

L. SCHÜTT.
COAL CUTTING MACHINE.
APPLICATION FILED NOV. 10, 1908.

931,017.

Patented Aug. 10, 1909.

2 SHEETS—SHEET 1.

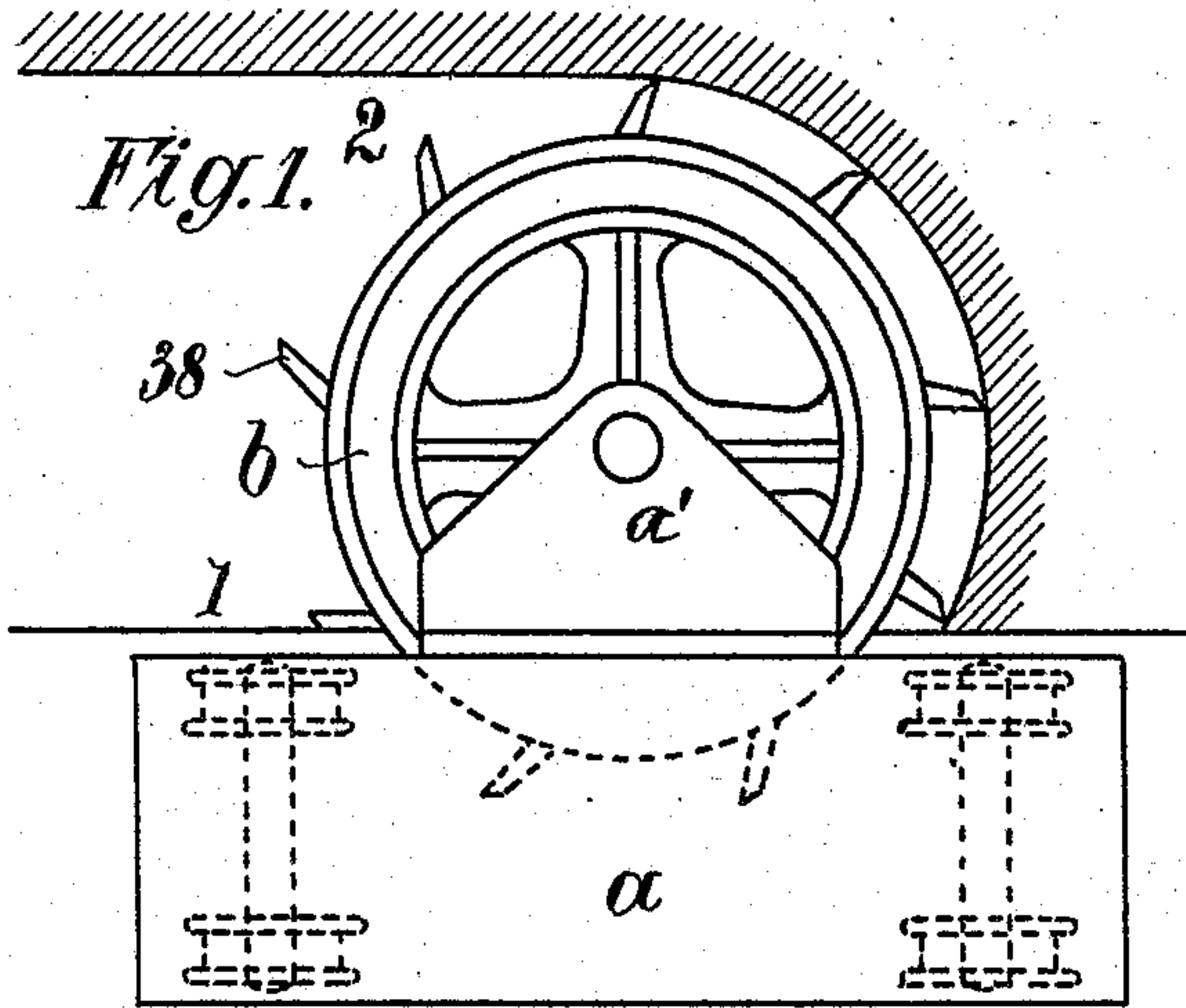
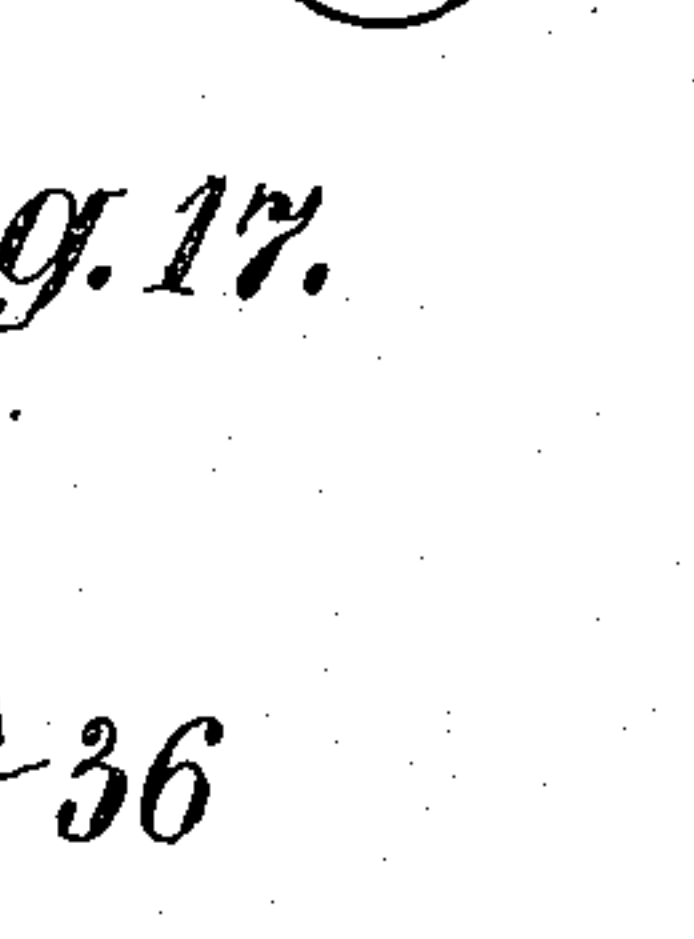
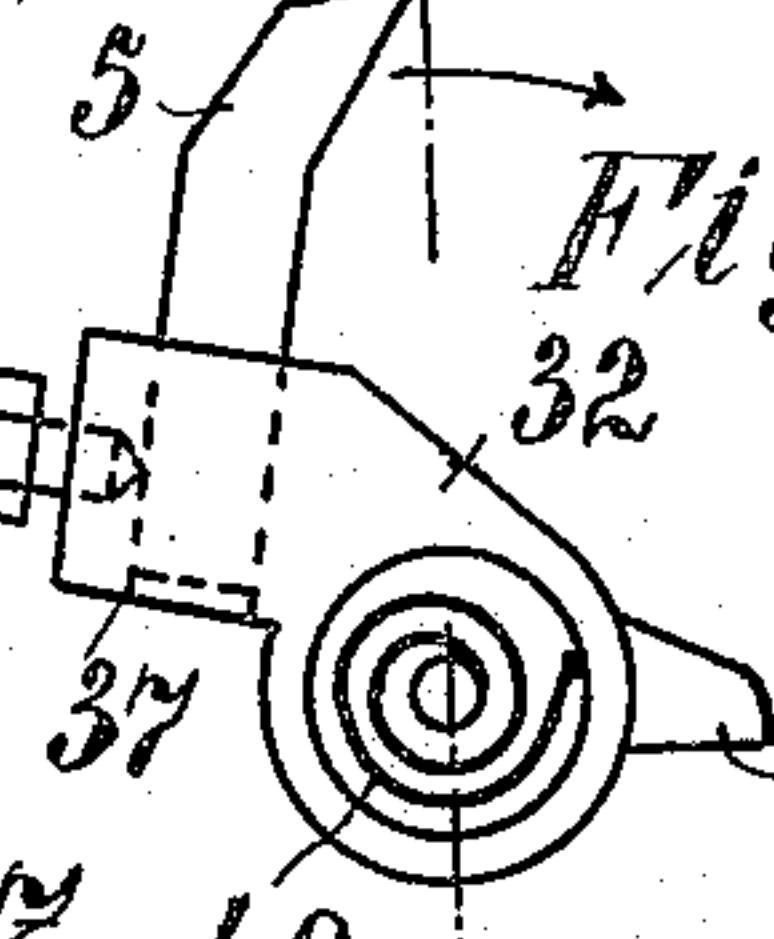
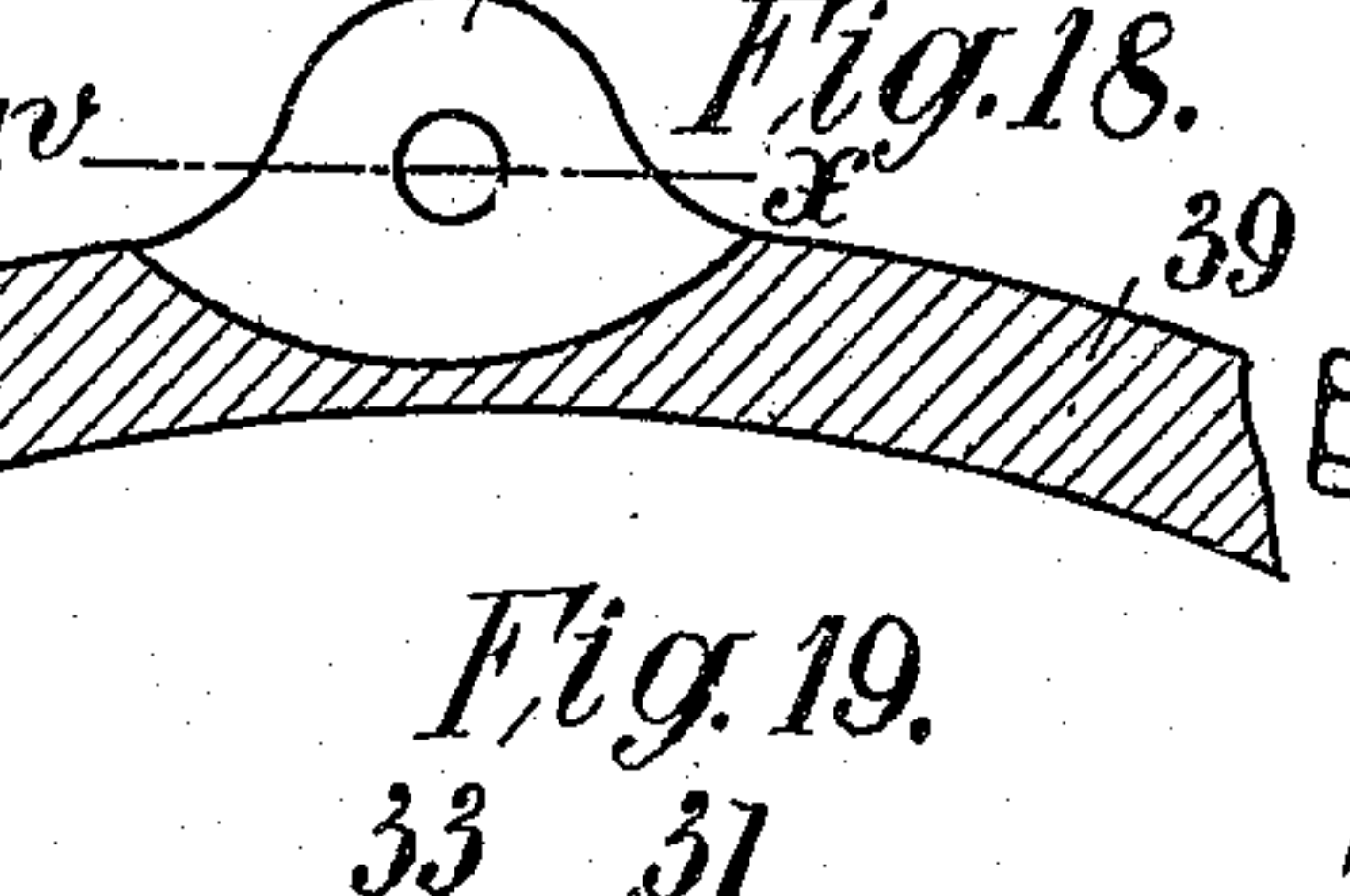
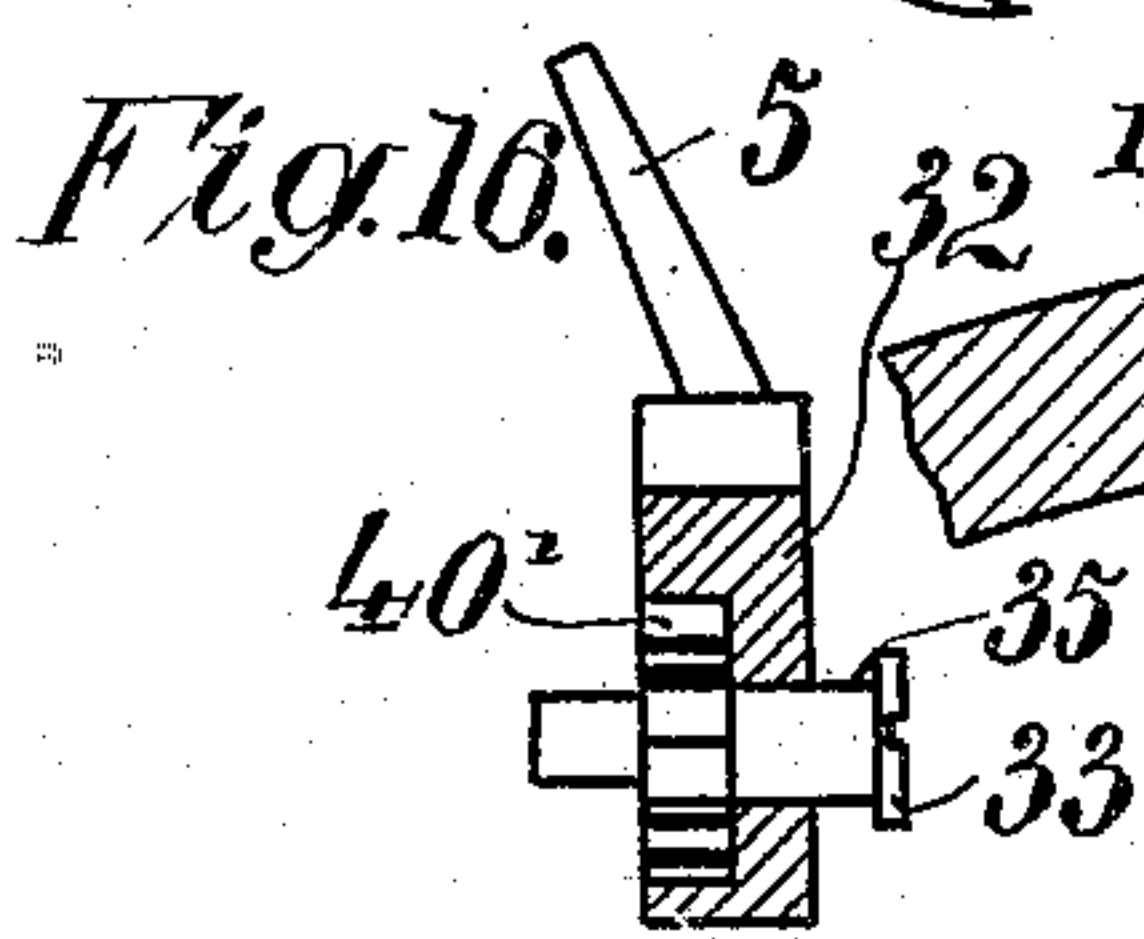
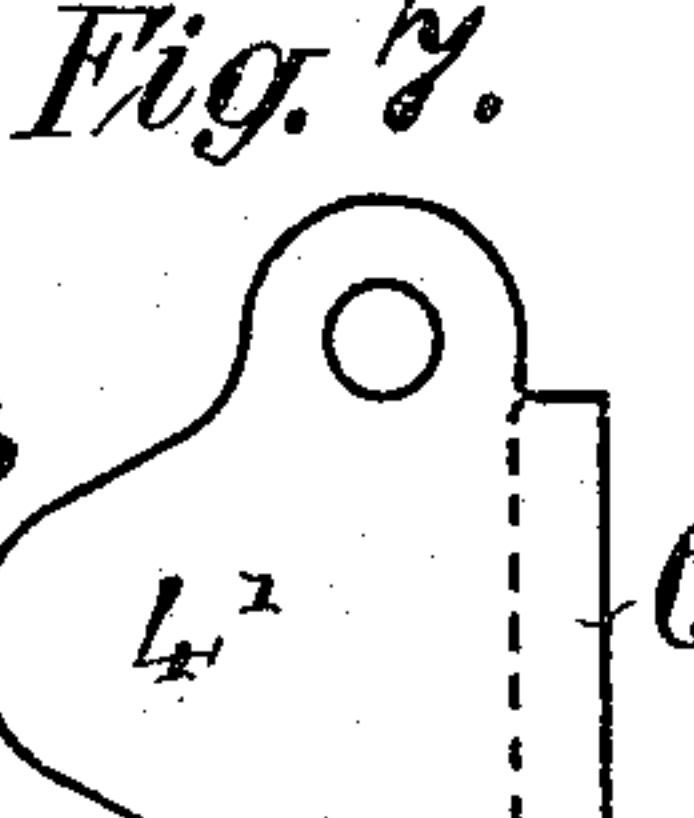
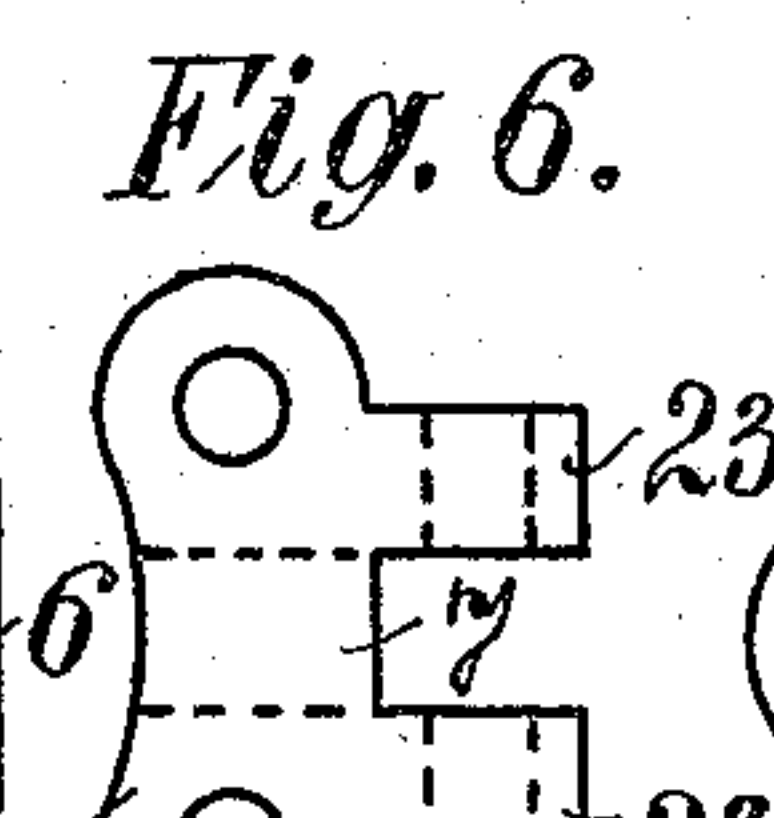
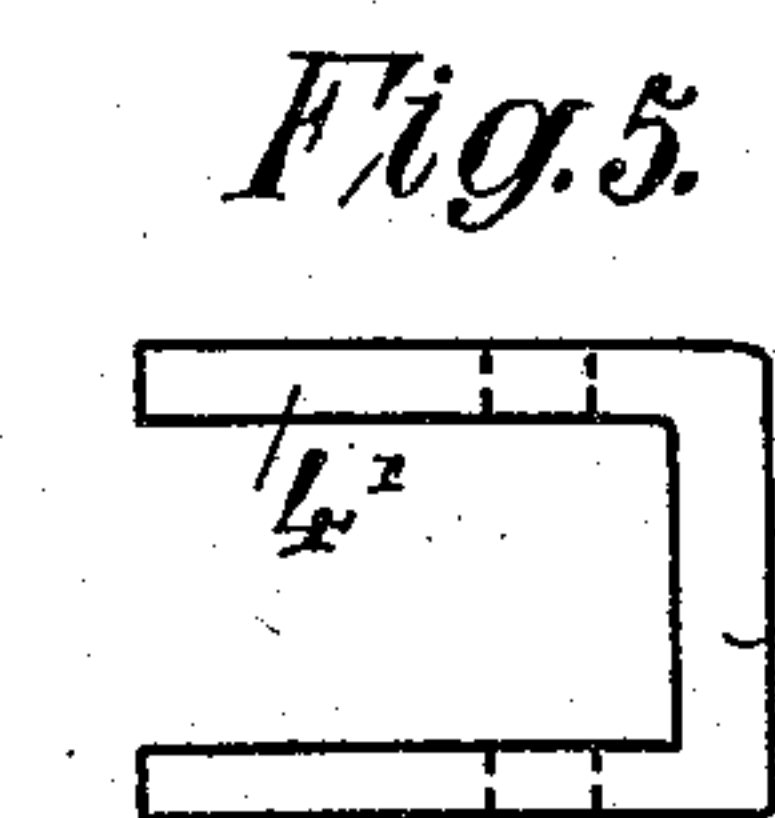
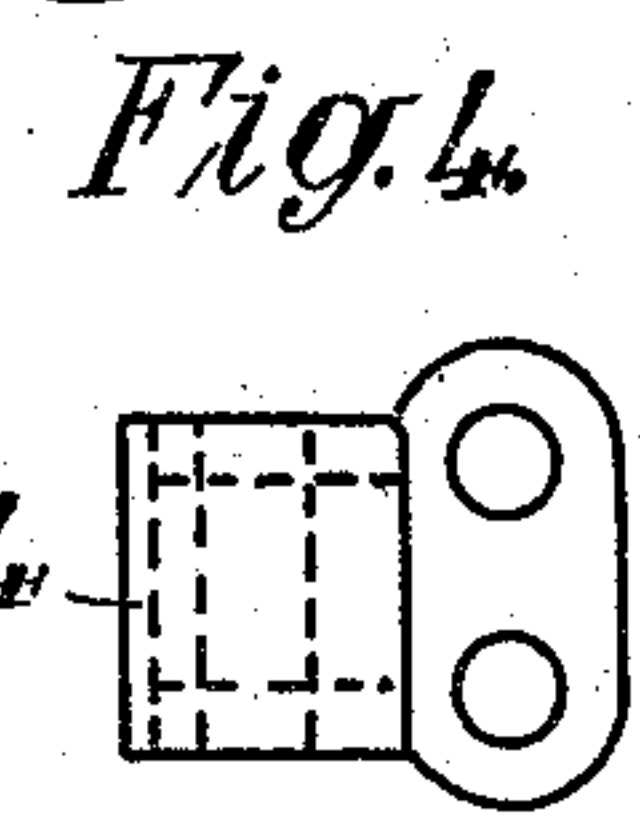
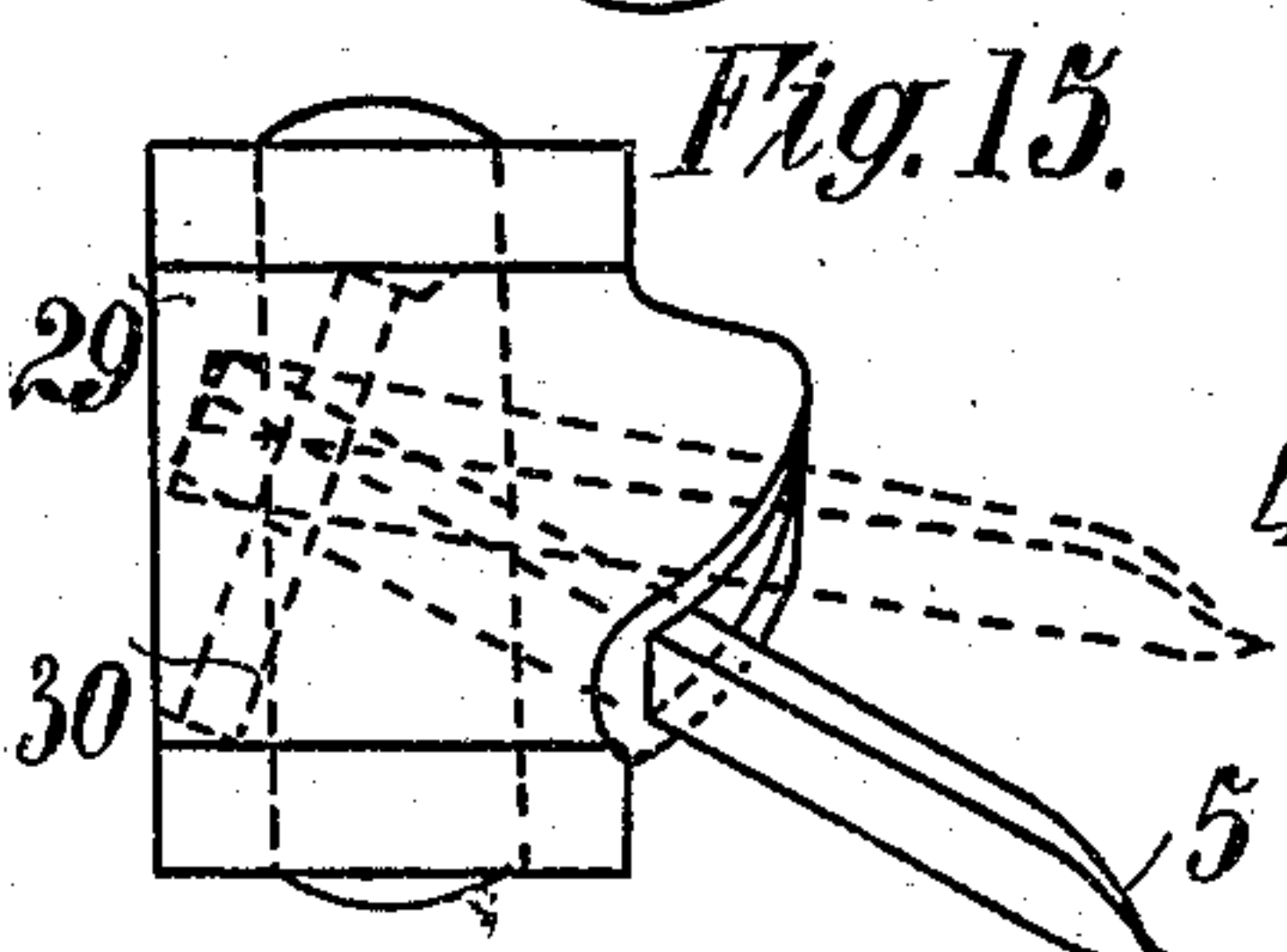
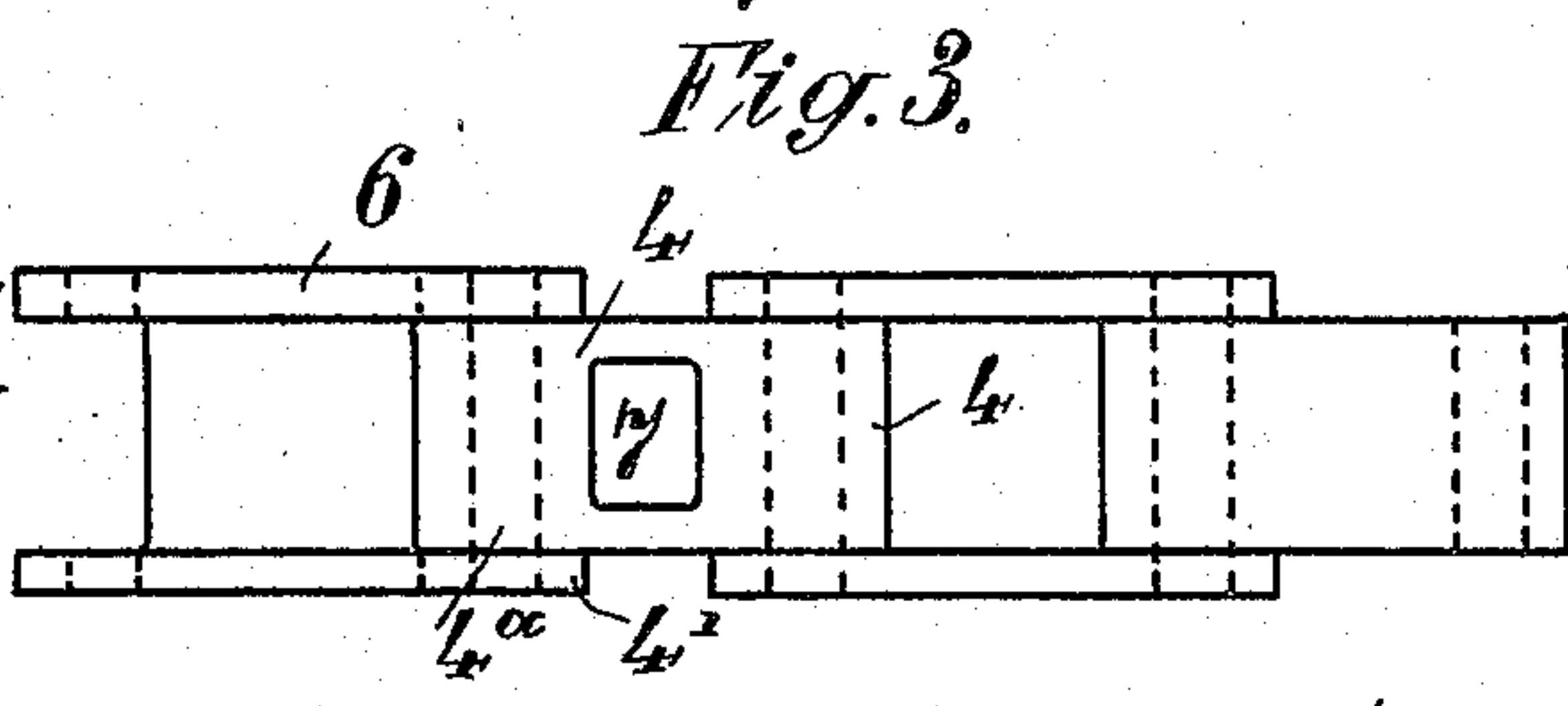
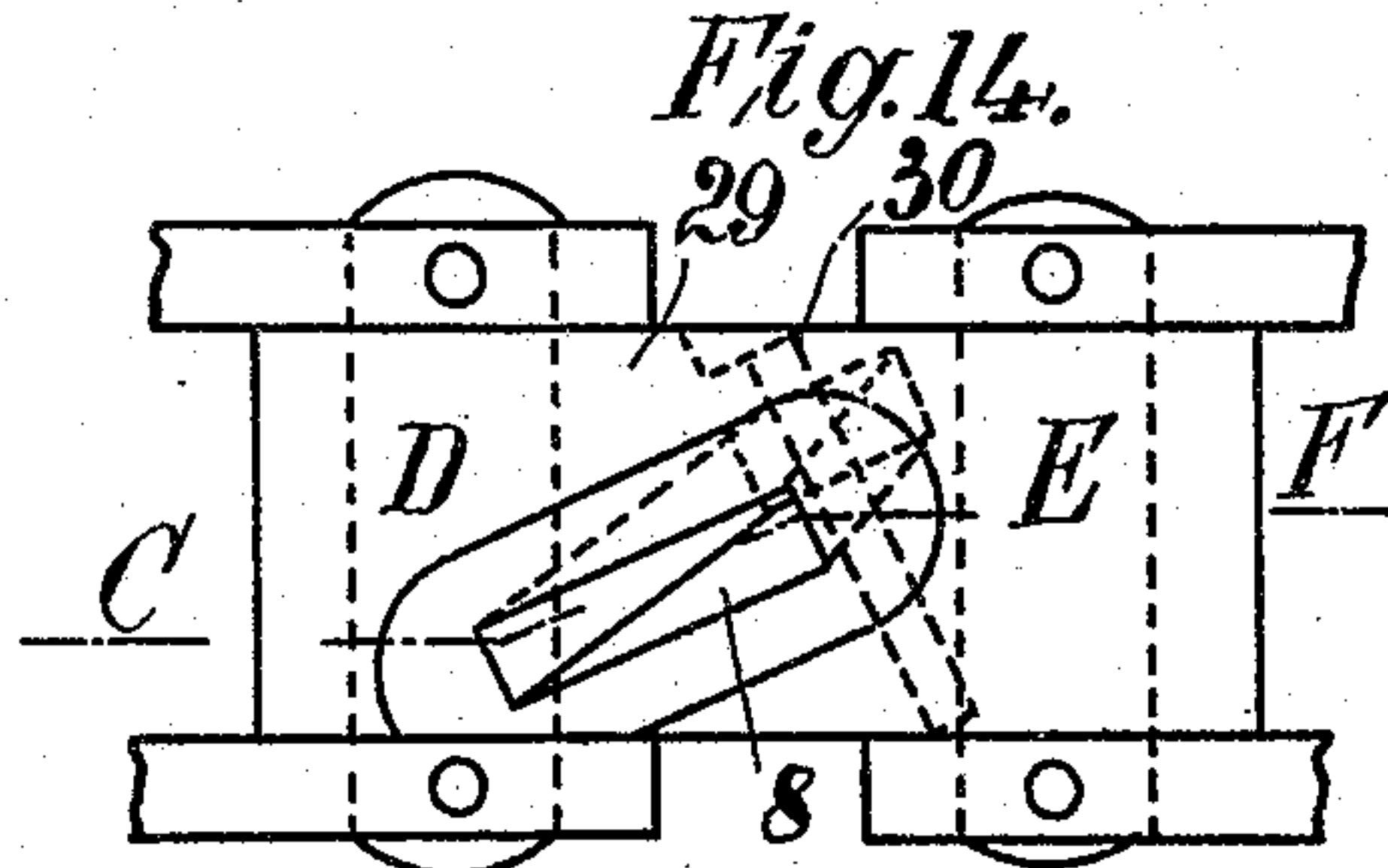
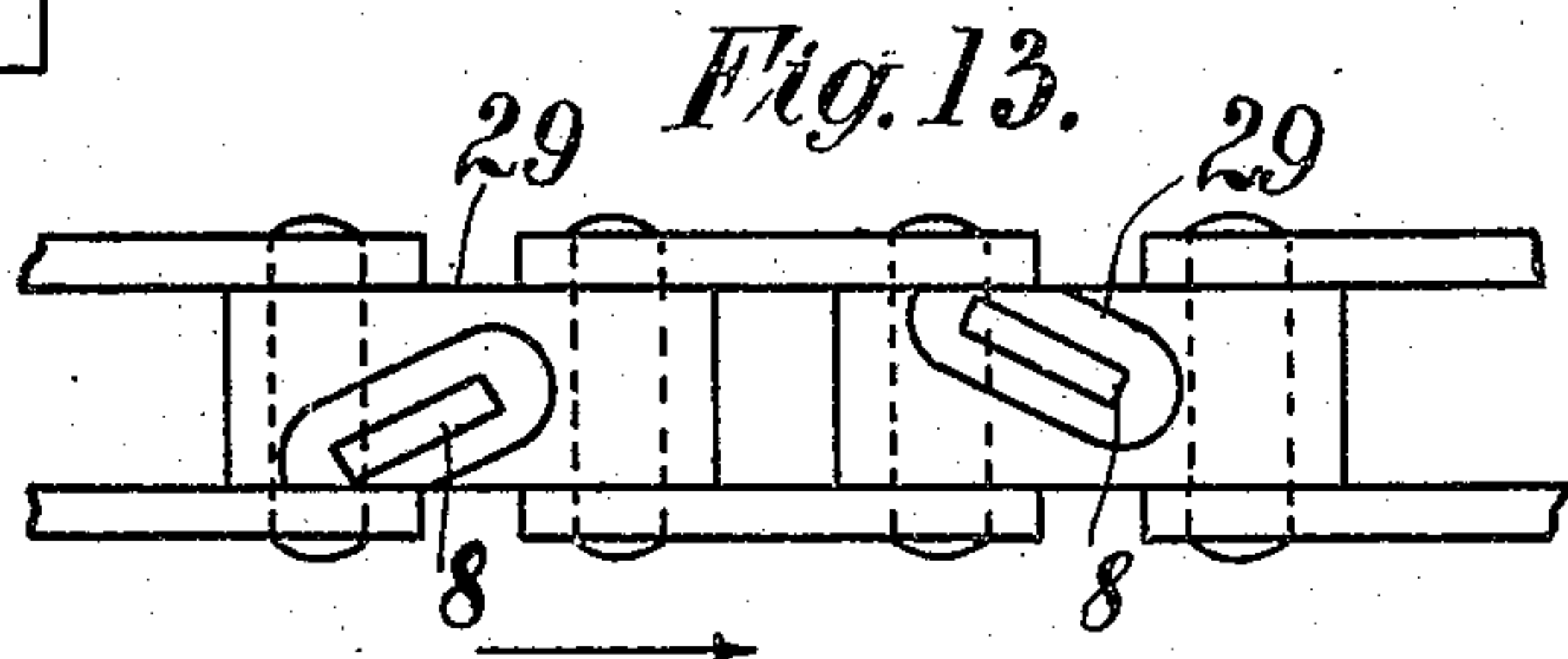
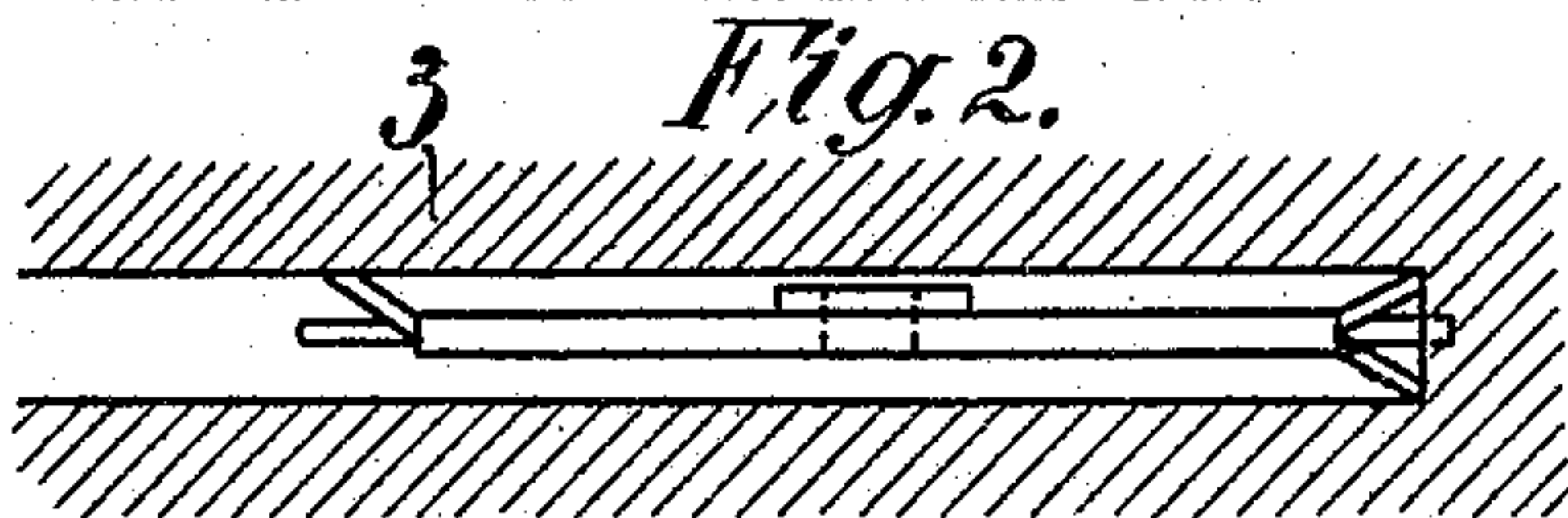
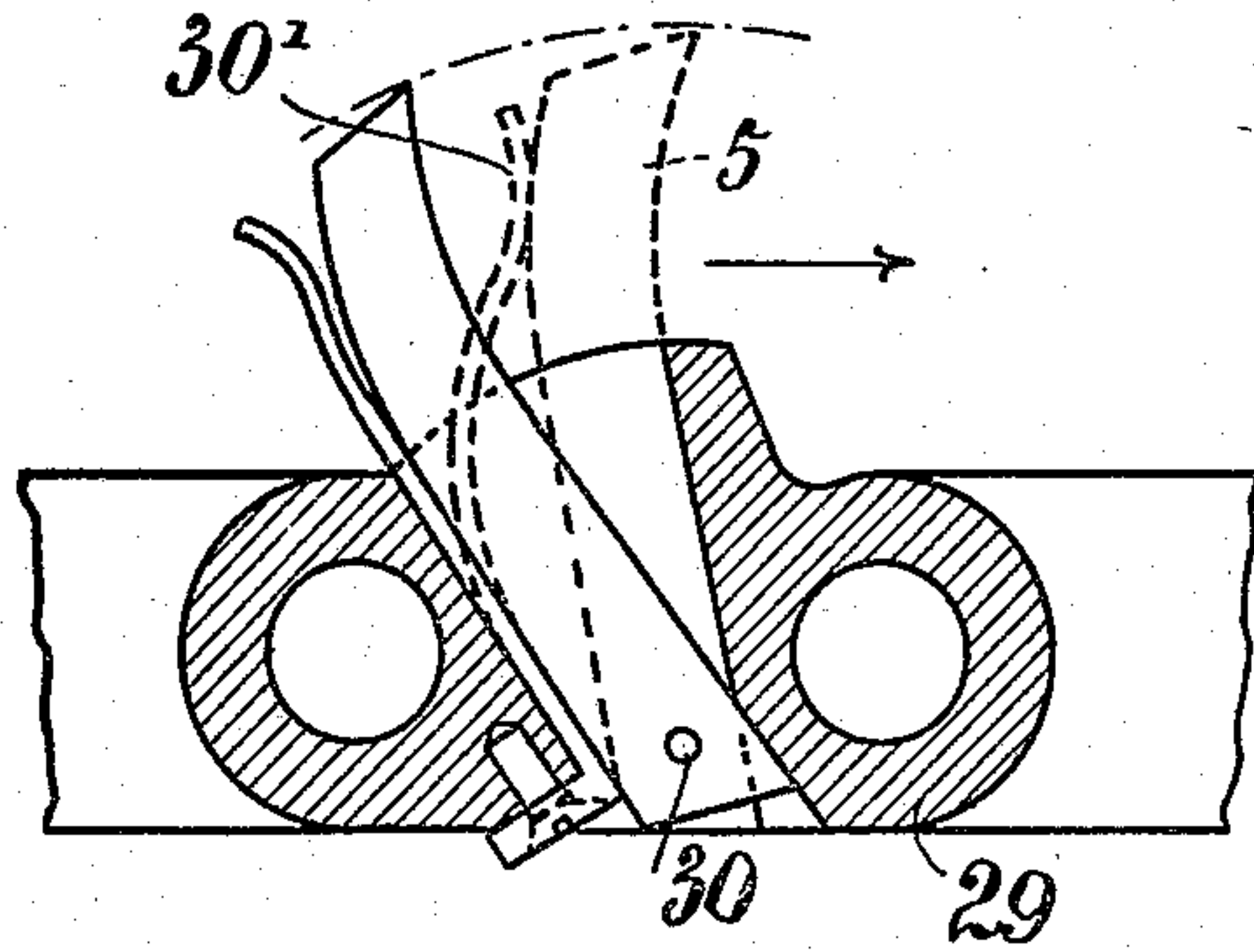


Fig. 12.



Witnesses

G. F. Cornell
J. H. Schmitt

Inventor
Ludwig Schmitt

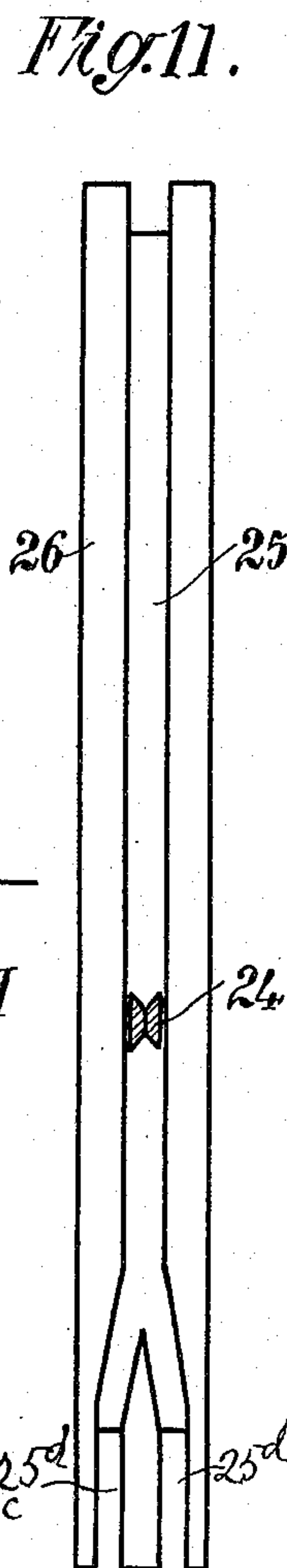
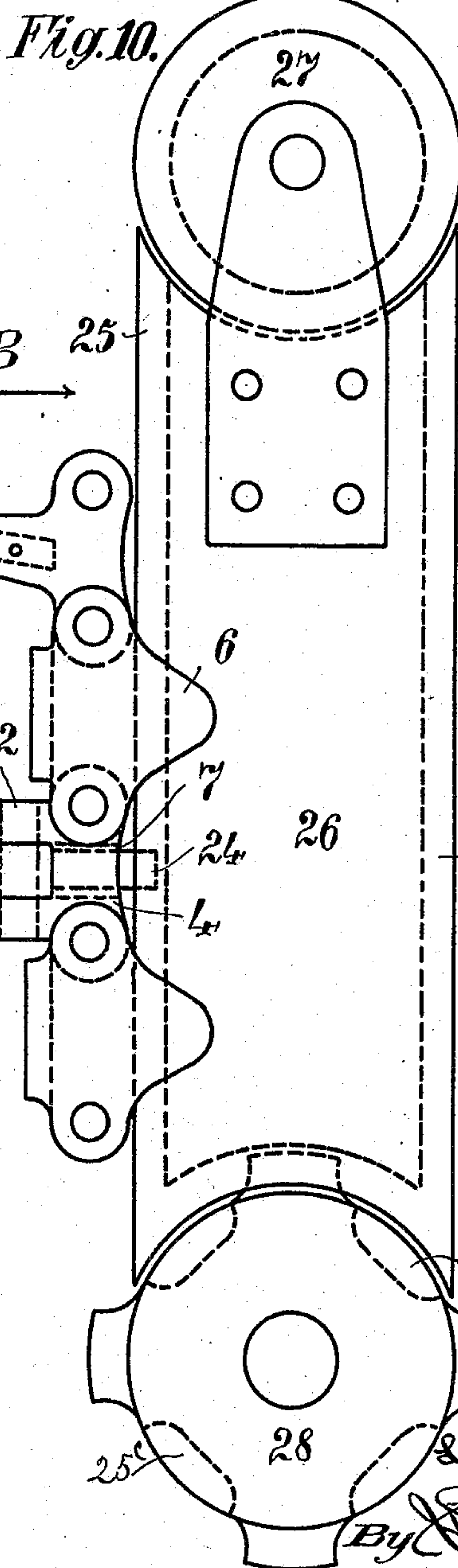
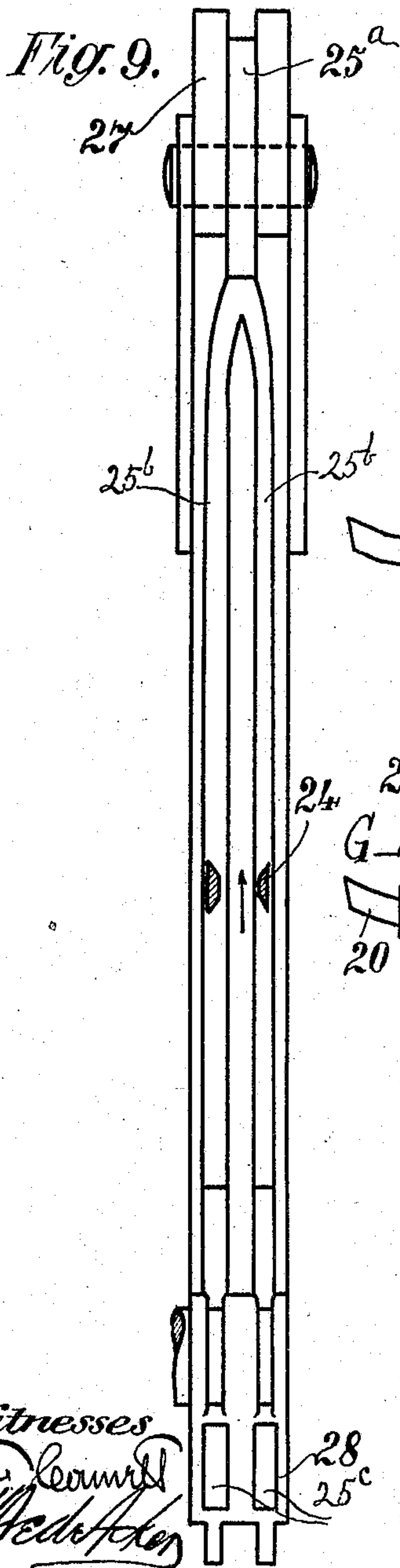
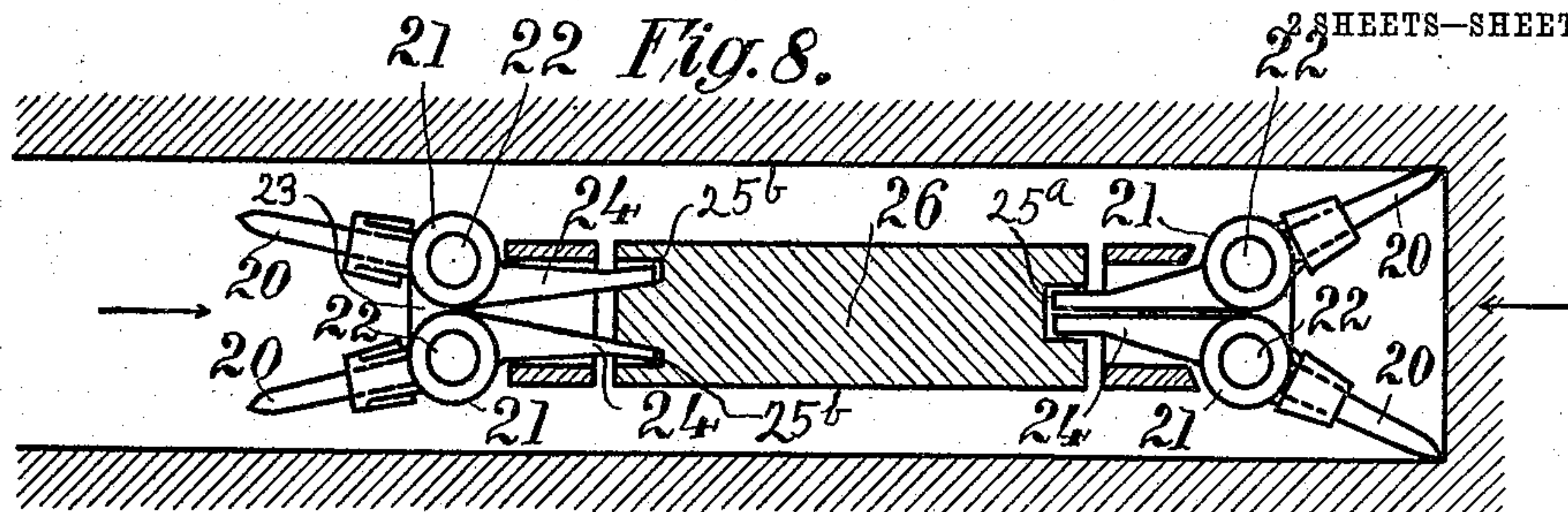
By *[Signature]*
Attorney

L. SCHÜTT.
COAL CUTTING MACHINE.
APPLICATION FILED NOV. 10, 1908.

931,017.

Patented Aug. 10, 1909.

2 SHEETS—SHEET 2.



Witnesses
G. F. Leonard
H. J. H. H.

Inventor
L. Schütt
By [Signature]
Attorney

UNITED STATES PATENT OFFICE.

LUDWIG SCHÜTT, OF SAARBRÜCKEN, GERMANY.

COAL-CUTTING MACHINE.

No. 931,017.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed November 10, 1908. Serial No. 461,855.

To all whom it may concern:

Be it known that I, LUDWIG SCHÜTT, engineer, a subject of the King of Prussia, and residing at Kronprinzenstrasse 2, Saarbrücken, Germany, have invented certain new and useful Improvements in Coal-Cutting Machines, of which the following is a specification.

This invention relates to certain improvements in mining machines, such as are particularly designed and adapted for use in cutting coal, rock salt, and the like, and has for its object to provide a machine of this general character of a simple and comparatively inexpensive nature, and of a strong and compact construction, having cutting mechanism capable of employment to afford a cut of greater width than the cutter supporting means, whereby binding or jamming of the machine due to sinking or rising of the roof or floor of the seam is effectively prevented, and wherein the cutting mechanism is constructed and arranged in such a novel and improved manner as to materially facilitate the operation of the machine during practical use.

The invention consists in certain novel features of the construction, and combinations and arrangements of the several parts of the improved mining machine, whereby certain important advantages are attained, and the machine is rendered simpler, less expensive, and otherwise better adapted and more convenient for use, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In order that my invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein—

Figure 1 is a somewhat diagrammatic plan view showing a coal cutting machine constructed according to my invention; Fig. 2 is an elevation showing the wheel only of the machine illustrated in Fig. 1; Fig. 3 is an elevation showing a fragment of a cutter carrying chain embodying my improvements; Figs. 4 and 5 are end elevations illustrating the two different forms of link comprised in such chain; Figs. 6 and 7 are side elevations showing the respective links illustrated in Figs. 4 and 5; Fig. 8 is a vertical section taken in the transverse plane indicated by the line G—H in Fig. 10, and illustrating a machine embodying my invention

wherein the cutter carrying chain illustrated in Figs. 3 to 7 is comprised; Fig. 9 is an elevation showing one lateral edge of the frame of the machine illustrated in Fig. 8; Fig. 10 is a plan view illustrating the machine constructed as shown in Figs. 8 and 9, part of the cutter carrying chain being omitted; Fig. 11 is a view similar to Fig. 9, but illustrating the opposite lateral edge of the machine; Fig. 12 is a horizontal section taken in the broken plane indicated by the line C—D—E—F in Fig. 14, and illustrating another formation of cutter carrying chain comprised in my present invention; Fig. 13 is an elevation showing a fragment of the chain illustrated in Fig. 12, the cutters being omitted; Fig. 14 is a view somewhat similar to Fig. 13, but drawn upon an enlarged scale and illustrating certain features of construction to be hereinafter referred to; Fig. 15 is an end elevation showing one of the cutter carrying links of the chain shown in Figs. 12 to 14, detached, and with its cutter in place; Fig. 16 is a sectional view illustrating certain features of construction of another formation of cutter holding member comprised in my invention, the plane of the section being indicated by the line *u—v* in Fig. 17; Fig. 17 is an elevation of the parts illustrated in Fig. 16; Fig. 18 is a sectional view taken through a fragment of the rim of a cutter carrying wheel capable of employment in connection with the cutter holding member illustrated in Figs. 16 and 17, the plane of the section being indicated by the line *y—z* in Fig. 19, and Fig. 19 is a vertical section taken through the wheel rim in the plane indicated by the line *w—x* in Fig. 18.

In these views, Figs. 1 and 2 illustrate somewhat diagrammatically a wheeled coal cutting or mining machine to which my present invention may be applied, such machine comprising a carriage or frame *a* capable of movement upon tracks or the like to traverse the breast or face of the working, and provided with a projecting part or member *a*¹, whereon is mounted to turn the driven cutter carrier or wheel *b* having peripheral cutters 38 for engagement with the coal to produce a traversing cut therein in a well known way.

In order that the best results may be attained in machines of this general character, it is desirable that the cutters should only operate along that end of the cut or holing which is forward in the direction of travel of the machine across the face of the work-

ing, and therefore the cutters 38 in a machine such as is shown in Figs. 1 and 2, should not be in cutting contact with the coal between the points marked 1 and 2 in Fig. 1, nor at the point marked 3 in Fig. 2, since such contact at these points would, at best, only result in loss of power and, if the floor or roof of the seam should sink or rise, or the cut or holing should not be extended in a right line, such contact would very probably result in serious jamming or binding of the machine, and possibly in breakage thereof. For avoiding cutting contact of the cutters upon the coal at these points, it is desirable that the cutters be capable of movement in a direction at right angles to their travel in cutting, so as to cause them to present a wider cutting surface for cutting engagement with the coal at the points opposite the supporting member a^1 whereat the cut or holing is to be extended, and a narrower cutting surface at other points in order that they may be withdrawn from cutting contact with the coal, and the present invention relates more particularly to novel and improved means for accomplishing this result.

I will now proceed to describe in detail the embodiment of my invention illustrated in Figs. 3 to 11 inclusive, wherein the cutter carrying member is made in the form of a chain adapted to be driven in any suitable manner, and having the cutter carrying links 4, 4, alternating with the connecting or intermediate links 4', 4', such links 4 and 4' being pivotally connected by pivot pins or the like as shown at 4^a to afford the requisite flexibility, and the links 4', 4' being provided with spaced lugs 6, 6 adapted to travel along opposite surfaces of the supporting member or frame 26, and at opposite sides of the driving and guide wheels 28 and 27, as clearly shown in Fig. 10 in order to effectively guide the chain during its movement and prevent swaying or whipping thereof during operation of the machine. In this form of the machine, each link 4 carries two cutters 20, 20 mounted in cutter holders 21, 21 which are pivotally supported upon pivot pins 22, 22 extended parallel with each other and held at their opposite ends in apertured lugs 23, 23, spaced apart and projecting at the outer surface of the link 4, the arrangement being such that when the cutter holders 21, 21 are rocked upon said pivot pins 22, 22, the said oppositely arranged cutters 20, 20, carried by such cutter holders 21, 21, are moved toward or from each other in directions transverse to the travel of the chain so as to vary the width of the cutting surface presented by such cutters for contact with the coal. Each link 4 is provided with a central aperture through which the tails or extensions 24, 24 of the corresponding

cutter holders 21, 21 are extended, the structure being such that said tails or extensions 24, 24 are caused to project inwardly beyond the inner surface of the link in position for engagement in a cam groove or channel 25 centrally produced in the edge of the forward side of the frame 26, or that side thereof at which the cut or holing is being extended across the working. Such forward side of the frame is indicated at A in Fig. 10, and Fig. 11 is an edge view of the frame viewed from that side.

The cutters are extended beyond the forward side of the frame to produce a projecting cutting surface upon the side of the carrying member or chain which is exposed at said forward side of the frame and the cam groove 25 in said forward side of the frame is of such width and the cutters are so mounted in the holders 21 that such cutters are forced apart from each other by the engagement of the tails 24 of the respective holders upon the opposite walls of said cam groove and the resultant pivotal movement imparted to the holders, whereby it will be seen that the cutters are caused to diverge or spread apart in directions transverse to the travel of the chain so as to present a comparatively wide cutting surface during their travel along the forward side of the frame, such cutting surface afforded by the divergent cutters being adapted for engagement with the coal along the forward end of the cut or holing, and serving to produce a cut the width of which is greater than the thickness of the frame when viewed from the side whereat the cutting surface projects, in order that the frame may freely traverse such cut or holing without jamming or binding when it is moved to extend the holing across the face of the working.

The guide wheel or member 27 which is mounted to turn at the free end of the supporting member or frame 26 and is adapted during the operation of the machine, to traverse the inner part of the cut or holing, is also provided with a cam groove or channel 25 centrally produced around its peripheral surface in alinement with the groove or channel 25 at the forward side of the frame 26, and adapted to operate in a similar manner to maintain the cutters 20, 20 spread apart to afford a comparatively wide cutting surface during their travel in cutting engagement with the coal. The groove or channel 25 of said guide wheel or member 27 is clearly illustrated in Fig. 9 of the drawings.

At the rear side of the frame or supporting member 26, or that side, viewed from the direction indicated by the arrow B in Fig. 10, which is rearmost with regard to the direction of movement of the frame in extending the cut or holing across the face of the working, the edge of said frame is pro-

vided, adjacent to the guide wheel 27, with a central cam groove or channel 25^a, alined with the cam groove or channel 25 of said guide wheel 27, and wherein the tails 24 of the cutter holders of each link 4 are received after such links shall have traversed those edge portions of the frame and wheel 27 whereat the cut or holing is being extended, and said terminal central groove 25^a has communication with spaced cam grooves 25^b, 25^b, which form substantial continuations of said terminal groove 25^a and are extended therefrom along the rear edge of frame 26 toward the driving wheel or member 28, as clearly shown in Fig. 9. The tails 24 of the cutter holders for each link 4 are adapted, upon passing from the terminal groove 25^a into the spaced parallel grooves 25^b, to be forced apart by contact with the walls of said parallel grooves 25^b, whereby the holders 21 are rocked pivotally in such a way as to cause the cutters carried by them to be drawn toward each other in directions transverse to the path of the chain during their movement along the rear side of the frame, so that said cutters are caused to present a cutting surface narrower than that afforded at the forward side of the frame and at the perimeter of the guide wheel 27 in order that they may be withdrawn from cutting engagement with the roof and floor of the holing, as clearly shown at the left-hand side of Fig. 8. The driving member 28 has spaced cam grooves 25^c, 25^c, alined with the spaced grooves 25^b of frame 26 and adapted to receive the tails 24 of the holders after the cutters shall have traversed said frame, and at the forward side of the frame, adjacent to the driving wheel 28, the edge of the frame has spaced grooves 25^d, shown in Fig. 11, adapted to receive the tails 24 after they shall have traversed the driving wheel, said grooves 25^d merging with the adjacent end of the central groove 25 above referred to so that the tails may be drawn toward each other to throw the cutters outwardly during their passage along said forward side of the frame.

In the embodiment of my invention shown in Figs. 12 to 15, inclusive, the cutter carrying member is also in the form of a chain, but the cutters 5 are mounted singly upon the respective links instead of in pairs as in the preceding structure, each such cutter being pivotally supported at that end which is opposite its cutting edge, upon a pivot pin 30, extended through the corresponding link at an inclination to the travel of the chain, as clearly shown in Fig. 14, and also at an inclination to the edge surface of the frame or supporting member to be traversed by such chain, as clearly shown in dotted lines in Fig. 15, the cutter being, by such pivotal mounting, adapted to traverse an inclined slot or guide channel 8 produced

in the central part of the link so as to be capable of swinging or rocking movement in a direction transverse to the travel of the chain in order that the width of the cutting surface produced by the several cutters may be increased at the forward side of the supporting member and reduced at the rear side of such supporting member as described above with reference to the construction illustrated in Figs. 3 to 11, inclusive. In this form of the machine, the pivot pins 30, and slots 8 of each two adjacent cutter carrying links comprised in the chain are set at reverse inclinations, so that the corresponding cutters, when moved pivotally, may be thrown toward or from each other in order to afford the requisite variation in the width of the cutting surfaces opposite to the front and rear sides of the supporting member, and behind each cutter 5 is arranged a spring 30¹, the tension of which is exerted to throw such cutter normally toward that end of the corresponding slot 8 which is adjacent to the center of the link, whereby the several cutters 5, 5 of the chain are normally caused to stand substantially in alignment at the center of the chain, so as to present a cutting surface of minimum width, but the structure is such that when the forwardly inclined cutters 5 come into cutting engagement with the coal during movement of the corresponding links along the forward side of the cut or holing, said cutters are swung pivotally against the tension of their springs and are caused to traverse the inclined slots 8 so as to be spread apart as above described in such a manner as to increase the width of the cutting surface afforded by them.

In the embodiment of my invention illustrated in Figs. 16 to 19, inclusive, the cutters 5 are adapted to be carried on a cutter carrying member 39 made in the form of a wheel, whereof only a fragment of the rim is shown in Figs. 18 and 19. In this form of my improvements, the rim of said wheel or member 39 is provided at intervals with spaced outwardly directed lugs or projections 31, 31, extended at inclinations to the axis of rotation of said wheel or member, and provided with registering apertures wherein are engaged the ends of pivot pins 33, extended across the spaces between the respective lugs of each pair, in directions inclined to the axis of said wheel 39. Each pivot pin 33 is provided, as shown in Fig. 16, with a projection 35, adjacent to its head end, and adapted for engagement with a recess in one of the lugs or projections 31 to prevent such pivot pin from turning in the apertures of the lugs in which the pin is supported. Upon the pivot pins 33 are held for rocking movement the cutter holders, which as shown in Figs. 16 and 17, are provided with disk-like body portions 32, mounted between the lugs or

projections 31, 31 of the wheel rim, and provided with laterally directed arms 37, apertured to receive the shanks of the cutters 5, and provided with set screws whereby said cutters may be securely held in place in said apertures of the arms 37 when in adjusted position. Each cutter holder has its disk like body portion 32 provided with a chamber 40¹ surrounding the pivot pin 33 whereon it is supported for rocking movement, and within such chamber 40¹ is mounted a spring 40, one end whereof has connection with the pivot pins 33, while its opposite end has connection with the body portion of the cutter holder in such a way that the tension of the spring is exerted to rock the cutter holder normally in a direction such that the operative end of the cutter 5 will be pressed to a position substantially central with respect to the perimetral face of said wheel or member 39. By this arrangement of the parts, the cutters 5 are caused to project from the perimeter of the wheel or member 39, so as to be adapted for cutting engagement with the coal when said wheel or member 39 is driven, and said cutters are normally maintained opposite the central part of the perimetral surface of the wheel by the tension of the springs 40, but are adapted, when in cutting engagement with the coal, to be moved against the tension of said springs in directions inclined across the perimeter of said wheel or member, so as to afford a cut of greater width than the perimetral surface of said wheel or member 39. The body portions 32 of the cutter holders are provided with detent projections 36 extended from them to limit the movement of the holders when actuated by the engagement of the cutters upon the surface of the coal.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. A machine of the character described having a frame, a cutter carrying member movably mounted upon the frame, cutters movably supported upon said member, and means for controlling said cutters to move said cutters in directions transverse to the path of said member during their cutting operation, first to increase the width of the cutting surface afforded by said cutters, and afterward to reduce the width of said cutting surface.

2. A machine of the character described having a frame, a cutter carrying chain capable of movement upon said frame, cutters

movably supported upon the chain, and means, for controlling said cutters during movement of the chain upon the frame, first to increase the width of the cutting surface afforded by said cutters, and afterward to reduce the width of said cutting surface.

3. A machine of the character described having a frame, a cutter carrying chain capable of movement upon the frame and adapted to traverse different sides thereof, cutters movably supported on the chain, means at one side of the frame, for controlling said cutting means to increase the width of the cutting surface afforded by said cutters during the passage of said cutters along that side of the frame, and means at another side of the frame, for controlling said cutting means to reduce the width of the cutting surface afforded by said cutters during their passage along that side of the frame.

4. A machine of the character described having a frame, a cutter carrying chain capable of movement upon the frame, cutter holders movably supported upon said chain and provided with cutters, said cutter holders having projecting parts, and a cam surface extended upon the frame which engages the projecting parts of the cutter holders to actuate the same.

5. A machine of the character described having a frame, a cutter carrying chain capable of movement upon the frame and adapted to traverse different sides thereof, cutter holders movably supported upon said chain and provided with cutters affording a cutting surface for engagement with a substance to be cut, said cutter holders having projecting parts, and cam surfaces extended upon different sides of the frame, one of said cam surfaces controlling the projections of the cutter holders to increase the width of the cutting surface afforded by the cutters during their passage along that side of the frame, and the other cam surface controlling the projections of the cutter holders to reduce the width of the cutting surface afforded by said cutters during their passage along another side of the frame.

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

LUDWIG SCHÜTT.

Witnesses:

LOUIS VANDORN,
M. KARLHAUS.