

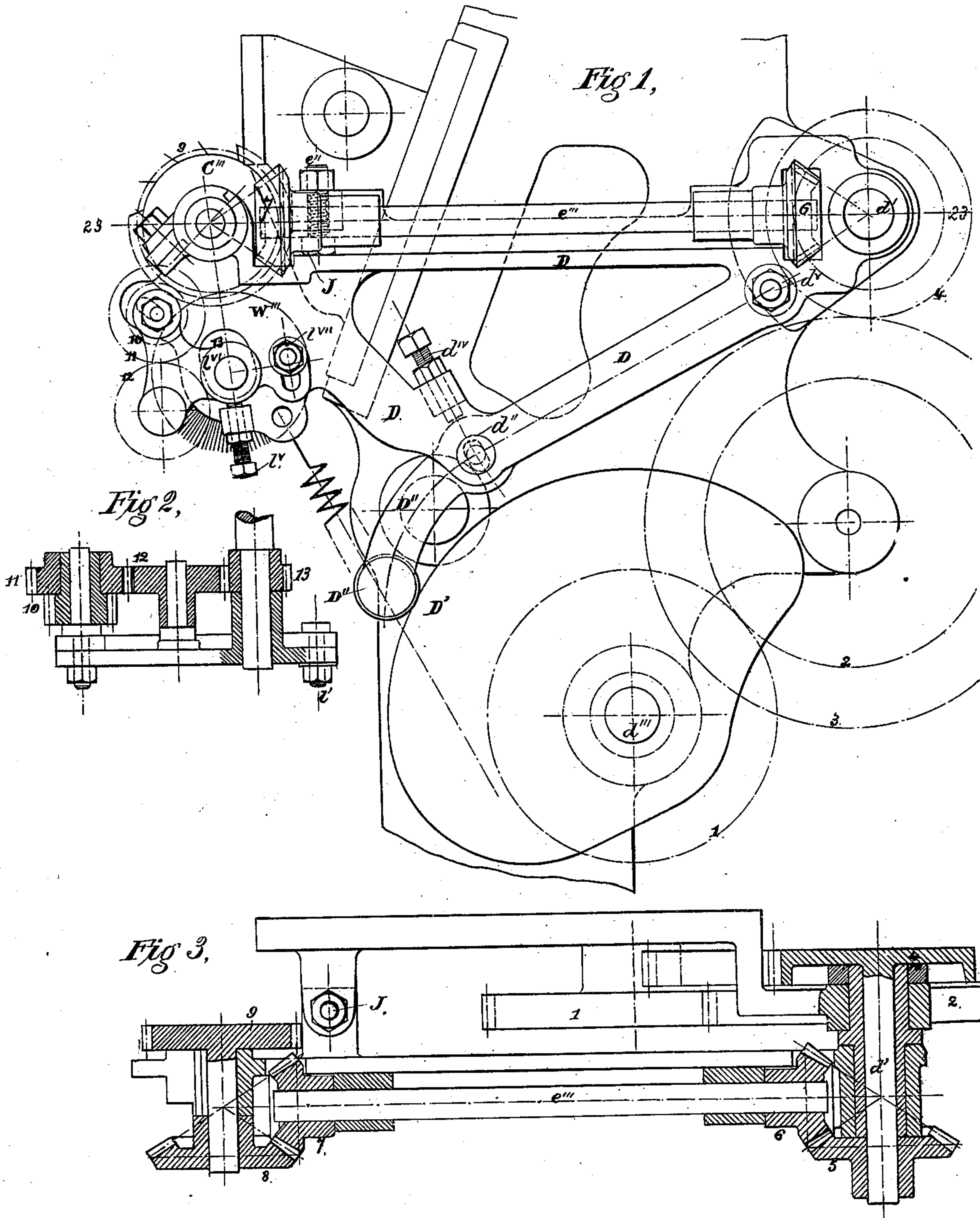
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8 Sheets—Sheet 1.

P. HEILMANN-DUCOMMUN.
MACHINERY FOR COMBING FIBROUS SUBSTANCES.

No. 373,365.

Patented Nov. 15, 1887.



Attest
Geo. F. Smallwood Jr
Walter Allen

Inventor:
P. Heilmann-Ducommun,
By *Knights & Sons*
Attys.

8 Sheets—Sheet 2.

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Geo. T. Smallwood Jr.
Walter Allen

Inventor

P. Heilmann-Ducommun

Bu Knight Bros

Attys

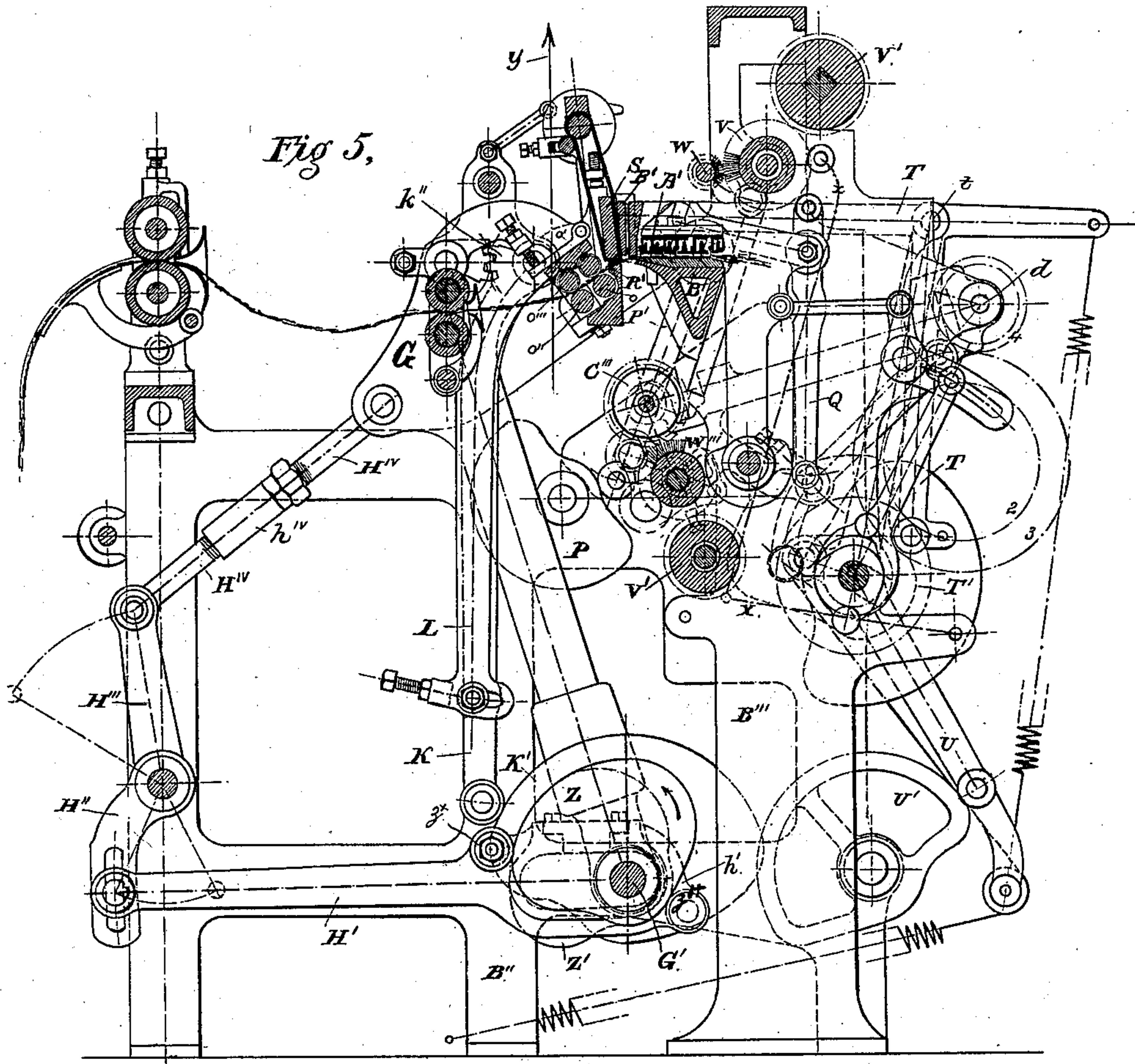
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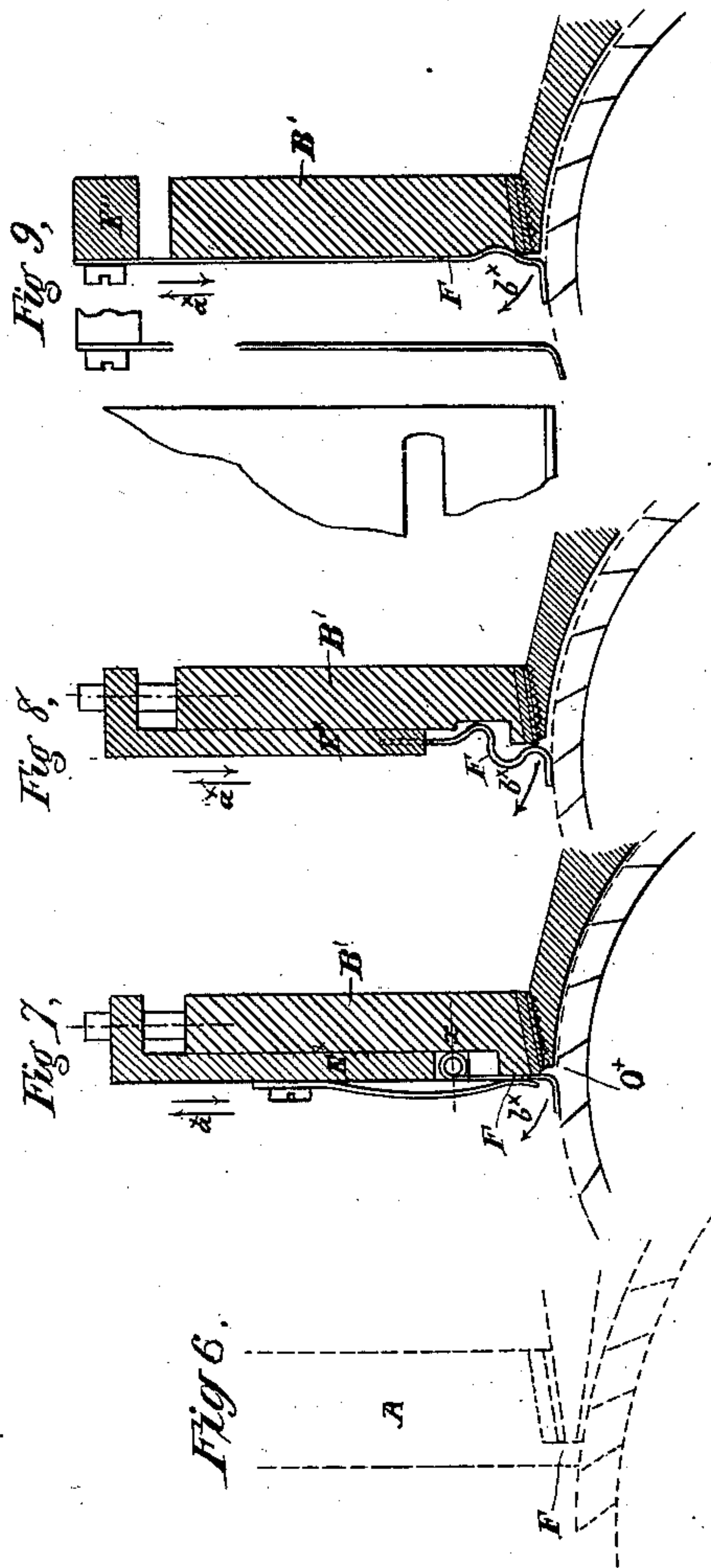
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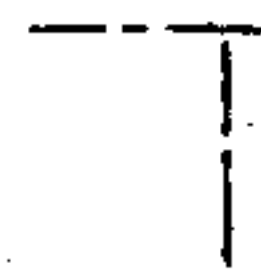
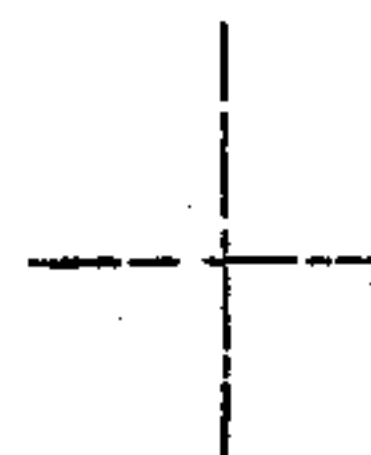
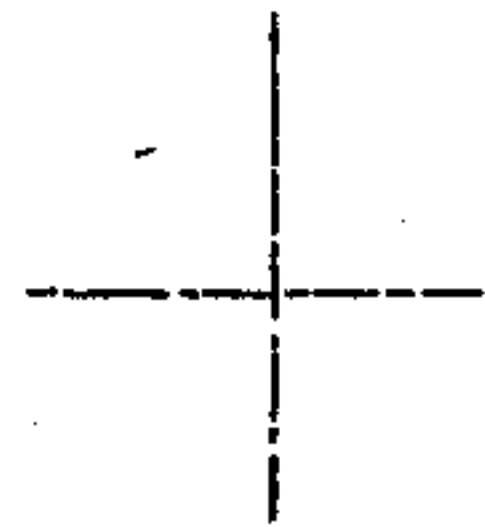
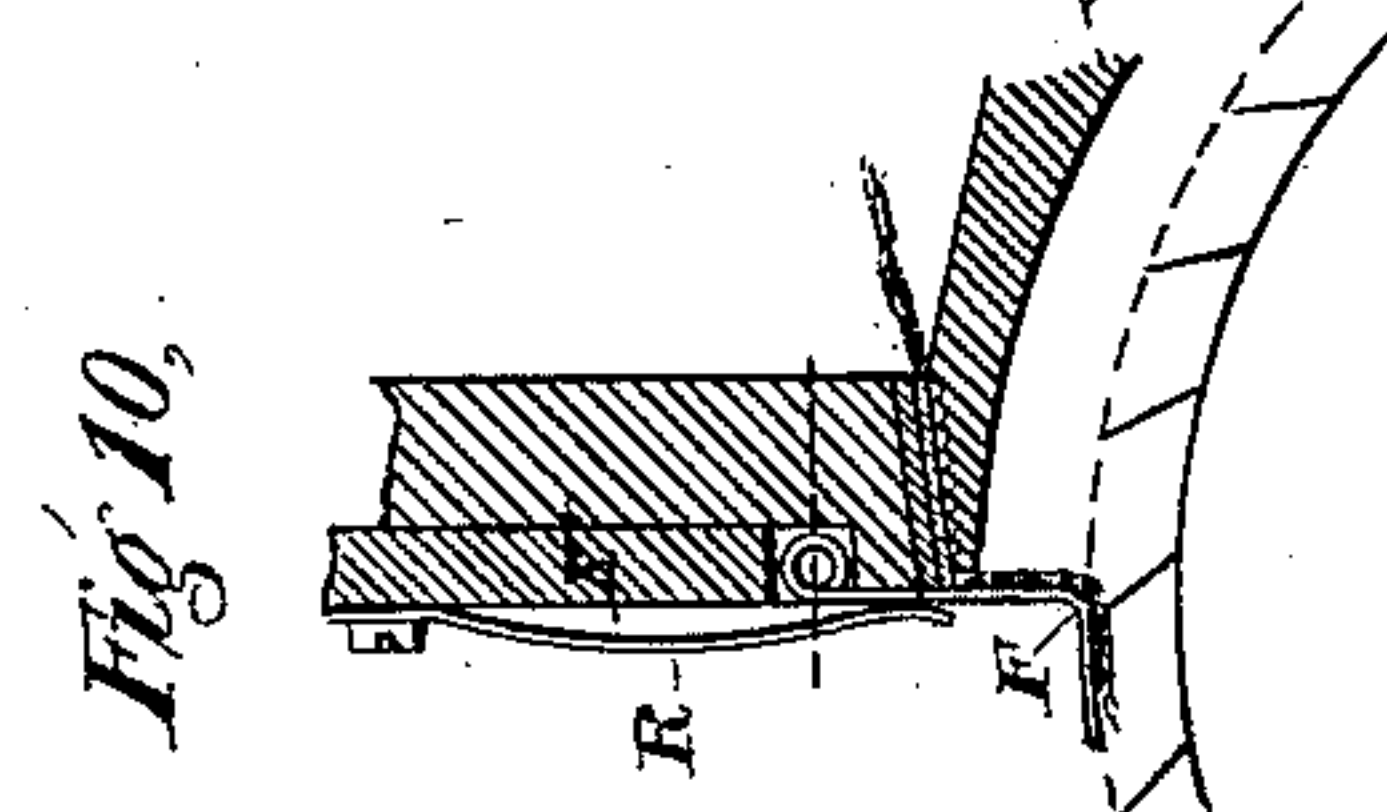
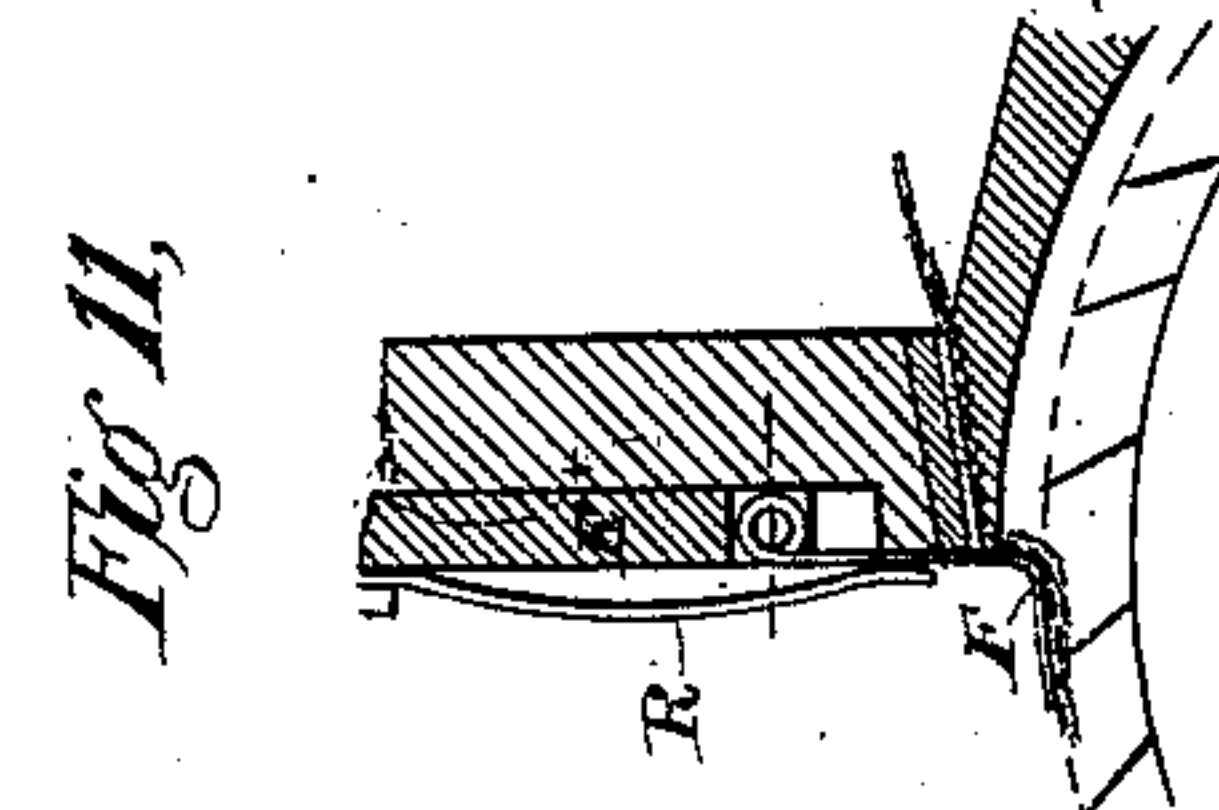
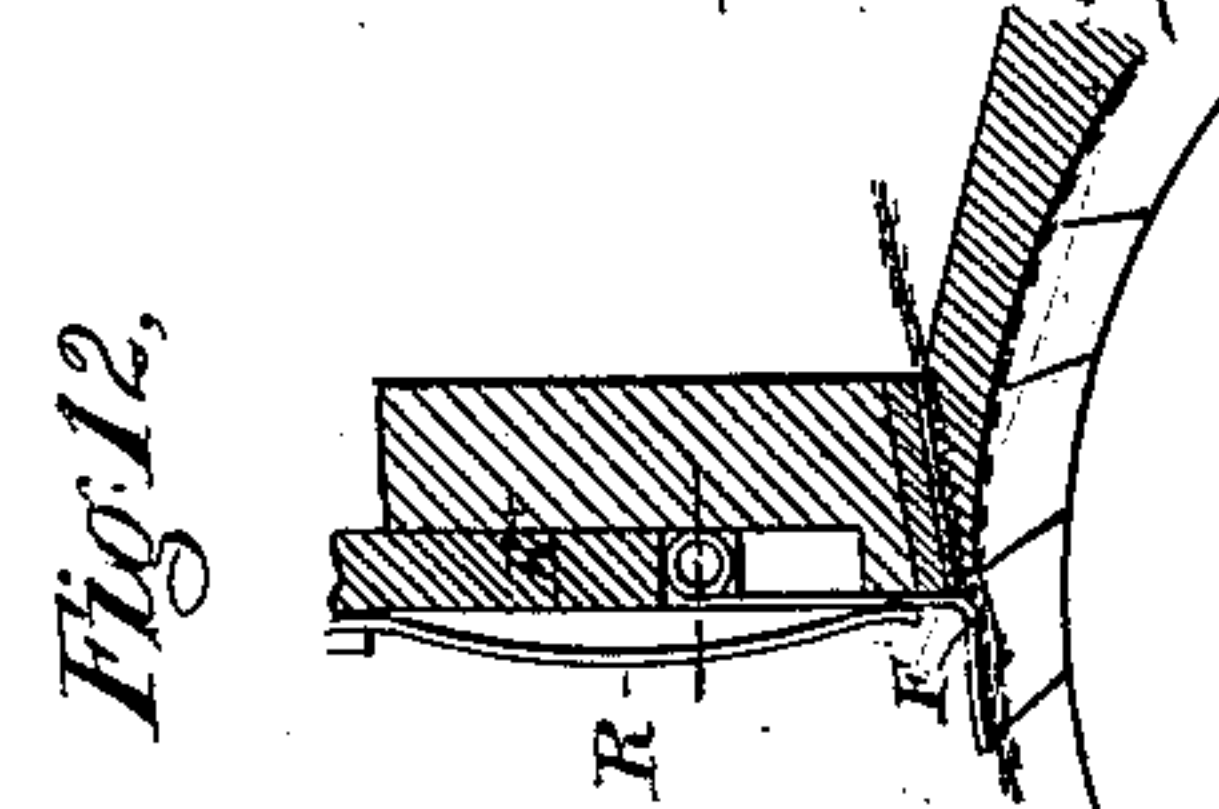
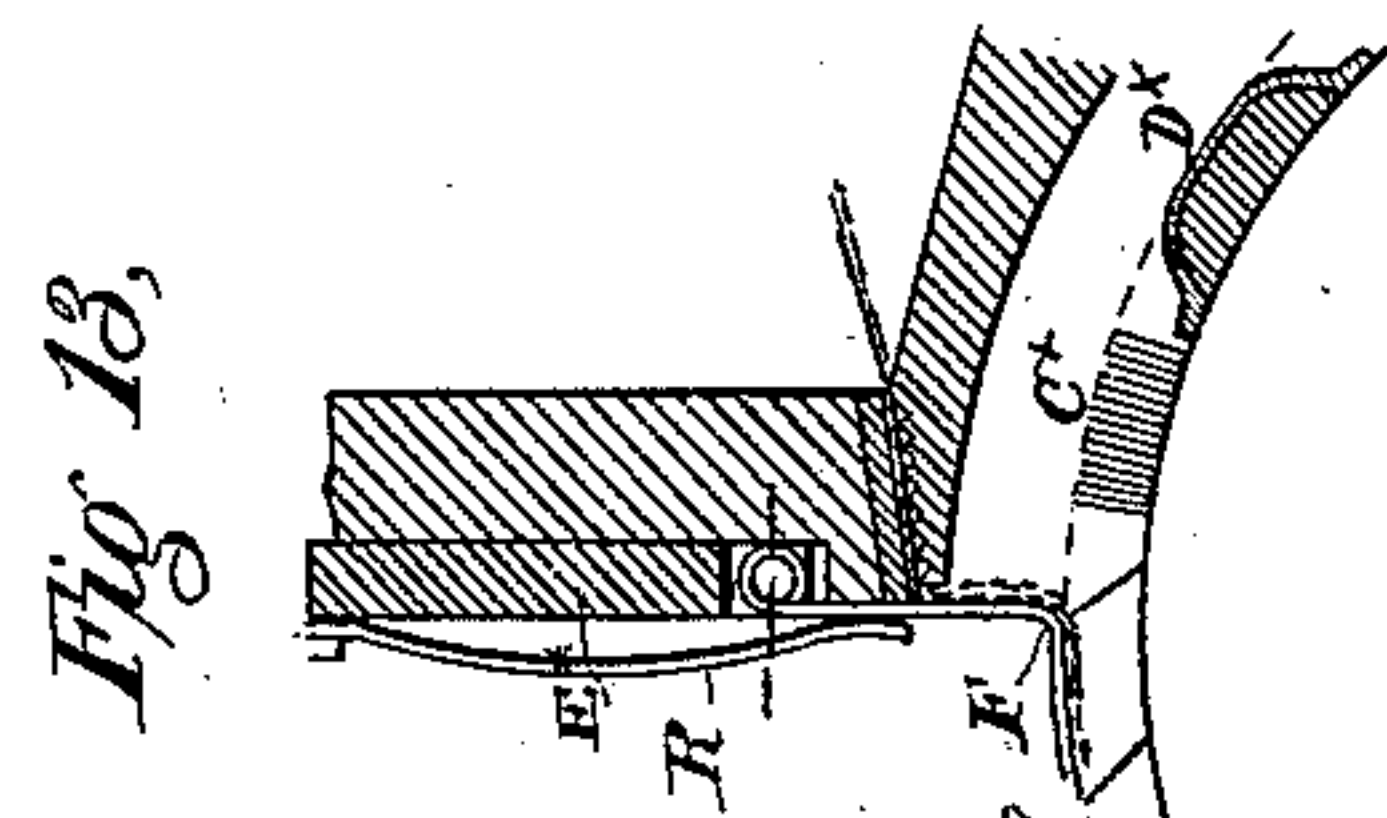
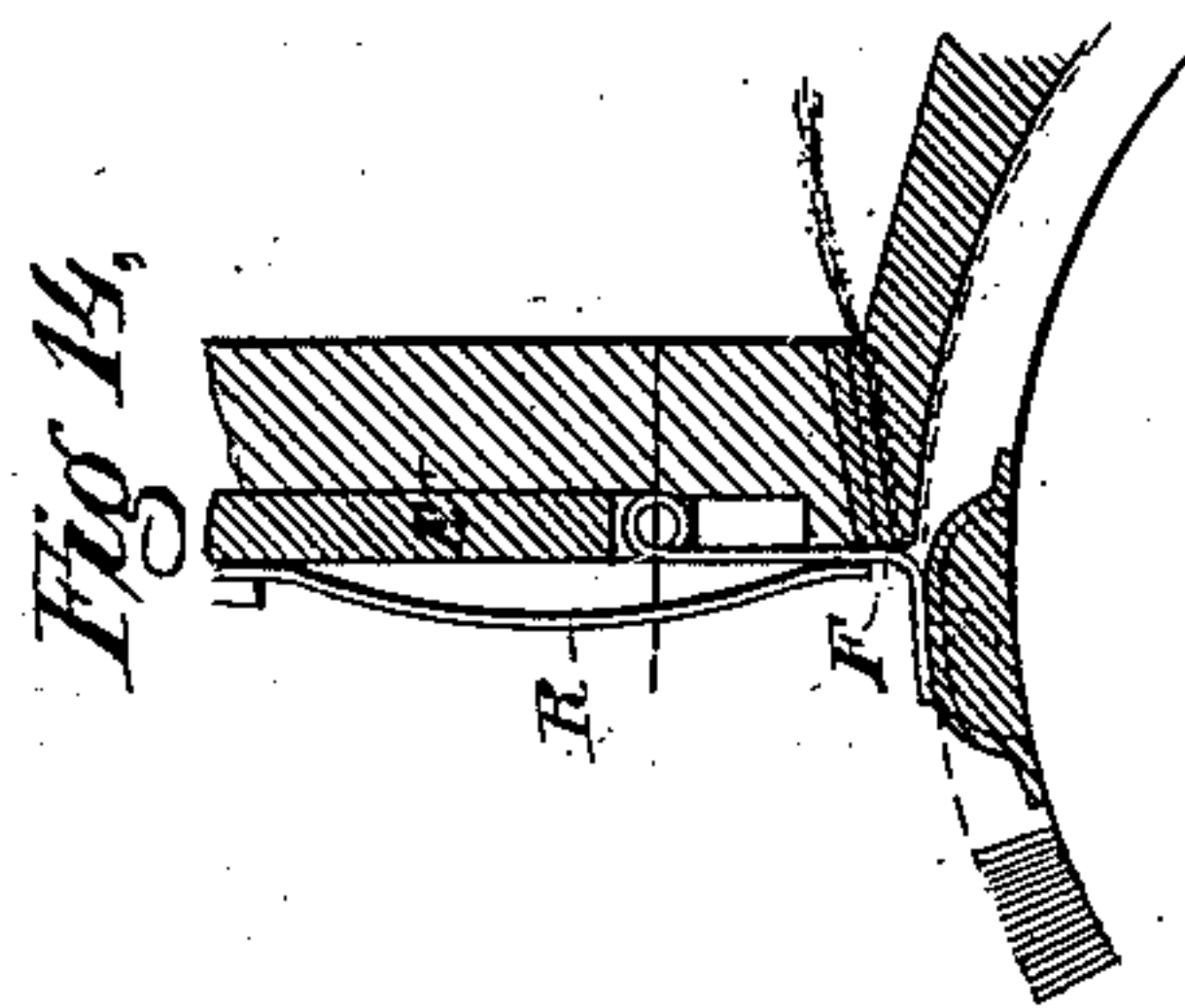
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Inventor:

P. Heilmann-Ducommun.

By Knight Bros

Attys

Attest:
Geo. Smallwood Jr
Walter Allen

(No Model.)

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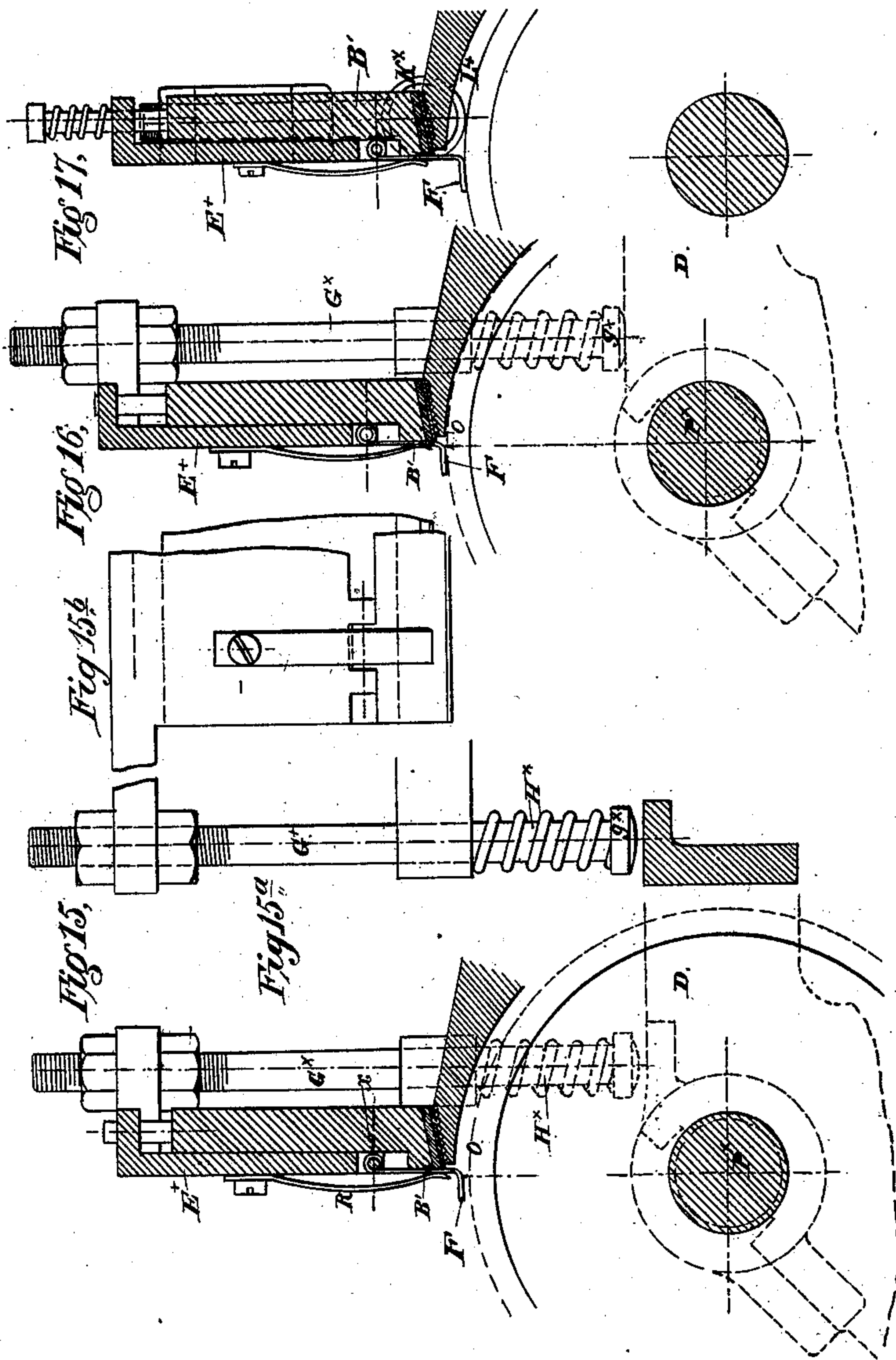


Fig 21,

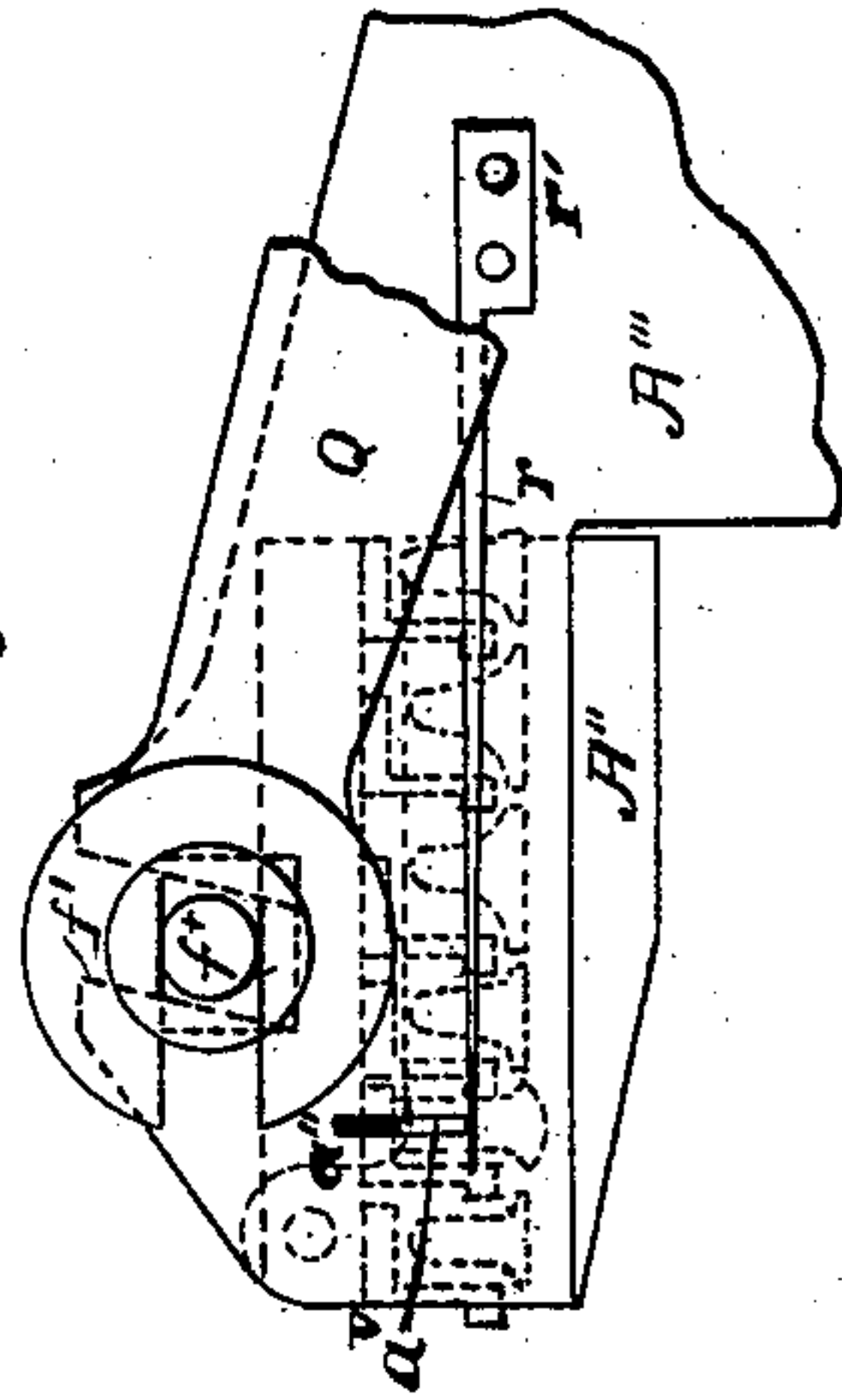
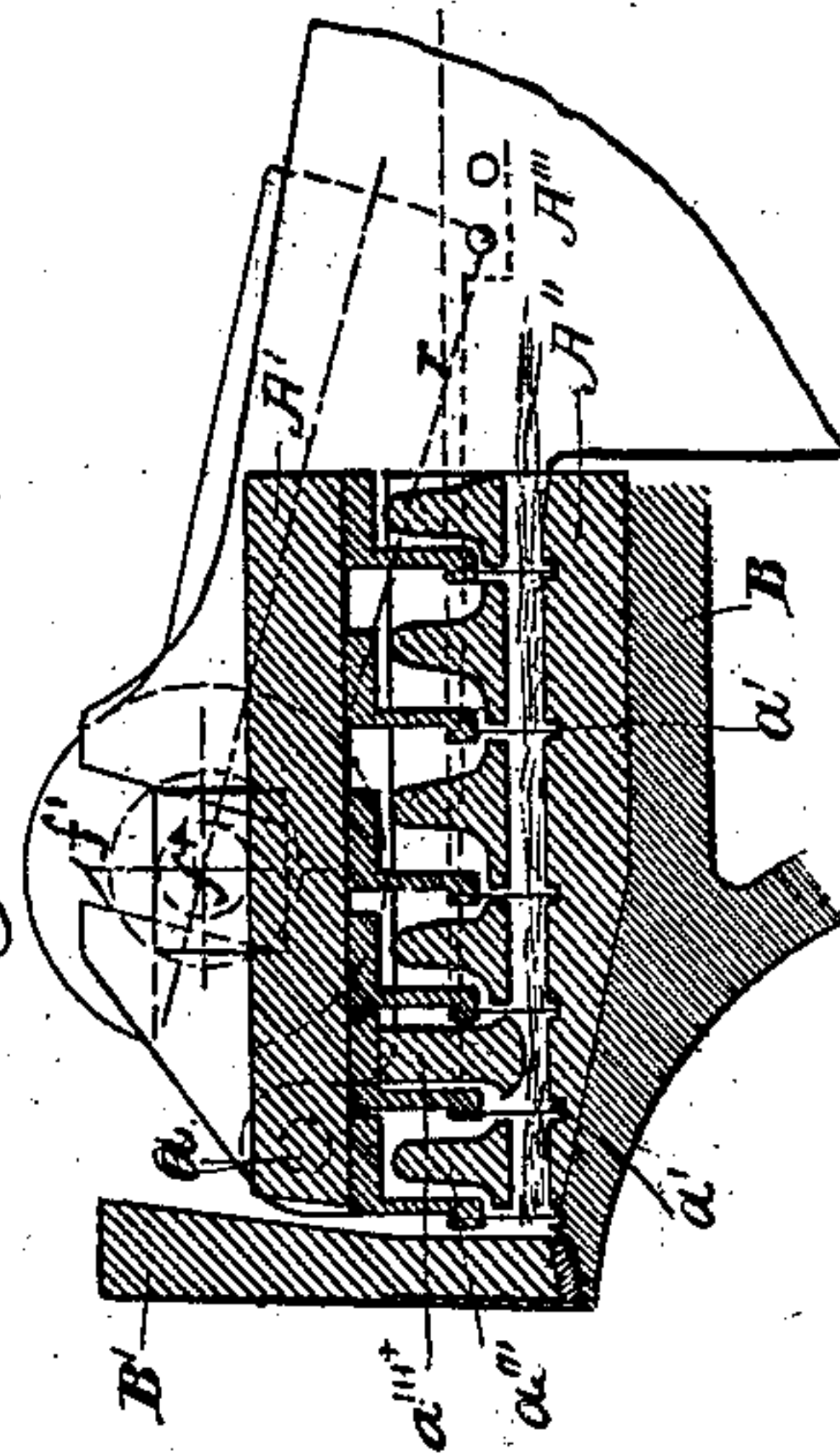


Fig 20,



Inventor:

Attest:
Geo. J. Smallwood Jr.
Walter Allen

P. Heilmann-Ducommun.
Knight Bros.
attys.

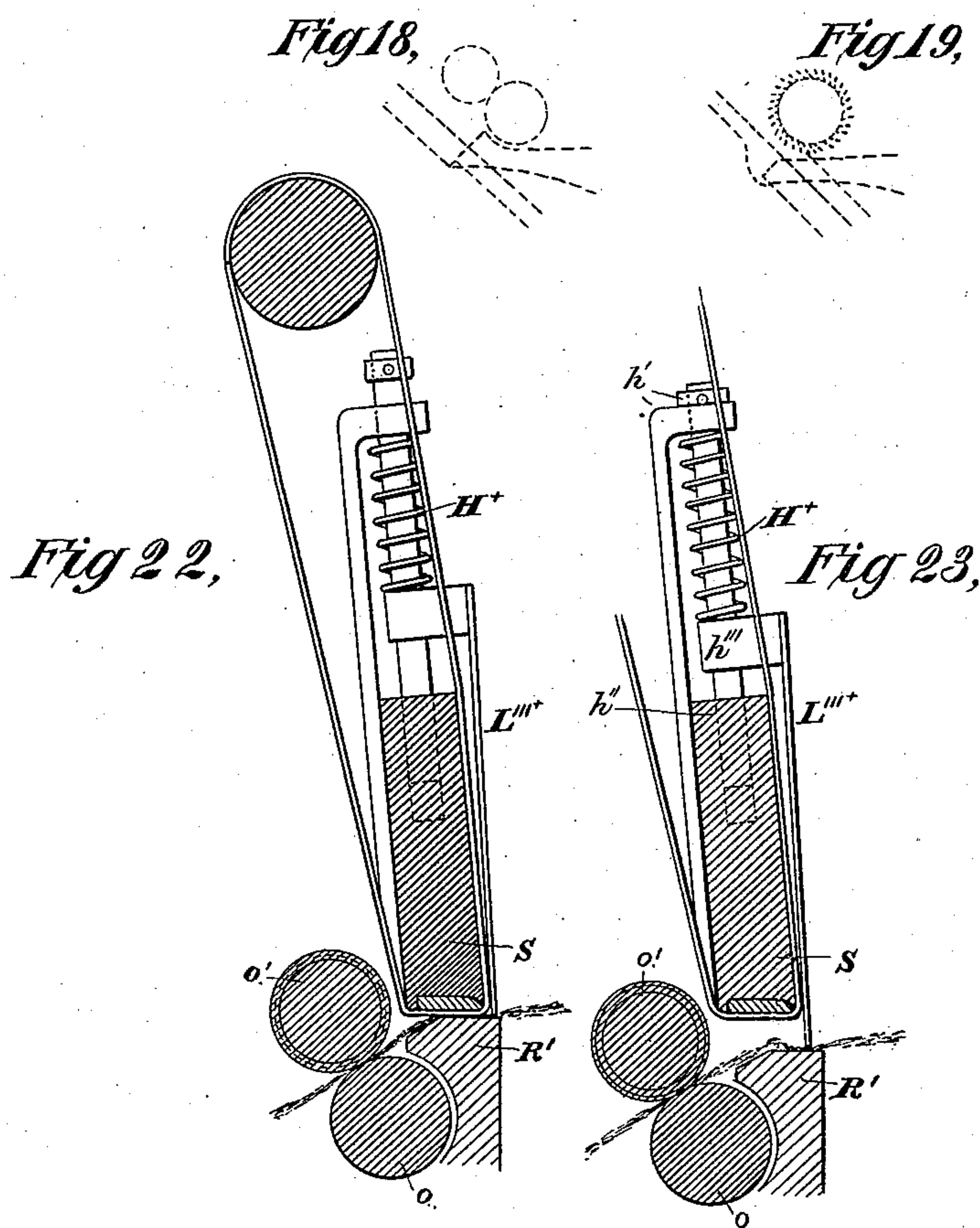
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Geo. T. Smallwood Jr.
Walter Allen

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P. Heilmann-Ducommun

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Atty.

(No Model.)

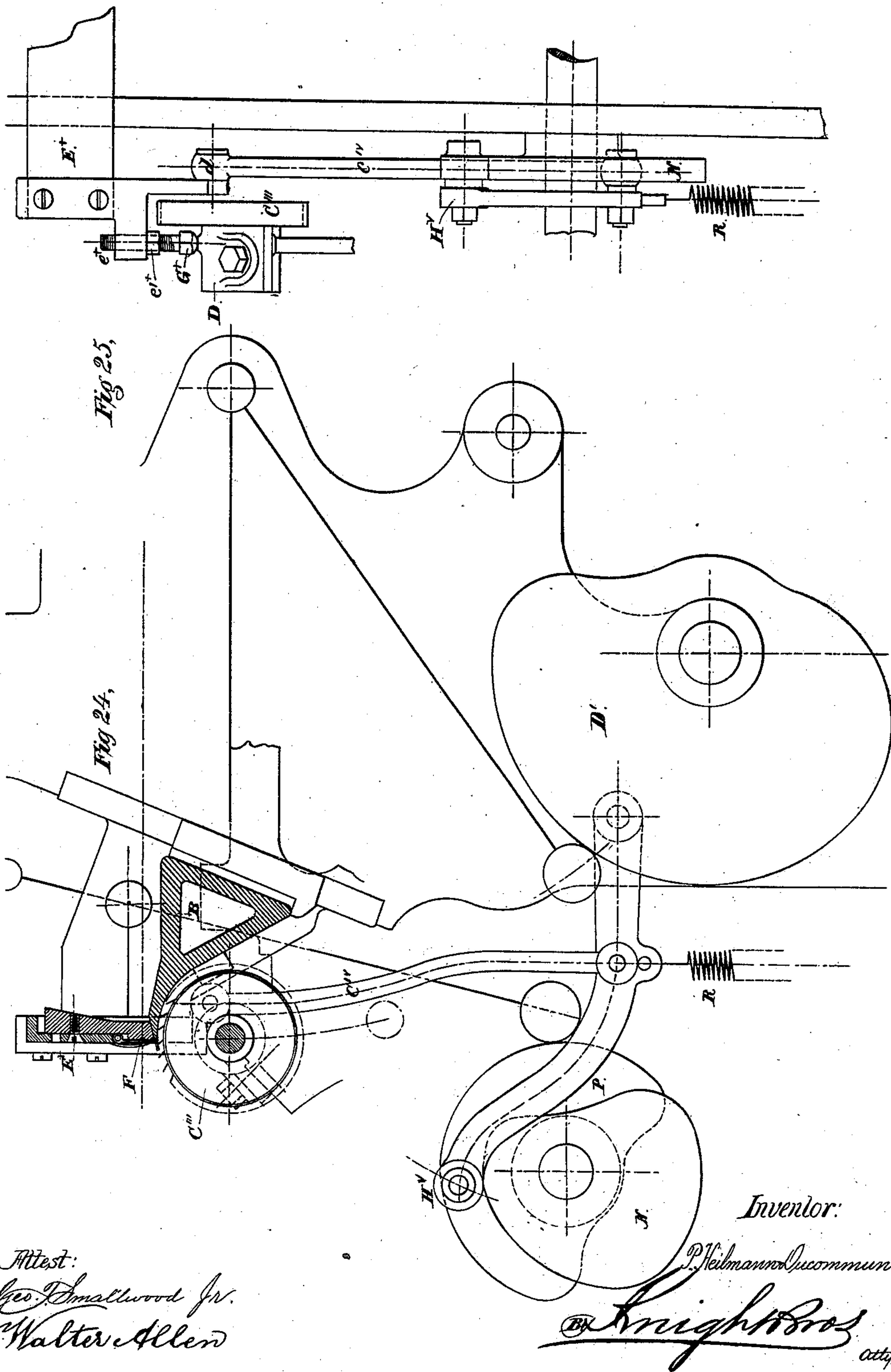
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Attest:
Geo. D. Smallwood Jr.
Walter Allen

Inventor:

L. Heilmann & Co. Comm.

Knights Bros attys

UNITED STATES PATENT OFFICE.

PAUL HEILMANN-DUCOMMUN, OF MULHOUSE, ALSACE, GERMANY, ASSIGNOR
TO HEILMANN-DUCOMMUN & STEINLEN, OF SAME PLACE.

MACHINERY FOR COMBING FIBROUS SUBSTANCES.

SPECIFICATION forming part of Letters Patent No. 373,365, dated November 15, 1887.

Application filed November 28, 1884. Serial No. 149,131. (No model.) Patented in France November 8, 1877, No. 120,910, February 21, 1878, No. 122,573, April 8, 1878, No. 123,709, August 24, 1878, No. 126,092, and January 1, 1879, No. 128,506; in England November 29, 1877, No. 4,508, September 28, 1878, No. 3,836, and February 11, 1879, No. 547; in Germany September 11, 1878, No. 6,244, February 11, 1879, No. 7,772, March 27, 1879, No. 7,445, and April 22, 1879, No. 8,167; in Belgium April 26, 1879, No. 48,040; in Italy May 31, 1879, XXII, 16, and June 30, 1879, X, 316; in Spain June 30, 1879, No. 253, and in Austria-Hungary October 17, 1879, No. 376.

To all whom it may concern:

Be it known that I, PAUL HEILMANN-DUCOMMUN, engine-manufacturer, of Mulhouse, Alsace, have invented certain new and useful
5 Improvements in Machinery for Combing Fibrous Substances, (for which I have obtained patents in Germany, No. 6,244, September 11, 1878, No. 7,445, March 27, 1879, No. 7,772, February 11, 1879, and No. 8,167, April 22, 1879; in England, No. 4,508, November 29, 1877, No. 3,836, September 28, 1878, and No. 547, February 11, 1879; in France, No. 120,910, November 8, 1877, No. 122,573, February 21, 1878, No. 126,092, August 24, 1878, No. 123,709, April 8, 1878, and No. 128,506, January 1, 1879; Italy, Vol. 22, No. 16, May 31, 1879, second series, Vol. 10, No. 316, June 30, 1879; Austria, Class XIV, 376, Vol. 29, page 1358, October 17, 1879; Belgium, No. 48,040, April 26, 1879, and Spain, No. 253, folio 74, June 30, 1879,) of which the following is a specification.
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My invention relates to that class of fiber-combing machines described in Patent No. 224,428, issued to me in conjunction with Charles V. Steinlen on the 10th of February, 1880, to which patent I refer for a detailed description of the general features and operation of the machine.

30 My improvements are as stated specifically in the following description.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in
35 which—

Figure 1 is a side elevation of the rotary comb and its accessories. Fig. 2 is a sectional view of the gearing for transmitting motion from the rotary comb to its cleaning-brushes.
40 Fig. 3 is a horizontal section on the line 23 23, Fig. 1. Fig. 4 is a sectional elevation of the holding-nipper, gill-box feed, and mechanism for operating the same. Fig. 4^a is an elevation of the nippers, showing the manner of securing the upper jaw thereof to the frame of
45 the machine and the mechanism for imparting to it the necessary reciprocating motion. Fig.

5 is a vertical transverse section of the entire machine, showing the rotary comb and the gill-box feed. Fig. 6 is a diagram illustrating a stationary nipper constructed with a holding lip or finger, as heretofore used. Figs. 7 to 14, inclusive, are vertical sections of the stationary nipper, illustrating the action of my improved movable holding-finger in presenting the head of the web to the action of the rotary comb. Figs. 15 and 16 are vertical sections of the holding-nipper and lip and of the stop employed to lift the lip upon the approach of the rotary comb. Figs. 15^a and 15^b are detail views of parts of the device shown in Figs. 15 and 16 removed. Fig. 17 is a vertical section showing a stop of modified form for accomplishing the same object. Figs. 18 and 19 are diagrams illustrating, respectively, roller and porcupine feeders heretofore used, showing the necessary distance of their holding-points in rear of the face of the nipper. Figs. 20 and 21 are respectively a vertical transverse section and side elevation of a gill-box provided with bars, one of which is constructed to serve as a supplementary nipper in rear of the holding-nipper B B'. Figs. 22 and 23 are transverse sections showing in two positions the parting-nipper provided with a supplementary lip moving relatively to its upper jaw, so as to prevent the adhesion of the web thereto. Figs. 24 and 25 are respectively a transverse section and a front elevation of another form of mechanism for imparting the required relative movements to the movable finger of the holding-nipper and the rotary comb.
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It has been found in practice that the slotted rock-shaft for actuating the drawing-nipper and regulating its stroke did not afford sufficient adjustment, and in order to obviate this difficulty I have provided a means whereby the drawing-nipper may be made to perform its oscillations within any desired distance of the holding-nippers, according to the length of the fibers being combed. To do this I make the rod H^{IV}, which connects the drawing-nipper frame G with its source of oscillation, in
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two portions and connect the adjoining ends by a nut, h^{IV} , provided with right and left threads, so that by turning the nut the bar may be lengthened or shortened, according as short or long fibers are being combed. Instead of the crank as heretofore used in this class of machines for operating the drawing-nippers, I now prefer to employ one or more cams, as the regular motion of the crank is ill adapted to the proper distribution of time in making the oscillation forward and backward, it being desirable that the nipper should remain stationary for a certain period at each end of the stroke, and that it should proceed with an accelerating movement from the beginning nearly to the end of the drawing-stroke and rapidly on its return-stroke. In order to accomplish this motion the connecting-rod H' is provided with a yoke, h' , which embraces the shaft G' , so as to serve as a guide and support for the said rod, and at opposite ends of said yoke I provide anti-friction rollers $Z \times Z'$, which bear against the cams Z Z' , that impart through them and the rod H' , pivoted lever H'' H''' , and rod H^{IV} the desired irregular motion to the drawing-nippers.

Fig. 4 shows the mode of applying the gill-box feed mechanism to this class of combing-machines. The upper frame, A' , of the gill-box has attached to its under side the gills a' , and receives a vertical motion from the cam Q' , operating through bell-crank lever Q , and both the upper part, A' , and the lower part, A'' , receive an adjustable horizontal movement from cams M M' , operating through levers $L \times L' \times I \times$ and oscillating cheek-plates A''' .

a''' a''' are bars forming a grating to facilitate the withdrawal of the gills a' from the web, the said bars being connected together at their ends, and also to the base A'' of the gill-box, the bars and base being pivoted at a to the cheek-plates A''' . These cheek-plates are pivoted at q and have in their upper edges slots f' , concentric with the pivots q'' of the levers Q , which slots receive and guide studs $f \times$ on the upper plate, A' . The studs $f \times$ extend outside the cheek-plates A''' and rest in horizontal notches in the ends of the arms Q , as shown in Fig. 21.

The lower jaw, B , of the nipper is stationary, while the upper jaw, B' , is movable to and from it, said jaws operating in conjunction with each other to produce the same result as the jaws of the nipper in Patent No. 224,428, above referred to. The nipper-jaw has a slotted or other connection, $P \times$, with the frame of the machine, which will permit it to be moved by the cam P through the bell-crank lever P' . One arm, P'' , of this bell-crank lever is loosely connected to the jaw B' , as represented in Fig. 4^a, and when rocked on its fulcrum $P' \times$ causes said jaw to move to or from the jaw B .

When using a pair of rollers or a porcupine-cylinder for feeding, as shown in Figs. 18 and 19, the web is held at a point too far in rear of the parting line, and in neither case is the nip-

ping-surface sufficiently broad to accomplish the desired result. To remedy these defects in an improved manner one or more of the bars a''' , which occupy the spaces between the gills a' , are replaced by a bar, $a''' \times$, that extends down below the bars a''' , as shown in Fig. 20, in order to nip the fibers in rear of the nippers B B' while said nippers are closing. In the drawings this nipping-bar $a''' \times$ occupies the second space; but any one of the other bars a''' may be replaced, according to the length of the fiber being drawn. These nipping-bars $a''' \times$ are depressed by the top A' of the gill-box, and have flat end studs or extremities a^v , which project through slots a'' in the cheek-plates A''' and rest on the free ends of steel springs r , which are secured to the cheek-plates A''' at r' and serve to lift the bar $a''' \times$ after it has been depressed by the top A' of the gill-box.

It is sometimes desirable to substitute a rotary comb for the lower reciprocating comb described in the aforesaid Patent No. 224,428, and in Figs. 1, 2, and 3 I have shown a means of adapting and operating such a comb in this class of machines.

The rotary comb C''' is journaled in a triangular frame, D , which is pivoted at d' , and receives an oscillating movement about said pivot to and from the holding-nipper by means of cam D' . The comb is driven from the shaft d' by bevel-gears 5 6 7 8 and shaft e'' . The frame D carries, also, a stripping or cleaning brush, W''' , for removing the waste from the comb, said brush being driven by the gearing 10 11 12 13 from the gear-wheel 9 on the comb-shaft. The brush W''' is regulated in position with regard to the comb cylinder C''' by set-screw l^v operating the lever l^{VI} , said lever being clamped in position by bolt l^{VII} .

The limit to the upward movement of the rotary comb is regulated by set-screw e'' in stop J (against which the frame D strikes at the end of its upward stroke) and by lever D'' , pivoted at d^v to the frame D , adjusted by means of set-screw d^v and slot d'' and bearing against cam D' .

In Fig. 6, F represents the lip or finger which is usually employed to present the front end of the web or sliver to the action of the comb. According to the present invention the lip or finger, instead of being a fixture upon the stationary jaw, is made movable up and down in the direction of the arrows $a \times$, Figs. 7, 8, and 9, and to and from the nipper in the direction of the arrows $b \times$. The former of these motions is accomplished by attaching the lip F to the vertically-sliding face $E \times$, which is attached to the rod $G \times$, against which the frame D impinges as it nears the upper end of its stroke, thereby maintaining a constant distance between the center $P \times$ of the comb C''' and the lip F after the comb has risen to within a certain distance of the nipper. The same object may, however, be obtained by the device illustrated in Fig. 17, which shows the employment of a roller, $K \times$,

pivoted to the lip-holder E^x and running on the edge of a disk, L^x , mounted on the comb-cylinder, the disk L^x being mounted eccentrically on the shaft P^x , so as to give the necessary up-and-down movement to the lip. The movement of the lip to and from the nipper is accomplished either by pivoting the lip to the face E^x , as in Figs. 7 and 10 to 17, inclusive, or else by securing the lip to the face, as in Figs. 8 or 9, and allowing it to spring away therefrom and return thereto by reason of its own elasticity.

Figs. 24 and 25 illustrate still another mode of operating the lip-holder E^x relatively to the rotary comb. C^{IV} is a connecting-rod pivoted to E^x and operated by cam N through lever and friction-rollers H^V for raising and lowering the lip-holder. The comb-carrying arm D , Fig. 25, strikes against the adjustable stop G^x as it nears the upper end of its stroke and thereby lifts the roller H^V from the cam N , and from thence upward the comb and lip move in unison. When the pivoted form is used, a spring, R , will be necessary to hold it against the nipper-face. This vertical play of the lip F enables the line of attack upon the front end of the web to be varied from its point, as in Fig. 10, to its central portion, as in Fig. 11, and then to its base, as in Fig. 12. The combing may either be completed in this position of the comb-cylinder or it may be finished at the point of the front end, as illustrated in Fig. 13, with fine-tooth brush C^x and a rubber, D^x , for smoothing the web and neutralizing the electricity generated by the passage of the teeth; or the operation upon the front end of the web may terminate in the position shown in Fig. 14.

The horizontal play given the lip F enables it to yield and move away from the teeth should any exceptional amount of work come upon it.

In order to prevent the web or sliver adhering to the upper jaw, S , of the drawing-nipper when it opens, I have found it necessary to apply a lip, L^{IIIx} , Figs. 22 and 23, which slides on a guide, h' , secured to said jaw S , and by means of the spring H^x is caused to hold the sliver to the lower jaw, R' , until the upper jaw, S , striking against the upper part, h''' , of the lip L^{IIIx} , lifts the same and liberates the fiber.

I am aware that the means employed by me for adjusting the length of the connecting-rod H^{IV} is not new, and do not claim such as my invention.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination, with the upper member, A' , having the gills a' , of the lower member, A'' , having the bars a''' and the nipping-bar a^{IIIx} , and the spring r , for lifting said bar a^{IIIx} , substantially as set forth.

2. In combination, the cheek-pieces A''' , the lower member, A'' , of the gill-box, pivoted thereto and having the bars a''' , the upper member, A' , of the gill-box, having the gills a' , the bell-crank lever Q , loosely connected at

the extremity of one of its arms to the upper member, A' , and the cam Q' , bearing against the other arm of said bell-crank lever, substantially as and for the purpose set forth.

3. The combination, with the cheek-pieces A''' and the lower member, A'' , of the gill-box, pivoted thereto, of the upper member, A' , having the studs f^x projecting therefrom, the bell-crank lever Q , pivoted to the cheek-pieces at q'' and having one of its arms slotted for embracing the studs f^x , and the cam Q' , bearing against the other arm of said lever, substantially in the manner and for the purpose set forth.

4. The combination, with the nippers $B B'$, of the rotary comb C''' , the pivoted frame in which it is journaled, the cam for moving the frame, and means for operating said nippers, rotary comb; and cam, substantially as and for the purpose set forth.

5. The combination of the frame D , the shaft d' , upon which it oscillates, the rotary comb C''' , driven from said shaft d' , the intermediate gearing connecting said shaft and comb, the cam D' , for oscillating said frame D , and means for operating the cam, as and for the purpose set forth.

6. The combination of the pivoted frame D , the rotary comb C''' , journaled therein, the rotary stripping-brush W''' , also journaled in said frame D , the cam D' , and means for operating said rotary comb, brush, and cam, substantially as and for the purpose set forth.

7. The combination of the pivoted frame D , the rotary comb C''' and its stripping-brush W''' , both journaled therein, means for adjusting said brush W''' relatively to said comb C''' , the cam D' , for oscillating the frame, and means for operating said comb, brush, and cam, substantially as set forth.

8. The combination, with the nippers $B B'$, of the pivoted frame D , the rotary comb C''' , carried thereby, the cam D' , for oscillating said frame, and an adjustable stop for limiting the upward movement of said frame D , and means for operating said nippers, comb, and cam, substantially as set forth.

9. In combination, the frame D , the rotary shaft d' , upon which it pivots, the shaft e''' , the rotary comb C''' , the stripping-brush W''' , and intermediate pinions, substantially as herein described, whereby said comb C''' and brush W''' are rotated from the shaft d' , as set forth.

10. The combination, with the pivoted comb-carrying frame D , of a lever, D'' , pivoted thereto, a set-screw for adjusting said lever and frame relatively to each other, and a cam, D' , upon which said adjustable lever bears, as and for the purposes set forth.

11. The combination, with the upper and lower jaws of a nipper, of a finger secured to said upper jaw and movable vertically relatively thereto and a spring for projecting said finger beyond the face of the said upper jaw of the nipper, substantially as and for the purposes set forth.

12. In combination, the upper jaw, B', and the lower jaw, B, of the nipper, the sliding block E^x, secured to said upper jaw, the finger F, carried by said block, and the frame D and means for oscillating said frame, substantially as set forth.

13. In combination with the upper and the lower jaws of the nipper, block secured to said upper jaw and having a limited vertical movement relatively thereto, and a finger secured to said block and adapted to yield laterally, substantially as and for the purpose set forth.

14. The combination, with upper jaw, B', and the lower jaw, B, of a nipper, of the sliding block E^x, secured to said upper jaw, and the finger F, secured to said block and bearing against the latter at its lower extremity with a yielding pressure, substantially as set forth.

15. In combination, the upper jaw, B', and the lower jaw, B, of the nipper, the vertically-sliding block E^x, secured to said upper jaw, the finger F, secured to said block, the rod G^x, to which said block is secured, the spring H^x, for holding said rod G^x and its attachment down with a yielding pressure, the frame D, and means for oscillating said frame, substantially as and for the purposes set forth.

16. The combination, with the upper jaw, S, and the lower jaw, R', of the drawing nipper, of a finger, L''', carried by said upper

jaw and having a limited vertical movement relatively thereto, substantially as set forth.

17. The combination, with the upper jaw, S, and the lower jaw, R', of the drawing nipper, of the finger L''', carried by said upper jaw, and a spring for projecting said finger beyond the face of the jaw, substantially as set forth.

18. The combination, with the nippers B B', of the gill-box, substantially as herein described, the cheek-pieces A'', pivoted at q and having the said gill-box secured thereto, and a cam for oscillating said cheek-pieces, substantially as set forth.

19. The combination of the lower member, A'', of the gill-box, the cheek-pieces A'', pivoted at q and having the said member A'' of the gill-box hinged thereto, a cam for oscillating said cheek-pieces, the upper member of the gill-box, the bell-crank lever Q, pivoted to said cheek-pieces at q' and having one of its arms connected loosely to the said upper member, and the cam Q', for oscillating said bell-crank lever, substantially as and for the purpose set forth.

PAUL HEILMANN-DUCOMMUN.

Witnesses:

C. HUSERL,

J. MULLER.