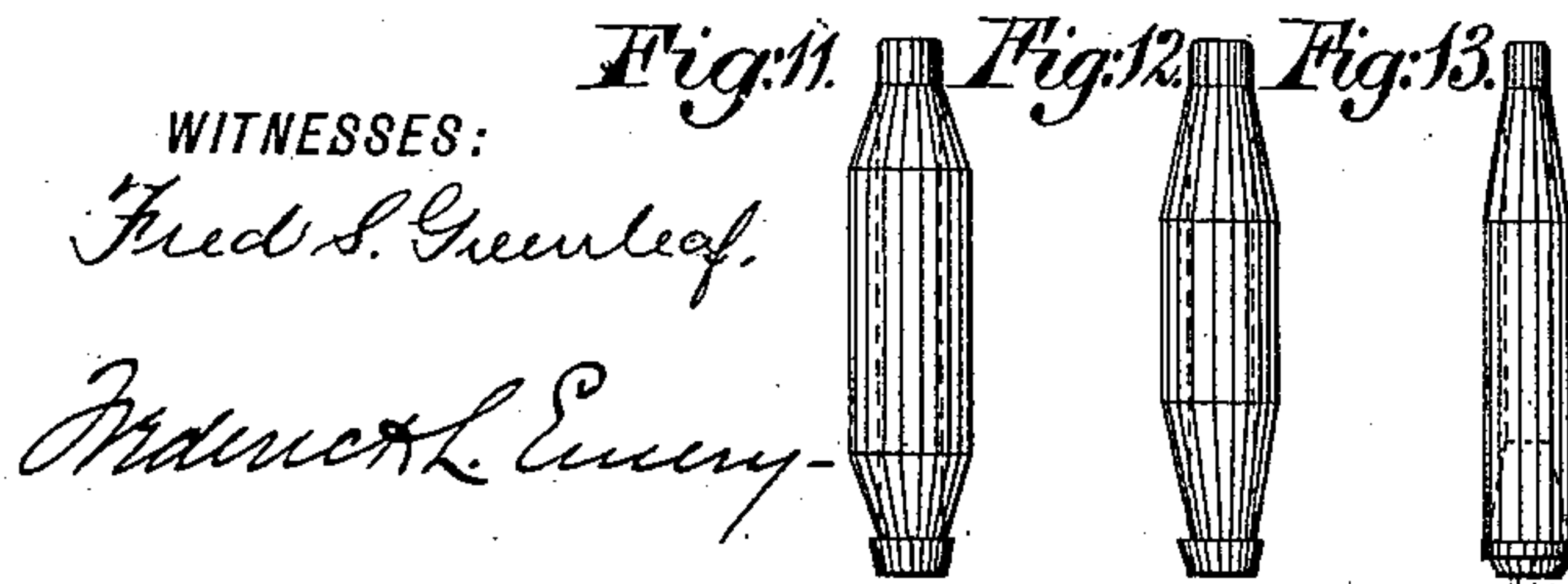
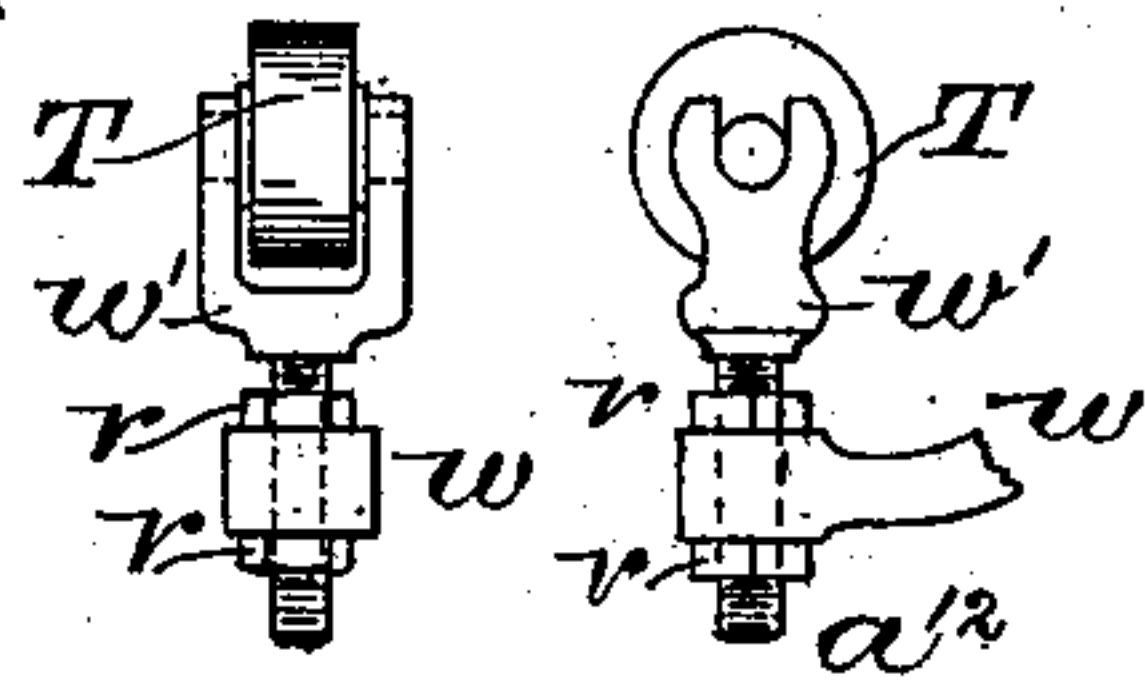


Fig. 9. Fig. 10.



WITNESSES:

Fred S. Greenleaf.

Madison L. Emery.

INVENTOR

Henry C. Spence,

BY Lemby & Gregory

ATTORNEYS

UNITED STATES PATENT OFFICE.

HENRY C. SPENCE, OF FALL RIVER, MASSACHUSETTS.

COP-BUILDING MECHANISM FOR SPINNING-FRAMES.

SPECIFICATION forming part of Letters Patent No. 465,217, dated December 15, 1891.

Application filed December 16, 1890. Serial No. 374,861. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. SPENCE, of Fall River, county of Bristol, State of Massachusetts, have invented an Improvement in Cop-Building Mechanism for Spinning-Frames, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

10 This invention has for its object to so construct the builder motion of a spinning-frame that with but slight changes, easily and quickly made, the same frame may be made to wind bobbins both for warp and for filling.

15 To accomplish this object in this my present invention I have provided one of the usual intermediate gears employed in the train of gearing for driving the usual rolls with a shaft, and have provided this shaft with a bevel-gear which may mesh with a gear of one or another number of teeth on the wave-shaft employed to actuate the building-cam shaft, such gears enabling me to readily change the speed of the builder-cam shaft

20 and its operative cam according to the work to be done, I having herein shown the gears on the said wave-shaft as a double bevel-gear. The builder-cam shaft, as shown, has a worm-gear engaged by a worm on the worm-shaft, and also two cams side by side, one a heart, it being of suitable shape to effect the warp-wind, and the other being three-pointed to effect the weft-wind. The builder-lever is made in two parts, one part having a stud to be acted upon by the heart-cam and the other a stud to be acted upon by the three-pointed cam, the said parts being adjustable to place either of the said studs as desired, in proper position to be acted upon by its proper cam.

30 This lever is adapted to receive either a segmental rack, as when winding warp-bobbins, or a gear, as when winding weft-bobbins, the usual chain or equivalent device attached to the rocker devices being attached to either this rack or this gear.

The particular features in which my invention consist will be hereinafter described, and pointed out in the claims at the end of this specification.

50 Figure 1 in broken elevation represents a sufficient portion of the head end of a spin-

ning-frame to enable my invention to be understood; Fig. 2, a partial front side view of the machine shown in Fig. 1, the parts contained in this and in Fig. 1 being thus adapted 55 for winding bobbins with a warp-wind. Fig. 3 is a somewhat enlarged detail of the builder-lever and the cams, the builder-lever carrying, however, the gear in place of the rack, as it will do when the machine is to be employed 60 for winding a weft-bobbin; Fig. 3^a, a modified form of builder-cam. Fig. 4 is a top or plan view of the parts shown in Fig. 3 with the cams omitted; Fig. 4^a, a section in line x^2 , Fig. 3. Fig. 5 is a sectional detail showing the driving source for the wave-shaft, the dotted lines showing the pinion in the position which it will occupy when the bobbins are being wound for weft. Fig. 6 shows the segment-plate which receives the segmental rack. 65 Fig. 7 shows the segmental rack removed from the builder-lever in Figs. 1 and 2. Fig. 8 shows the gear J detached. Figs. 9 and 10 show different views of the roll and its holder which acts upon the lifter-rod. Fig. 11 shows a bobbin wound with warp. Fig. 12 shows a bobbin of the same character, it having straight sides wound with weft-yarn. Fig. 13 shows a weft-bobbin having a truncated base wound with weft, the latter bobbin being adapted for 70 the loom-shuttle.

Referring to the drawings, the frame A, the roller-beam A', the band-cylinder A² for driving the spindles, the gear A³ thereon engaging the jack-gear A⁴ on a shaft, having a 85 change-pinion A⁵, which engages the intermediate gear A⁶, and the second intermediate A⁷, the said intermediates A⁶ and A⁷ driving the usual rolls, are and may be all as shown, as may also be the ring-rail B, the lifting-rod 90 B', and the rocker-shaft B².

The builder-cam shaft B³ has fast upon it the heart-cam F, employed when the bobbins are to be wound for warp, as in Fig. 11, and, as herein shown, the hub of this cam F has 95 fast upon it the weft-cam G, the connection being made by a usual bolt or key G'.

I have provided the usual intermediate A⁶ with a short shaft a , upon which I have adjustably secured by a set-screw a' a bevel- 100 gear a^x , the said bevel-gear being adapted to engage the outermost circle of teeth 2 of the

bevel-gear B^x , fast upon the upper end of the wave-shaft C, or the series of teeth 3 of a less number, forming, as herein shown, a part of the same gear, the gear a^x having preferably about thirty teeth, the series of teeth 2 having about fifty-two teeth and the series of teeth 3 about thirty-two teeth, so that when the gear a^x engages one or the other of the said series of teeth the wave-shaft is rotated at a different speed with relation to the shaft a and gear A^6 .

It is not intended to limit this invention to the exact number of teeth stated, as the difference in the size of the gears or the number of their teeth will vary, that depending upon the number of the yarn being wound.

In Figs. 1 and 2 the gear a^x engages the series of teeth 2 of the gear B^x , and in such condition it is supposed that the frame is winding warp-bobbins, but in Fig. 5 the gear a^x by its dotted-line position is shown as in mesh with the series of teeth 3, and at such time it is supposed that the machine will wind weft-bobbins.

The gear B^x is provided with a set-screw a^2 to hold it in adjusted position and enable it to be moved upon the shaft C when changing the gear a^x to one or the other of the series of teeth 2 or 3. The wave-shaft C is provided with a worm D, which engages the usual worm-toothed gear E, fast on the builder-cam shaft B^3 . To a cross-girt D' of the frame by bolt a^9 I have connected in adjustable manner a stand a^{10} , which receives a rock-shaft a^8 , to which is secured the builder-lever H H', the said builder-lever being a compound lever connected by a bolt a^7 . The arm H' near its forward end is grooved at its inner side to receive the slotted plate n , having the stud N, which is acted upon by the warp-cam F when the machine is being used to wind bobbins for warp, (see Fig. 11,) the said plate n being connected in an adjustable manner to the said arm H' by means of a bolt a^5 , carried by the said arm and extended through a slot n' in the arm H'.

Figs. 1 and 2 show the stud N in proper position to be acted upon by the warp-cam F; but in Figs. 3 and 4 the plate n is shown as moved forward upon the arm H' for a sufficient distance to remove the stud N from the path of motion of the cam F, it occupying such position when the weft-cam G is operating, as will be described.

The builder-lever referred to has suitable bearings, for the reception of the usual shaft M, having the worm m and the ratchet-gear a^{11} , and in practice this ratchet-gear is moved step by step in usual manner common to spinning-frames, as in United States Patent No. 222,330. The arm H of the builder-lever is suitably grooved (see Fig. 4^a) for the reception of segmental rack O, and the arm has a lug o' , through which is extended the bolt a^6 , (see Figs. 1 and 2,) which holds in place the segmental cap p , which retains the segmental rack O in place upon the builder-lever, but

so that it can be moved therein longitudinally by the action of the worm m in engagement with its teeth. The arm H also has connected to it by bolt a^4 the slotted plate i , having a stud I, which plate, when the machine is being used, as in Figs. 1 and 2, to wind warp-bobbins, is turned over back about the bolt a^4 as a center, as in dotted line, Fig. 1, thus placing the stud I out of the path of movement of the weft-cam G; but when the machine is to wind weft-bobbins and the stud N is drawn out into the position Figs. 3 and 4, as described, then the plate i is turned over forward from the position Fig. 1 into the position Figs. 3 and 4, so as to be acted upon by the weft-cam G.

The lifting-rod B' has at its lower end a shoe S, connected thereto by a set-screw s , the said shoe being of usual construction.

I have made some improvements in the rocker levers or arms to which the rocker-shaft is connected, especially the rocker-lever for operating the chain or equivalent a^{16} . The rocker-shaft x^{10} , which may be as usual, has an arm d' , to which is connected in adjustable manner by bolts a^{13} an arm W, in the outer end of which I have placed a stand W' , having a threaded shank a^{12} , provided with adjusting-nuts V, one above and one below the arm W, so that the said stand can be adjusted vertically in the arm W, the arm W being adjustable longitudinally. The stand W' carries a roll T, which acts upon the shoe S, and for the best results this roll should act upon the shoe centrally when the ring-rail B is in its central position, so it will be understood that with bobbins of different length, or where the wind upon the bobbins is to be varied in length, I may adjust the stand vertically and at the same time adjust the arm W longitudinally, to thus keep the proper relative positions of the parts according to the bobbin being wound, it varying as to the length of the traverse. The shaft x^{10} has a second arm d^2 , to which is adjustably connected by a bolt a^{14} an arm Z, having an ear d^3 , in which is adjustably mounted a chain-holder Y, the adjustment of the chain-holder being effected by means of two set-nuts a^{15} , to thus regulate the traverse of the ring-rail to the particular bobbins used, it being a fact that bobbins in different mills vary in length, and the adjustment of the chain enables the traverse of the ring-rail to be adapted to the particular length of bobbin. The chain a^{16} is connected at one end to this chain-holder, and at its opposite end it is connected to a hook a^{17} , in turn pivoted upon the rack O when the latter is used; but when the cam G is operated, then the end of the chain a^{16} is connected to the endmost link d^6 of a chain d^7 , (shown as fastened by a screw d^8 to the hub of the worm-pinion J, to be described.) The arm Z is provided with a curved rest or guide Z' , having a flange, over which the said chain a^{16} is passed, the chain being also passed over a sheave a^{18} , which may be as usual.

When the machine is to be used for winding weft-bobbins, the bolt a^6 is removed, taking off the cap-plate p , and the segmental rack O is drawn out, the chain a^{16} being disengaged from the hook a^{17} . This done, the worm-pinion J is secured to the ear o' of the arm H by a bolt K, and the chain a^{16} is connected to the chain d^6 , the worm m on the shaft M engaging the worm-pinion J and rotating the same step by step, unwinding the chain d^6 from the hub of the worm-pinion J intermittingly as the bobbin is filled, to thus change the starting-point of the ring-rail in its upward movement prior to applying each layer of yarn, this variation in traverse being, as shown, to wind the weft.

A machine provided with my improvement may be changed from the warp to the filling wind, or vice versa, ordinarily in less than five minutes, it being necessary only to shift the plates n or i , as stated, and to change the segmental rack for the worm-pinion, or vice versa, and to change the meshing of the gears a^x and B^x .

Prior to my invention I am not aware that the builder-cam shaft of a spinning-frame has ever been provided with a warp and a weft cam adapted to operate, as desired, upon studs mounted upon one and the same builder-lever, so that this invention is not limited to the particular shape of the builder-lever or of the manner in which the studs to be acted upon by the said cams are connected to or made adjustable on the said builder-lever, as the particular construction of these parts might be variously modified without departing from the gist of my invention.

While for simplicity I prefer the employment of the gears a^x and B^x in order to gain a different speed for the wave-shaft from the constantly-moving intermediate A^6 common to spinning-frames, yet this invention is not limited or intended to be limited to the exact construction of gearing shown, as instead I might employ any other well-known equivalent devices, whereby a difference in speed between the shaft a and the shaft C may be gained, there being many such devices well known to mechanics.

The three-pointed cam G, when shaped as in Fig. 3, will wind a weft or shuttle bobbin, as in Fig. 13, and as the grade of each half of each point of the three points is the same the speed of the ring-rail in its ascent and descent will be the same, the time in practice being about forty seconds in ascending and forty seconds in descending.

In some classes of work it is desired when the rail is rising to so wind the yarn as to form of that layer a binder to prevent the yarn "shelling off" or tangling when the bobbin is in the shuttle. To do this and wind the yarn as it is wound in mule-cops, I substitute for the cam G a weft-cam G^x , of the shape shown in Fig. 3^a, one side of each point being much shorter and steeper than the other half, the steeper grades running the rail up quickly to

make a binding-layer, the less steep grade letting the rail down slowly to wind the yarn closely.

I claim—

1. A spinning-frame containing the following instrumentalities, viz: a builder-cam shaft, a gear thereon, a wave-shaft having a worm, an intermediate gear, as A^6 , its shaft a , and intermediate gearing between the said shafts a and C, whereby the speed of the shaft C and consequently of the builder-cam shaft may be readily changed, as desired, substantially as described.

2. In a spinning-frame, the builder-lever having a groove for the reception of the rack-bar, and a rack-bar therein, combined with a worm-shaft M, having a worm m to engage and move the rack-bar, substantially as described.

3. In a spinning-frame, the builder-lever having a groove therein, an ear or lug, and the worm-shaft M, having the worm m , to operate substantially as described.

4. A spinning-frame containing the following instrumentalities, viz: a builder-cam shaft, builder-cams F and G thereon, and means to rotate the said shaft at different speeds according to which cam is to operate the builder-lever, combined with a builder-lever provided with adjustable studs adapted to be put into or out of operative position with relation to one or the other of the said cams, to operate substantially as described.

5. In a spinning-frame, the combination, with the ring-rail and lifting-rod provided with a shoe, of a rocker-lever having an arm provided with a vertically-adjustable stand containing a roll to act upon the said shoe and with means to adjust the said arm longitudinally, as and for the purpose set forth.

6. In a spinning-frame, the combination, with the ring-rail and lifting-rod provided with a shoe, of a rocker-lever having an arm d^2 , an arm Z, longitudinally adjustable thereon, and a chain-holder mounted on said adjustable arm Z to shorten the effective length of the chain and thereby regulate the traverse of the ring-rail to the bobbins used, substantially as described.

7. A spinning-frame containing the following instrumentalities, viz: a builder-cam shaft, a gear thereon, a wave-shaft having a worm, an intermediate gear A^6 , its shaft a , the adjustable bevel-gear a^x on said shaft, and the bevel-gear B^x , adjustable on the shaft C, provided with two concentric series of teeth equidistant from the shaft a , whereby the speed of the shaft C and consequently of the builder-cam shaft may be readily changed, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY C. SPENCE.

Witnesses:

ARTHUR F. SIMMONS,
FRANK B. CAMPBELL.