

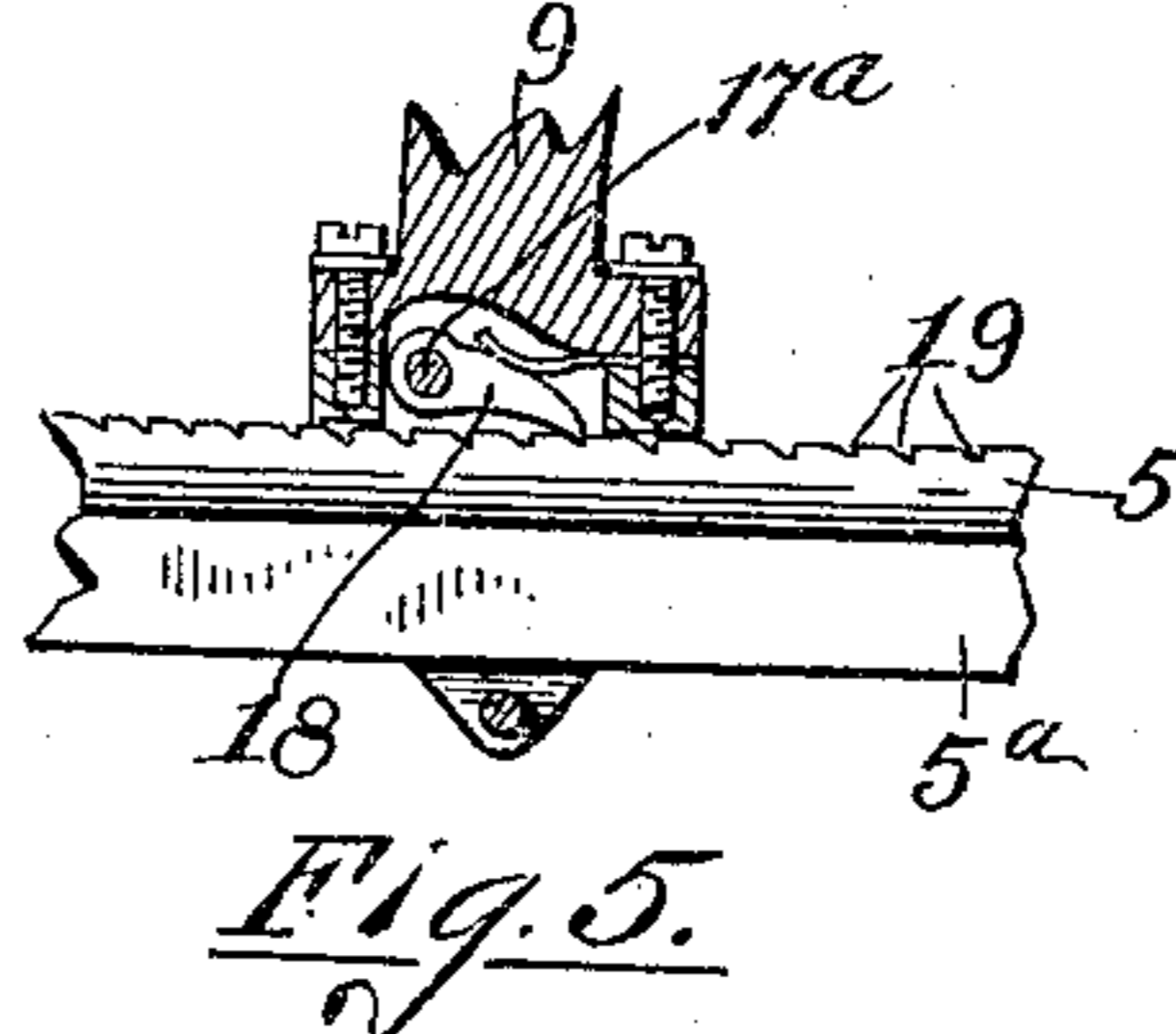
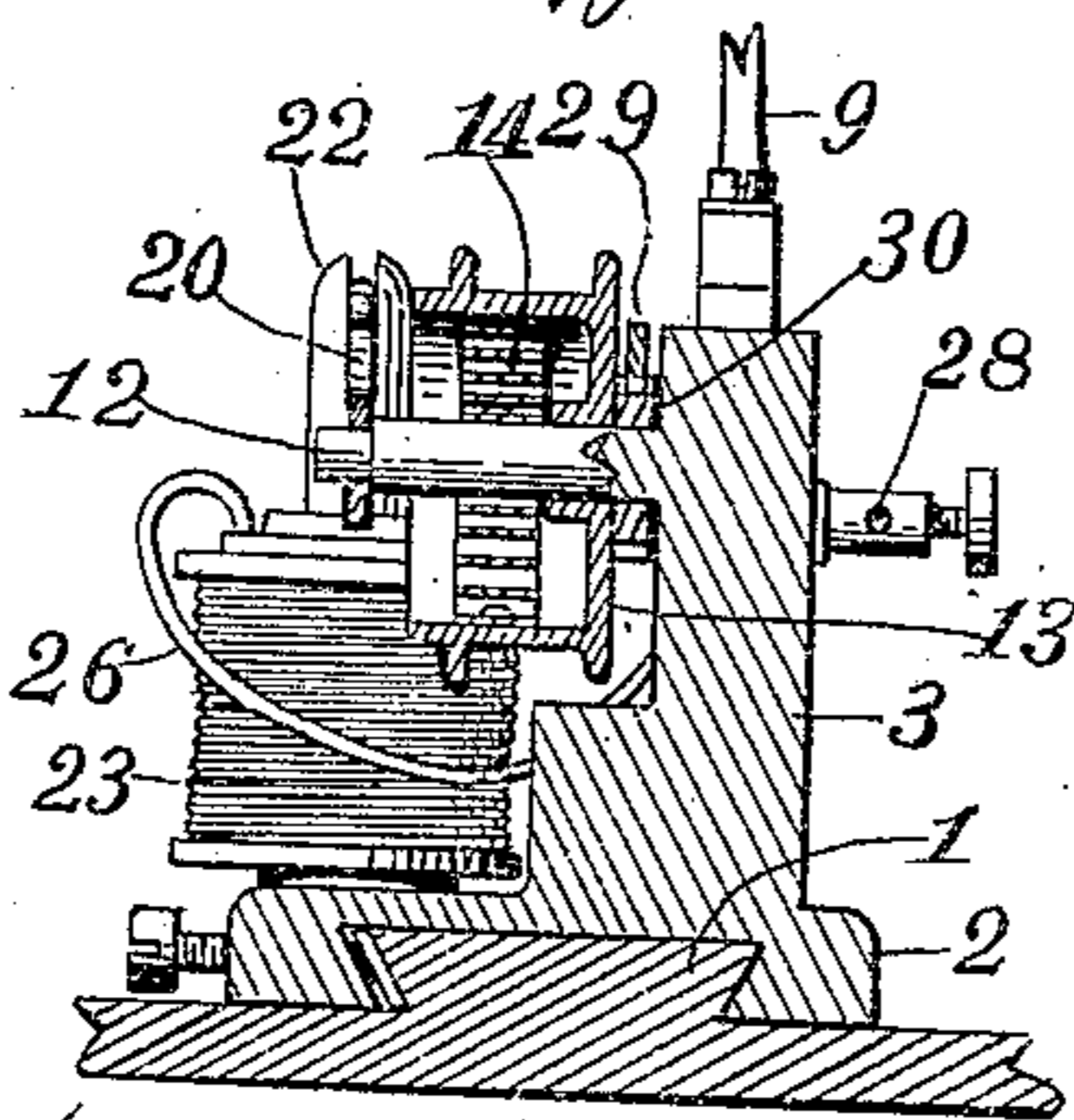
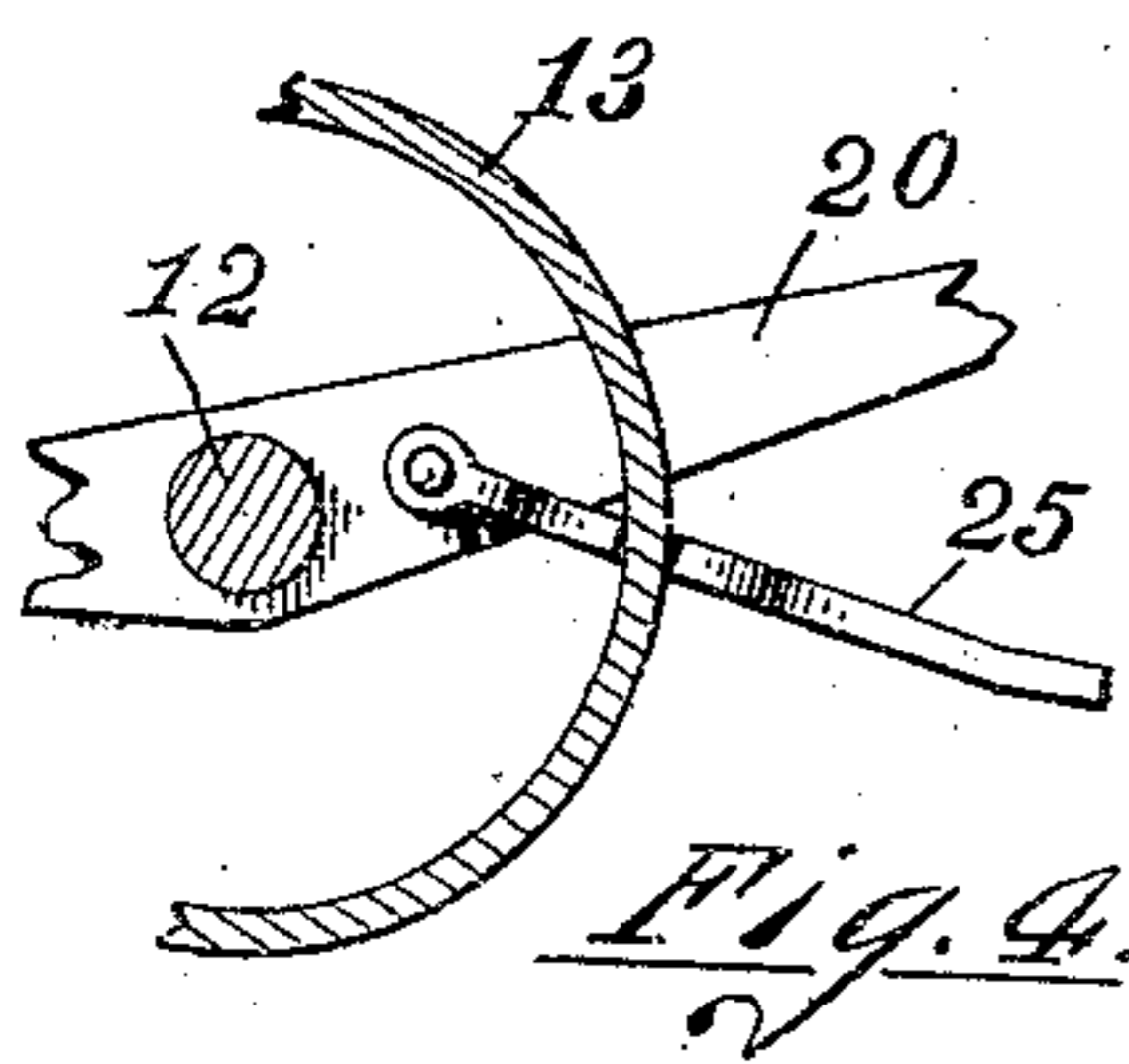
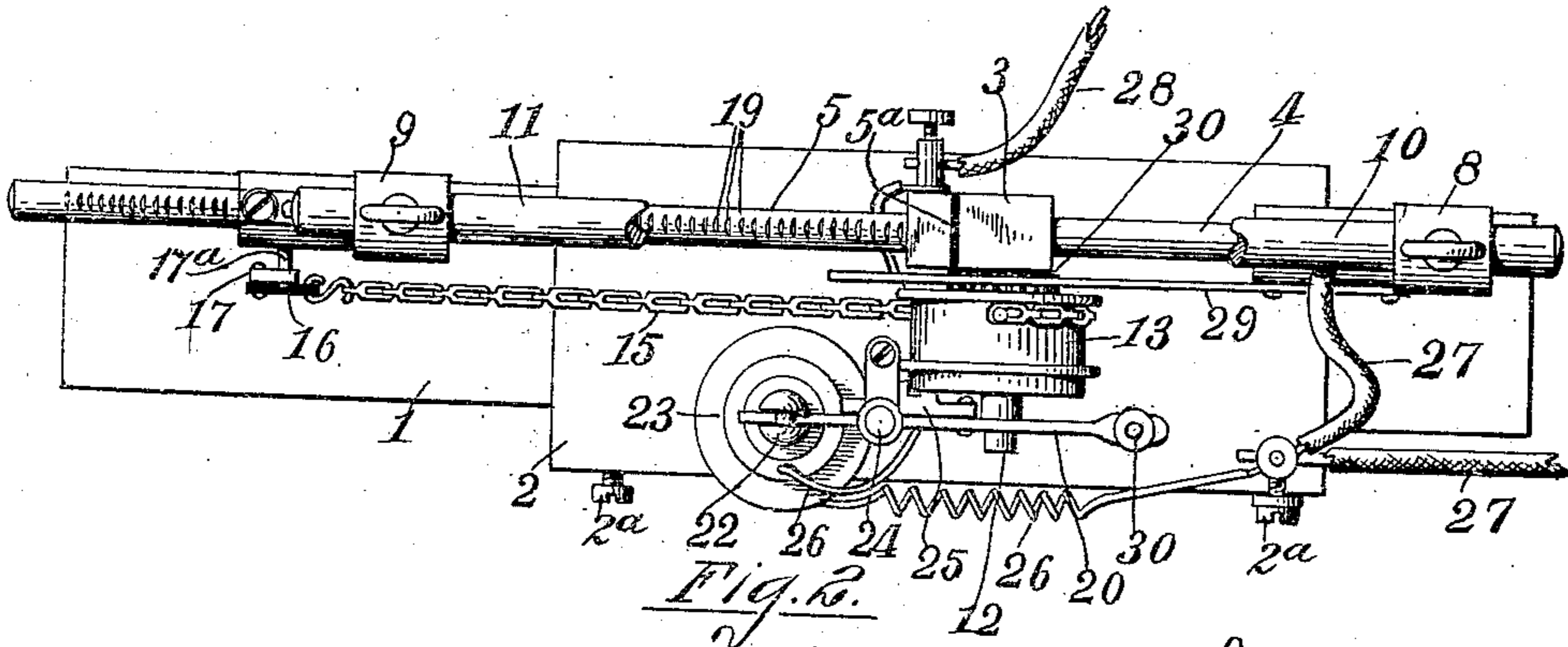
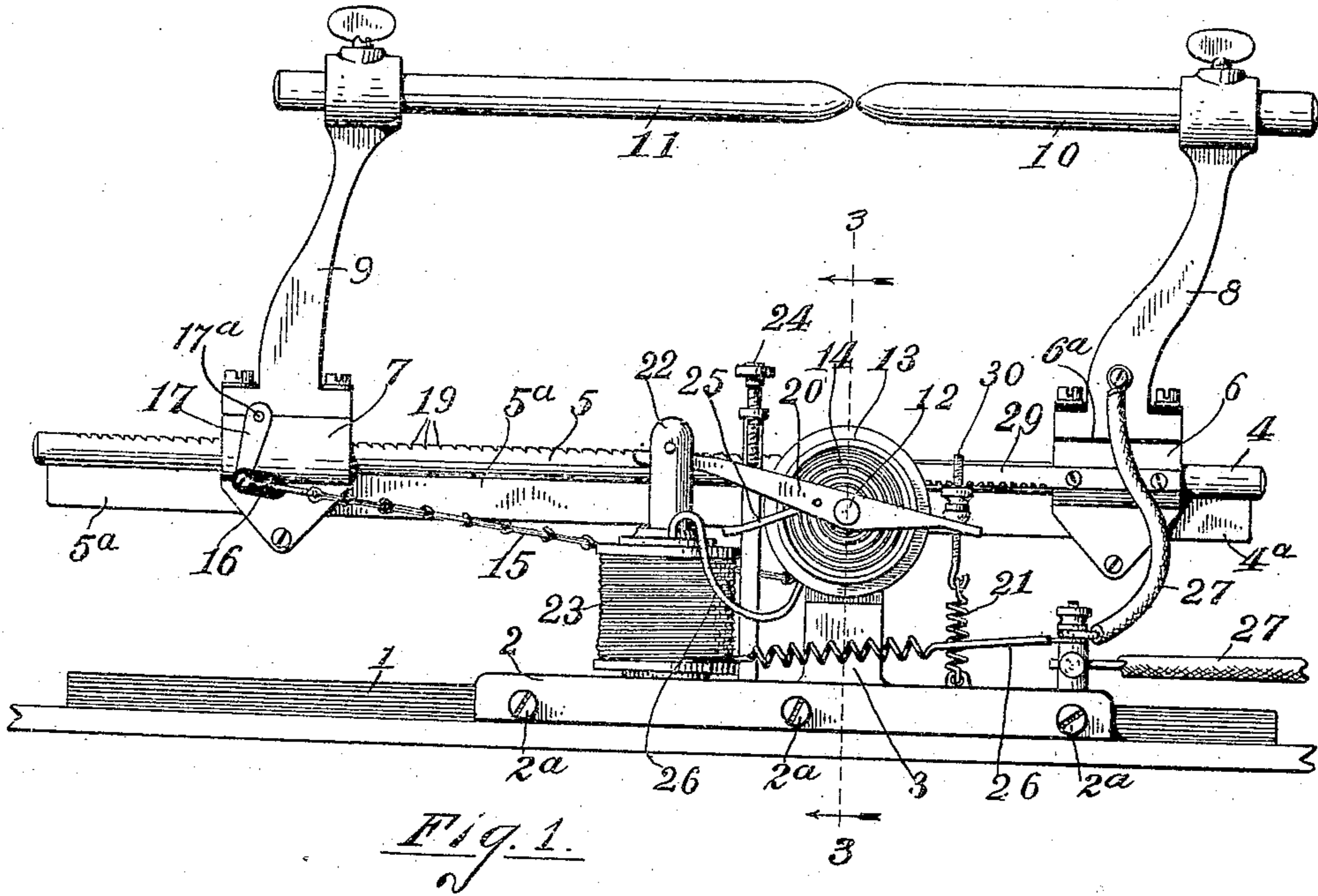
W. F. DAVIS.

ARC LAMP.

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989,698.

Patented Apr. 18, 1911.



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# UNITED STATES PATENT OFFICE.

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## ARC-LAMP.

989,698.

Specification of Letters Patent.

Patented Apr. 18, 1911.

Application filed April 20, 1909. Serial No. 491,128.

*To all whom it may concern:*

Be it known that I, WILLIAM F. DAVIS, a citizen of the United States of America, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Arc-Lamps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in arc lamps, and more particularly to arc lamps for locomotive head lights, search lights, and like purposes, and its object is to provide the same with improved means for automatically adjusting the carbons, and to provide the device with various new and useful features, hereinafter more fully described and particularly pointed out in the claims, reference being had to the accompanying drawings, in which:

Figure 1 is a side elevation of a device embodying my invention; Fig. 2 a plan view of the same; Fig. 3 a transverse vertical section on the line 3—3 of Fig. 1; Fig. 4 an enlarged sectional detail of the clutch mechanism; and, Fig. 5 a sectional detail of the pawl mechanism for the carbon holder 9.

Like numbers refer to like parts in all of the figures.

1 represents a dove-tail way on which is adjustably mounted a bed plate 2, held adjusted by screws 2<sup>a</sup> and supporting a post 3, on which is fixed oppositely projecting arms 4 and 5. These arms are preferably cylindrical and provided with a downwardly projecting fin 4<sup>a</sup> and 5<sup>a</sup> to maintain the carbon holders in vertical position and in alinement. Mounted on these arms are slides 6 and 7, upon which are supported carbon holders 8 and 9. In the holder 8 is mounted the negative carbon 10, and in the holder 9 is a positive carbon 11, these carbons arranged in alinement and horizontally

above the arms 4 and 5 and spaced apart therefrom.

12 is a stud extending from the upper part of the post 3, on which stud is journaled a drum 13 actuated by a coiled spring 14 to wind on the drum a chain 15, which chain is connected by an insulating link 16 to a lever 17, which lever is connected to a spring actuated pawl 18 in the slide 7 by a rock shaft 17<sup>a</sup> on which the lever and pawl are mounted, said pawl detachably engages ratchet teeth 19 in the arm 5 to hold the slide 7 from moving toward the slide 6, as hereafter described.

The drum is normally held from rotating by means of a clutch 25, which engages the edge of the drum and is pivoted on a lever 20, journaled on the stud 12. This lever 20 is normally held in position as shown in Fig. 1 and with the clutch 25 engaging the rim of the drum and holding the same. This lever is also yieldingly held in this position by a spring 21 provided with a tension adjusting screw 30 extending through the lever, and the upward movement of the lever is limited and adjusted by a screw 24. The lever 20 is moved downward against the action of the spring 21 by a core 22 in a solenoid coil 23, excited by a shunt circuit 26 extending from the arm 5, through the coil and to the negative or return conductor 27, which conductor extends from the carbon holder 8 to the negative side of the electric battery or generator for operating the lamp.

28 represents the positive conductor in circuit with the arm 5 which arm is insulated from the post 3 to which it is attached as at 5<sup>a</sup>. The holder 8 is also insulated from the slide 6 on which it is mounted.

A rack 29 is attached to the slide 6, extends parallel with the arm 4, and is engaged and actuated by a pinion 30 attached to the drum 13. The diameter of the drum and the pitch diameter of this pinion are so proportioned as to correspond with the

relative consumption of the carbons 10 and 11 to maintain the arc substantially stationary.

The operation of my device is as follows:

5 When the current is on, the parts are normally in the position shown in the drawings, and the carbons 10 and 11 suitably separated to form an arc therebetween. As long as this arc is properly maintained, the current  
10 will be through the positive conductor 28, the arm 5, the slide 7, the support 9, the carbon 11, the carbon 10, the support 8, and the negative conductor 27. As the carbons are consumed, and the arc increases, an increasing  
15 portion of the current will pass through the shunt circuit and excite the solenoid coil 23, and at a limit determined by the tension of the spring 21, the core 22 will be drawn down into the coil 23, and the end  
20 of the clutch 25 will be stopped by the top of the said coil, and thus be turned on its pivot more nearly radial to the drum, which will release the latter. The spring 14 will then turn the drum, winding the chain there-  
25 on, releasing the pawl 18, and bringing the carbons in contact with each other, restoring the arc which again takes the entire current through the carbons. The shunt circuit will thus be so reduced that the spring 21 will  
30 restore the parts to normal position, as shown in the drawings. When this latter movement takes place, the clutch 25 will turn the drum backward, unwind the chain  
35 15 sufficient to reengage the pawl 18, and hold the slide 7 from moving, and at the same time the pinion will run the rack 29 backward, and thus separate the carbons a proper distance to form a suitable arc, this distance depending upon the adjustment of  
40 the screw 24. Thus by adjusting the screws 24 and 30, the device will be adjusted to properly operate with any convenient current, and the device will automatically ad-  
45 just the carbons from time to time, to maintain correct operative position of the same, and the arc substantially stationary.

This device is intended to be used with a suitable concave reflector having its axis opposite the axis of the carbons and preferably  
50 behind the carbon 10. This reflector may be of any suitable concavity and the direction of the rays reflected therefrom, can be made more or less divergent or parallel by adjusting the bed 2 on the dove-tail way 1  
55 toward or from the reflector.

If the device is used where there is no jarring of the same, the pawl 18 and ratchet 19 may be omitted, and the device will operate quite as well, the friction of the slide on  
60 the arm being sufficient to hold the slide stationary between adjustments. It will also be noted that between the described adjustments there will be a gradual feeding up of

the negative carbon for that as the carbons burn away, the shunt current increases. 65 This starts the core downward and feeds the negative carbon forward by the rack and pinion. This increases the tension on the spring 21, so that the feed is gradual until the clutch trips, when the described read- 70 justment will occur.

What I claim is:—

1. An arc lamp, comprising a post, oppositely projecting arms on the post, carbon holders movable on the arms, a stud on the 75 post, a drum and a pinion journaled on the stud and attached to each other, a spring to rotate the drum and pinion, a rack engaging the pinion and attached to one carbon holder, a chain wound on 80 the drum and attached to the other carbon holder, a lever pivoted on the stud, a spring attached to one end of the lever, a core attached to the opposite end of the lever, a coil surrounding the core and in shunt 85 circuit with the carbon holders, a clutch pivoted to the lever and engaging the drum to hold the same, and a stop engaged by the pawl to release the drum.

2. An arc lamp, comprising movable car- 90 bon holders, arms on which the carbon holders are slidable, one of said arms having a ratchet, a pawl on one of said holders and engaging the ratchet, an arm connected to the pawl, a chain attached to the arm at one 95 end, a drum on which the other end of the chain is wound, a spring to turn the drum and wind the chain, a pinion attached to the drum, a rack engaging the pinion and connected to the other carbon holder, a lever 100 pivoted opposite the axis of the drum, a solenoid to operate the lever in one direction, a spring to operate the lever in the other direction, an adjustable screw to limit the movement of the lever, a screw to adjust 105 the tension of the spring, a clutch on the lever to hold the drum and turn the same backward, and a stop to release the clutch when the lever is moved by the solenoid.

3. An arc lamp, comprising two movable 110 carbon holders, a drum connected to the holders to move the same, a spring in the drum to rotate the same and move the carbon holders toward each other, a lever pivoted opposite the axis of the drum, a clutch 115 on the lever to engage and hold the drum, a solenoid to move the lever in one direction, a stop to release the clutch from the drum to permit the spring in the drum to rotate the drum and move the carbon holders toward 120 each other, and a spring to move the lever in the other direction and separate the carbon holders.

4. An arc lamp, comprising two movable carbon holders, a drum connected to said 125 holders to oppositely move the same, a

spring in the drum to rotate the same in one  
direction to move the holders toward each  
other, a lever pivoted opposite the axis of  
the drum, a clutch on the lever engaging the  
5 drum to hold and move the same against the  
tension of the spring, a spring attached to  
the lever to move the same in opposition to  
the first named spring, a solenoid attached  
to the lever to move the same in opposition

to the last named spring, and a stop to re- 10  
lease the clutch when the solenoid has moved  
the lever.

In testimony whereof I affix my signature  
in presence of two witnesses.

WILLIAM F. DAVIS.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
Washington, D. C."

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