

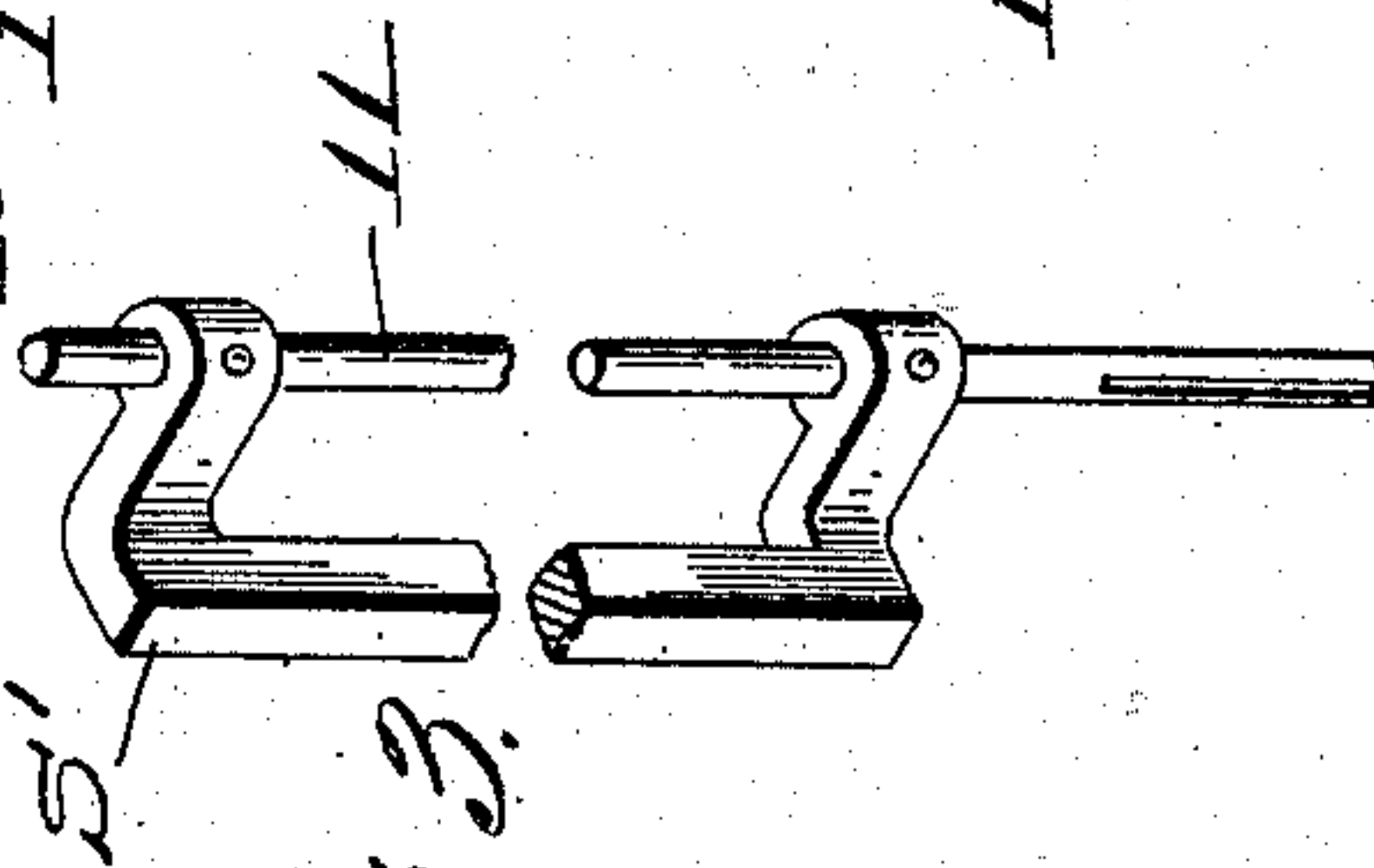
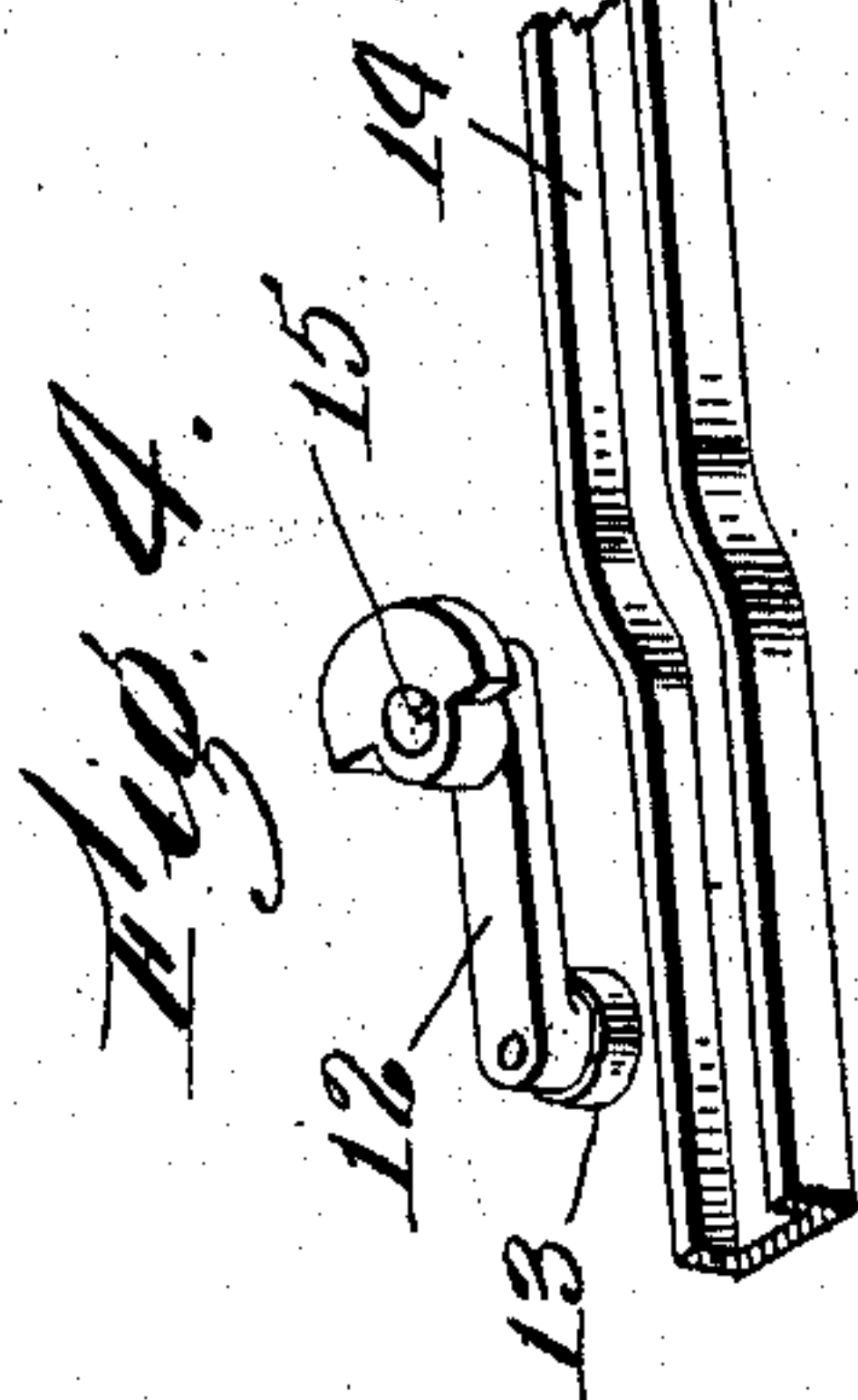
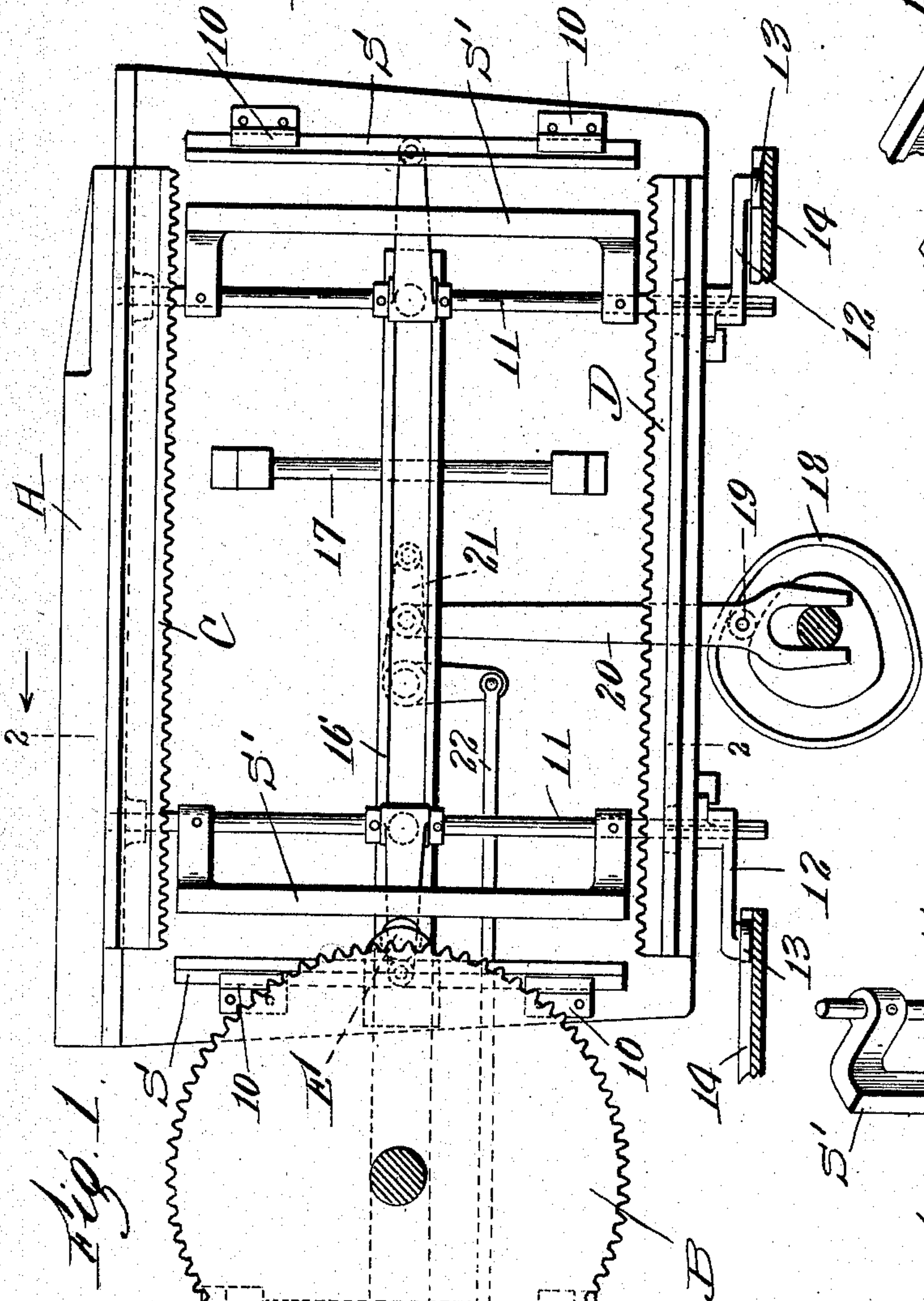
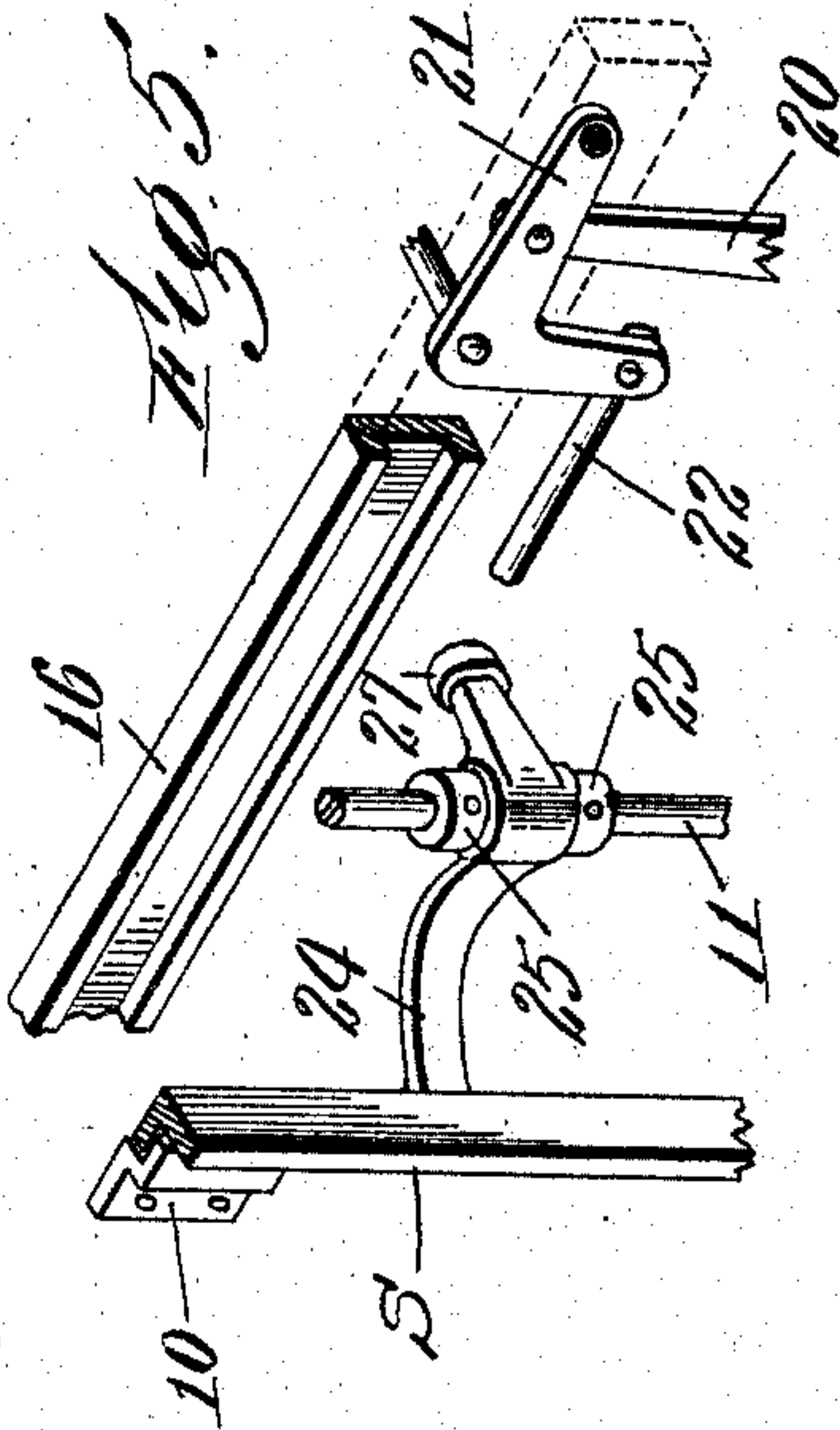
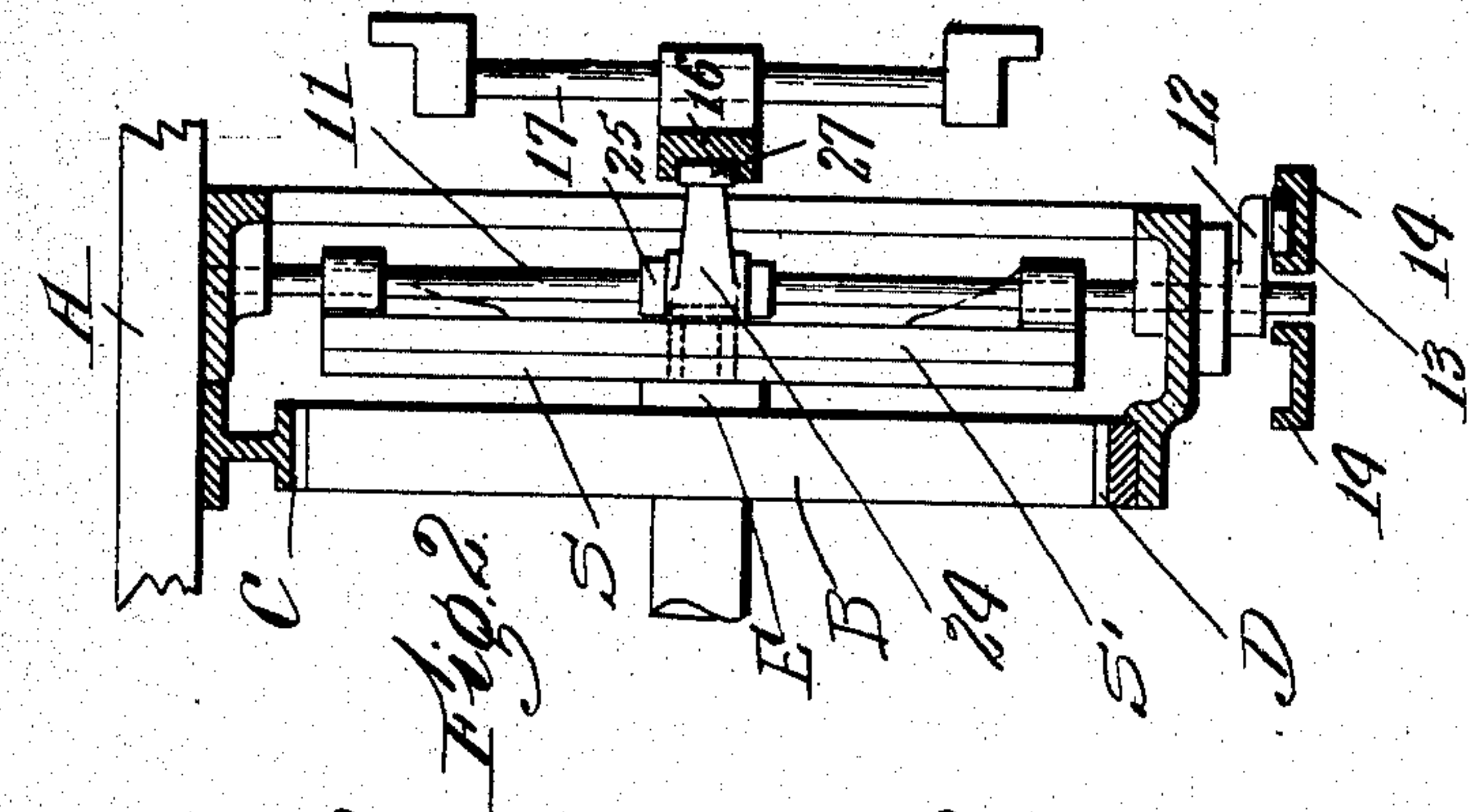
C. J. ROBERTSON.  
MECHANICAL MOVEMENT.

APPLICATION FILED MAR. 6, 1906. RENEWED MAY 4, 1909.

945,196.

Patented Jan. 4, 1910.

2 SHEETS—SHEET 1.



Witnesses  
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Inventor:  
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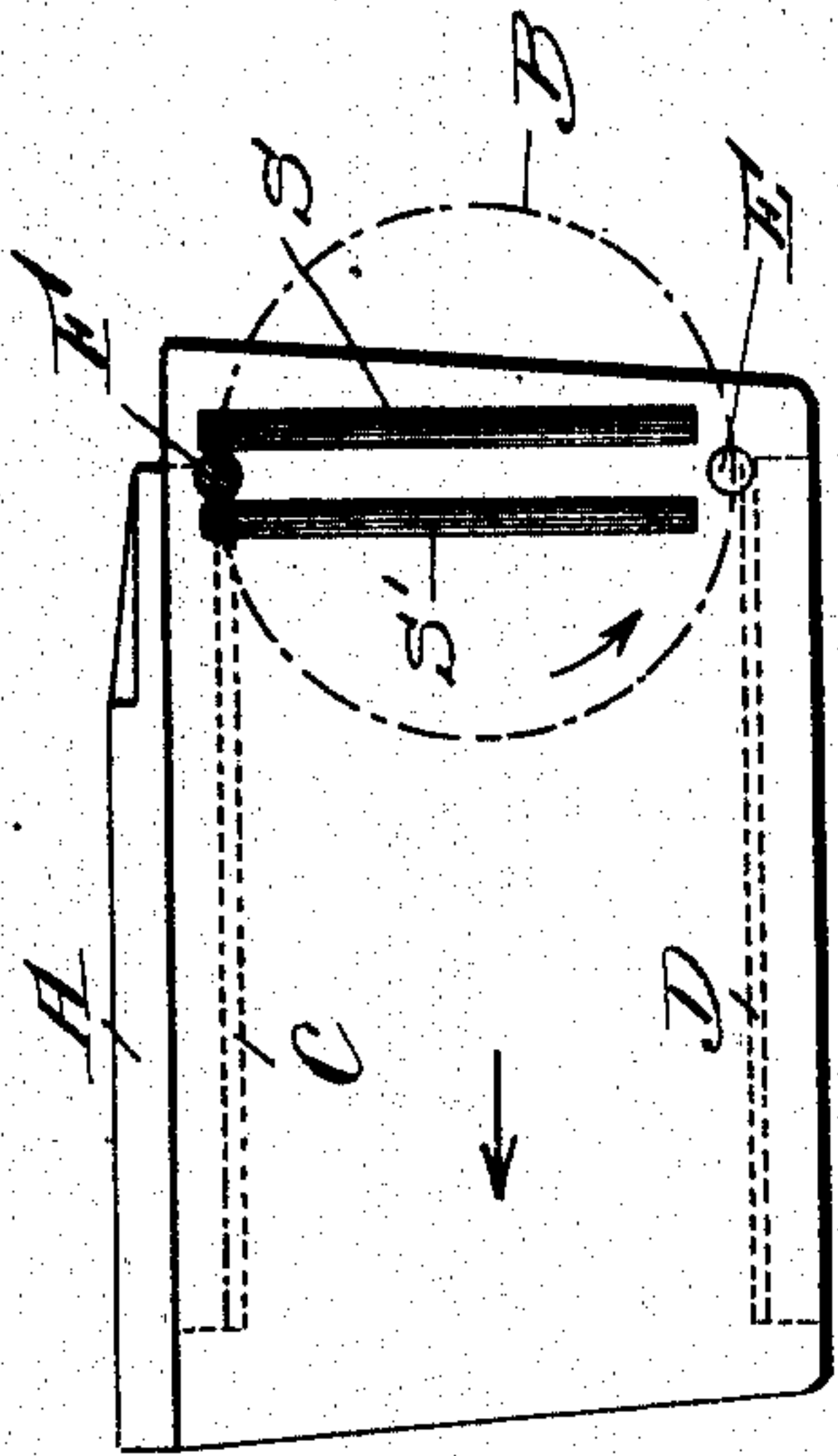


Fig. 9.

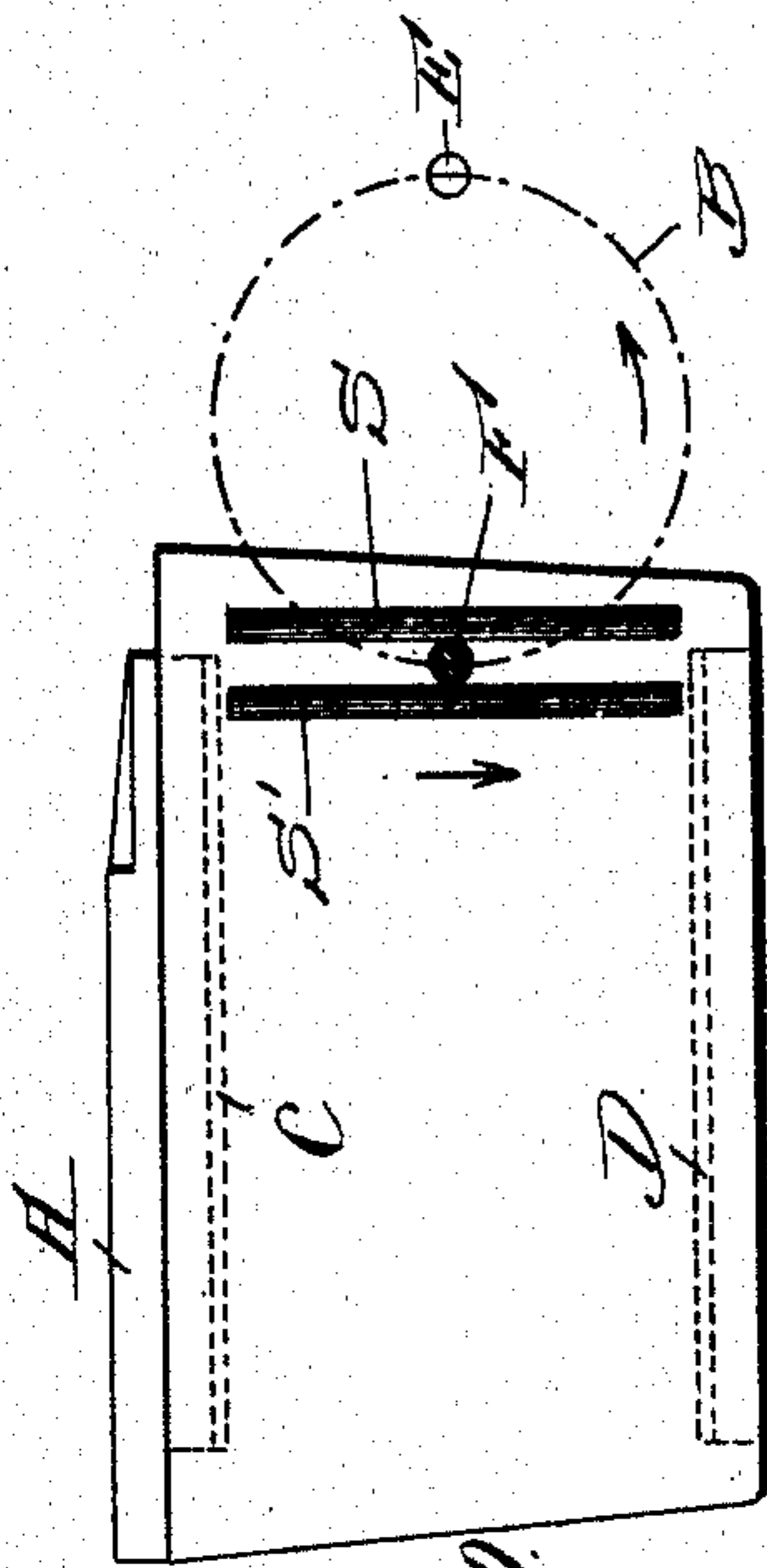


Fig. 10.

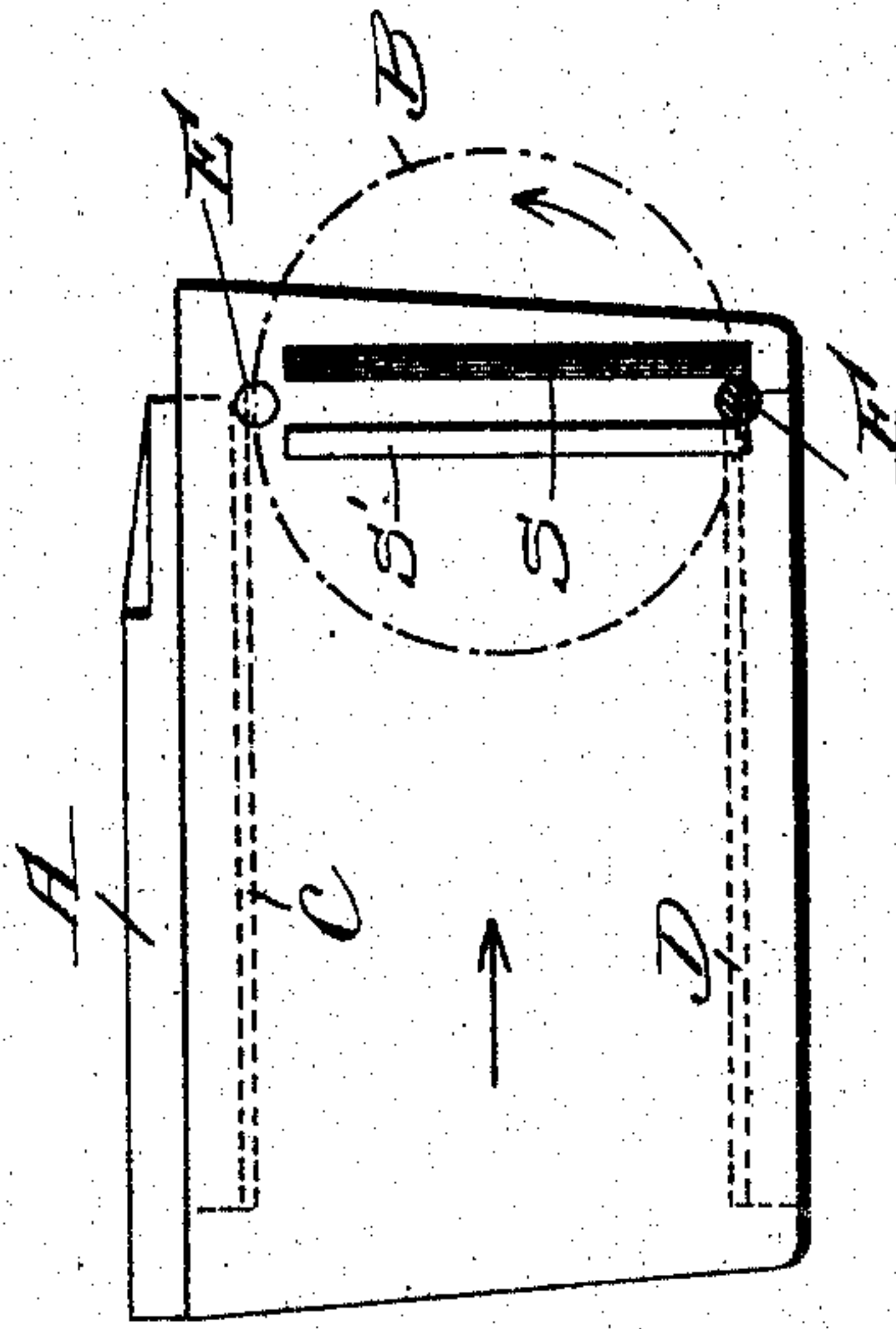


Fig. 11.

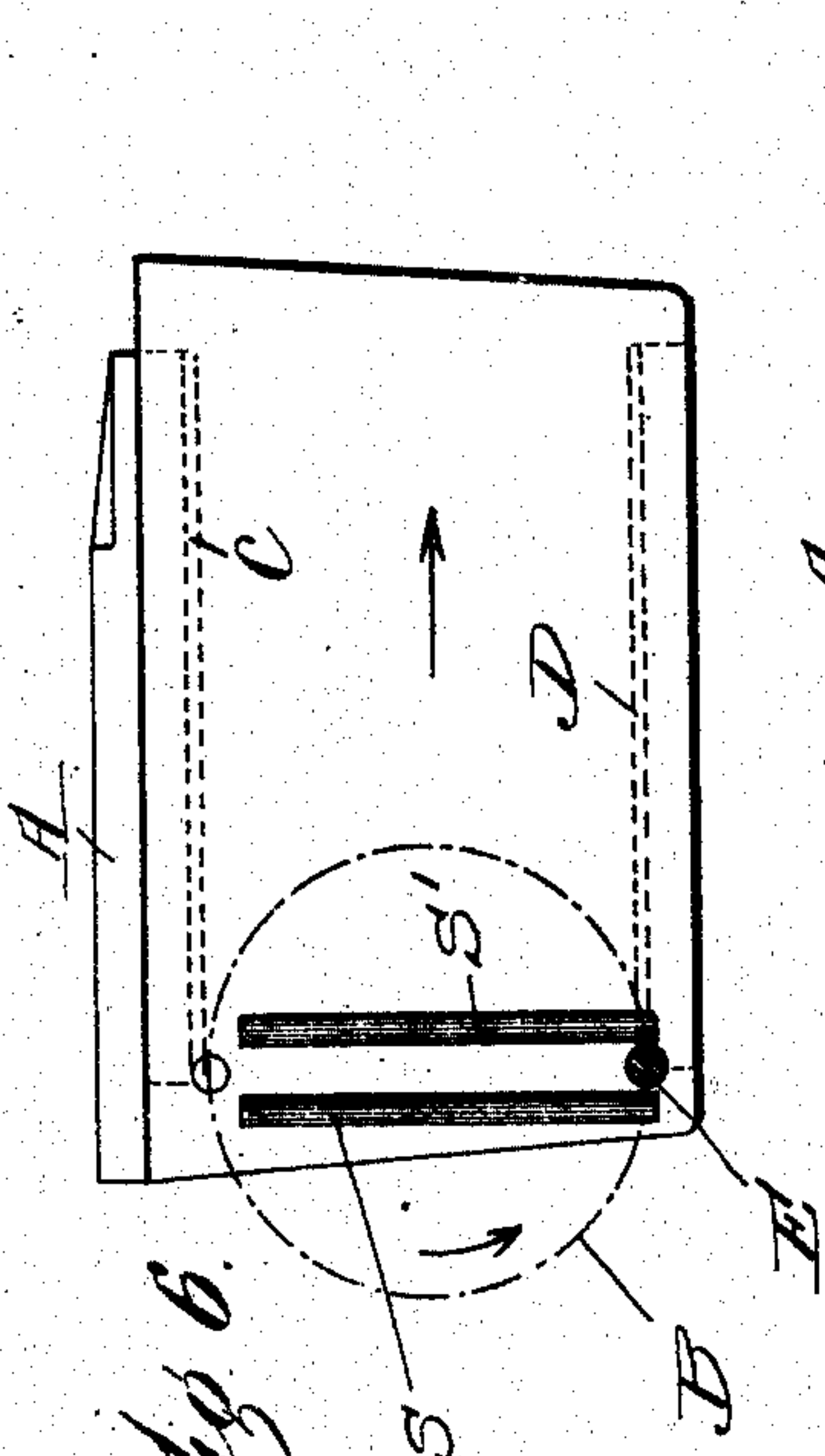


Fig. 6.

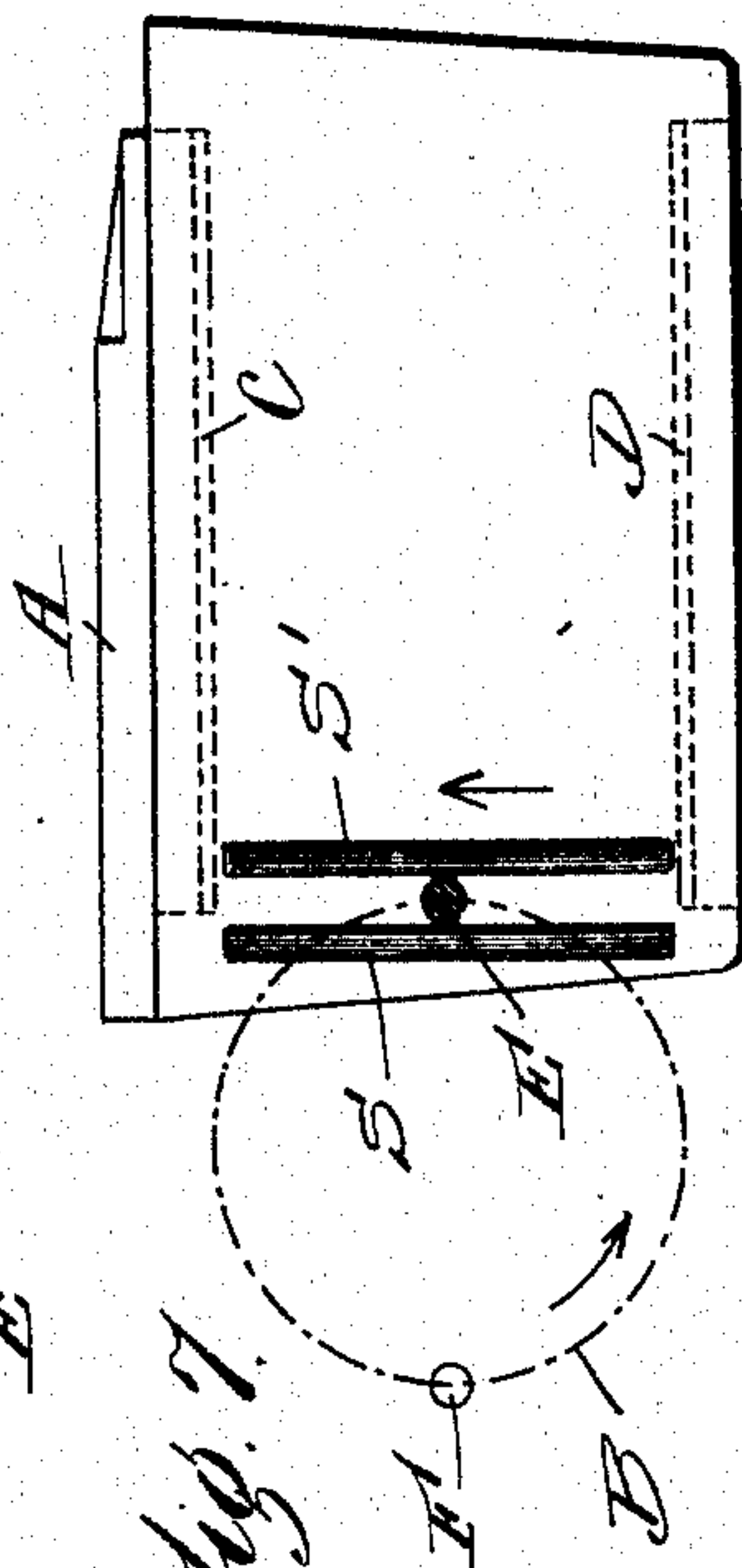


Fig. 7.

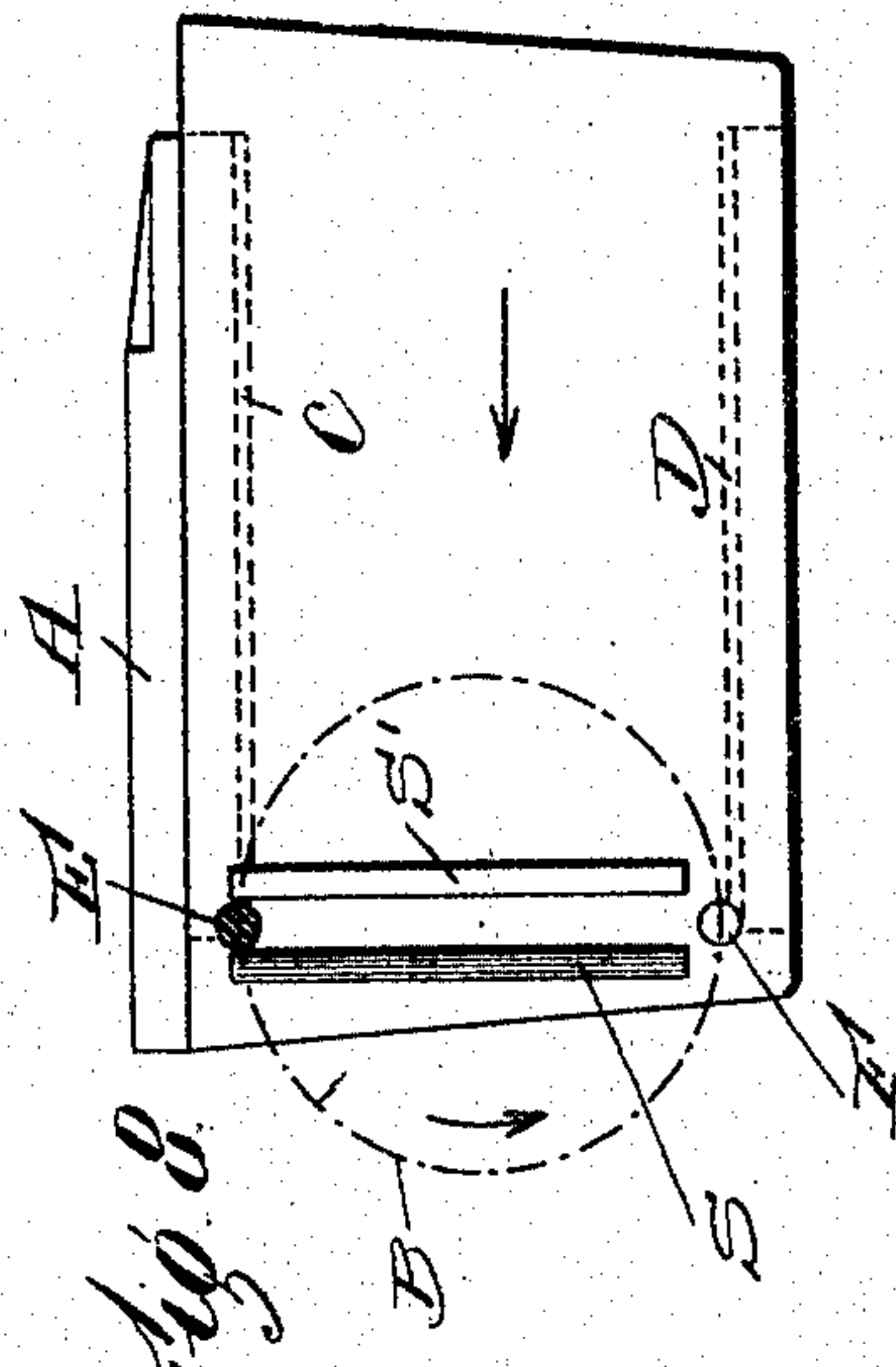


Fig. 8.

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# UNITED STATES PATENT OFFICE.

CHARLES J. ROBERTSON, OF TAUNTON, MASSACHUSETTS, ASSIGNOR TO THE CAMPBELL PRINTING PRESS & MANUFACTURING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## MECHANICAL MOVEMENT.

945,196.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed March 6, 1905, Serial No. 248,438. Renewed May 4, 1909. Serial No. 493,933.

*To all whom it may concern:*

Be it known that I, CHARLES J. ROBERTSON, a subject of the King of England, residing at Taunton, in the county of Bristol and State of Massachusetts, have invented a new and useful Mechanical Movement, of which the following is a specification.

The object of this invention is to provide a new and improved mechanical movement for converting rotary motion into a reciprocating motion. The movement has been particularly designed for reciprocating the beds of printing machines. These printing press movements have been developed to obtain a uniform or constant forward and backward movement of the bed combined with a crank reverse at the ends of movement along the lines of the old and well-known Napier movement. A form of this movement in use is that shown in patent to Miehle No. 322,309, dated July 14, 1885. This mechanism comprises a main driving mechanism consisting of a revolving pinion arranged between two racks, and a reversing mechanism comprising a revolving wrist-pin cooperating with vertical shoes at the ends of the bed, the spaces between which shoes form vertical slots. The wrist-pin is carried by the pinion. This mechanism well lends itself to a movement of the three-revolution type; that is, to a movement in which the crank operating element makes one revolution for the main forward movement, one revolution for the main backward movement, and a half turn for each crank reverse. It has also been proposed to provide a mechanical movement in which a two-revolution pinion is employed, which pinion carried two wrist-pins, one for reversing the bed at one end of its movement, and the other wrist-pin for reversing the bed at the other end of its movement. But it is impossible with this device to obtain a proper or half-turn crank reverse, because the outside shoes must be cut away to allow the idle-wrist-pin to pass above and below the same. This leads to a continuation of the main working movement at the expense of the reversing movement, and the reversing movement can only take place substantially at the centers of movement of the wrist-pin as distinguished from a true crank

reverse which takes practically a half turn of the crank.

As printing presses have been made heavier, and as the demand has come for higher speeds, it has been found necessary to meet this demand by giving more time to the reversing movements as compared with the main driving movements. This has led to the invention of the two-revolution movement with a true crank reverse, that is, to a mechanical movement in which each main forward and backward movement occupies a half turn of the crank element; while each crank reverse occupies a half turn thereof as before described. By this arrangement the speed can be increased as an easier reverse is obtained.

The object of this present invention is to arrange and improve the prior mechanical movements shown in said patents so that this advantageous method of operation can be obtained. I have discovered that this can well be done by imparting a movement to the shoes, the spaces between which form reversing slots. By doing this a full true crank reverse can be obtained in this style of two-revolution movement.

In the preferred form of my device, the movement imparted to the shoes takes place during the reversing movements so that the idle-wrist-pin will clear the shoes and so that the active wrist-pin will impart a true crank reverse to the bed.

The invention further consists of improved arrangements for carrying out this method of operation as hereinafter pointed out and claimed.

Referring to the accompanying two sheets of drawings forming part of this application, Figure 1 is a sectional side elevation illustrating the movement. Fig. 2 is a cross sectional view illustrating the operating mechanism. Figs. 3, 4 and 5 are perspective views illustrating details of the operating mechanism and, Figs. 6 to 11 inclusive are diagrams illustrating the operation of the movement.

Referring to the drawings and in detail, A designates the bed or moving member, which is mounted so as to be capable of reciprocation on the framing of the machine in any of the well understood ways.



B designates the driving pinion. The same is arranged between two racks C and D attached to the bed. These racks are arranged a little farther apart than the diameter of the driving pinion so that when the said pinion is in mesh with one rack it will clear the other. The driving pinion is raised and lowered by any of the mechanisms well understood in this art to engage the racks alternately to impart the main working or constant speed movements to the bed. The driving pinion B carries two wrist-pins E and F which are connected to the driving pinion so as to have an operative radius substantially equal to the pitch radius of said gear and said wrist-pins E and F which are arranged diametrically opposite or at 180 degrees to each other.

End shoes S—S are arranged on the frame of the bed in suitable brackets 10—10 so as to be capable of a vertical motion on the bed and swinging inner shoes S'—S' are arranged to cooperate therewith. The spaces between the shoes S and S' constitute the reversing slots. Arms 12—12 are journaled to the bottom of the frame and have rollers 13 at their free ends which cooperate with stationary cams 14 to operate the swinging shoes S'—S' to trap and release the wrist-pins. The arms 12—12 are provided with keys, 15 as shown in Fig. 4, and the shafts 11—11 have key-ways or slots cut therein to engage said keys, whereby said shafts 11 may be raised or lowered vertically and still may be controlled by the arms 12—12.

A guide-way 16, consisting of a slotted frame, is mounted so as to be capable of vertical motion on the frame of the machine in any desired way as by fitting the same on vertically arranged shafts 17—17. This guide-way is raised and lowered from a cam 18 engaging which is a roller 19 arranged on a yoke 20 which is connected to the horizontal arm of a bell crank lever 21, the outer end of which is secured to said guide-way 16. The depending arm of said bell crank lever 21 is connected by a link 22 to the depending arm of another bell crank lever 23 which has its horizontal arm connected to the guide-way 16. This mechanism forms a squaring mechanism for the guide-way so that the same will be kept in true position as it is raised and lowered. The cam 18 is driven by any of the usual gearings to turn once for each cycle of operation of the machine and its action causes the vertical movement of the guide-way as hereinafter described. A curved bracket 24 is arranged on each shaft 11. Collars 25—25 are secured to each shaft above and below each bracket 24 so that a vertical movement imparted to said brackets will move said shafts 11 vertically, but so

that the shafts 11 are free to turn in said brackets 24—24. The brackets 24—24 have rollers 27—27 at their outer ends which fit in the guide-way 16. The outer ends of the brackets 24—24 are connected to the outer shoes S—S as shown in detail in Fig. 5. By this arrangement, as the guide-way 16 is raised or lowered by the cam 18, the shoes will be correspondingly raised and lowered.

The operation can be followed from the second sheet of drawings. In Fig. 6 the bed is shown as just completing its constant speed movement to the right and the driving pinion B in mesh with, and just running out of the lower rack D. The left hand outer shoe S has just come into contact with the wrist-pin E which is now the active wrist-pin, and this wrist-pin has been trapped in the left hand reversing slot by the swinging motion of the left hand inner shoe S', which acts so far as this swinging motion is concerned substantially in the same manner as the swinging inner shoes shown in patent to Miehle, 322,309, referred to. Now during the next quarter revolution of the driving pinion B, the bed will be brought from full speed movement to the right to a state of rest at this right hand extreme, as shown in Fig. 7, by the wrist-pin E working in the left hand reversing slot. The other wrist-pin F which, during this operation is the idle-wrist-pin, runs over the top of the left hand shoes S and S'. During the next quarter revolution of the driving pinion B, the bed will be started from its position at rest at its right hand extreme up to full speed on its movement to the left as shown in Fig. 8. During this last half revolution of the driving pinion B and so soon as the idle-wrist-pin F has cleared the top of the left hand shoes S—S', the cam 18 will act to raise the shoes so that as the bed is brought up to full speed on this movement toward the left, the shoes will still trap the active wrist-pin E and the idle-wrist-pin F will pass under said shoes as shown in Fig. 8. During this last half revolution or reversing movement of the bed, the driving pinion will be raised so that it will come properly into mesh with the upper rack C so soon as the bed acquires its full speed movement to the left. After this takes place, the inner swinging shoe S' will move to release the wrist-pin E so that the bed can make its working or constant speed movement to the left. This constant speed movement takes a half revolution of said driving pinion B and brings the parts to the position shown in Fig. 9 where the wrist-pin E now passes under the shoes S—S' which make up the right hand slot, and wrist-pin F which now becomes the active wrist-pin is trapped in said right hand slot by the right hand shoe S coming up against the same, and the inner right



hand shoe S' swinging into operative position. During the next quarter revolution of the driving pinion B the bed will be brought from its full speed movement toward the left to a state of rest at its left hand extreme as shown in Fig. 10. During the next quarter revolution of the driving pinion the bed will be started from its left hand extreme on its movement to the right at a speed commencing at zero and gradually increasing up to full speed. During this last half revolution of the driving pinion B, and so soon as the wrist-pin E clears the lower ends of the right hand shoes S—S' as shown in Fig. 9, the cam 18 will act to lower the guide-way and the shoes so that as the bed acquires its movement to the right the wrist-pin E will pass over the tops of the right hand shoes S—S' and the wrist-pin F will remain in the right hand reversing slot as shown in Fig. 11, or until the bed is brought up to full speed on its movement to the right. During this last half revolution of the driving pinion B, or during this reversing movement, the driving pinion B will be lowered so as to engage into the lower rack D. During the next half revolution of the driving pinion B, the bed will be moved on its constant speed strokes to the right. This will bring the parts back to the position shown in Fig. 6, and will complete the cycle. Thus a two-revolution movement is provided which has a true crank reverse at each end, or in other words each reverse takes a half revolution. The constant speed movement forward and backward is equal to one half of the pitch circumference of the driving pinion and each reversing movement is equal back and forth to a pitch radius of said driving pinion.

This is a strong simple mechanism for the purpose described.

The invention is also well adapted to a four-revolution movement in which the main working movement occupies one and one half revolutions in each direction and each reversing movement a half revolution.

The details herein shown may be greatly varied by a skilled mechanic without departing from the scope of my invention as expressed in the claims.

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

1. In a mechanical movement, the combination of the bed, a main driving mechanism therefor, shoes carried by the bed, the space between the same forming reversing slots, two revolving wrist-pins, and means for imparting a movement to the parts making up the reversing slot to clear the idle-wrist-pin.

2. In a mechanical movement, the combination of the bed, a main driving mechanism therefor, shoes carried by the bed, the space between the same forming a reversing slot

at each end of the bed, two revolving wrist-pins, and means for imparting movements to the shoes so that one wrist-pin will clear at one end of the bed and the other wrist-pin will clear at the other end of the bed.

3. In a mechanical movement, the combination of the bed, a main driving mechanism therefor, shoes carried by the bed, a space between forming a vertical or straight slot at each end of the bed, two wrist-pins mounted on a revolving part, and means for imparting movements to the shoes so that one wrist-pin will clear the shoes at one end of the bed and the other wrist-pin will clear the shoes at the other end of the bed.

4. In a mechanical movement, the combination of the bed, a main driving mechanism therefor, outer shoes carried by the bed, swinging inner shoes carried by the bed, two revolving wrist-pins, and means for imparting movements to the shoes so that the idle-wrist-pin at each reverse will clear.

5. In a mechanical movement, the combination of the bed, a main driving mechanism therefor, shoes carried by the bed, the space between the same forming slots, a two-revolution driving pinion, two wrist-pins carried thereby, and cam mechanism for raising and lowering the shoes so that the idle-wrist-pin will clear at each reverse.

6. In a mechanical movement, the combination of the bed, a main driving mechanism therefor, shoes carried by the bed, the space between the same forming a reversing slot at each end of the bed, two revolving wrist-pins, one of which reverses the bed at one end of its movement and the other at the other end of its movement, and means for moving the shoes so that as the active wrist-pin engages between the ends of the shoes the idle-wrist-pin will clear, and so that when the active wrist-pin has run through the slot and engages the other end of the shoes the idle-wrist-pin will also clear.

7. In a mechanical movement, the combination of the bed, a main driving mechanism therefor, shoes mounted on the bed, so as to be capable of a vertical movement thereon, two revolving wrist-pins, a guide-way controlling the vertical position of the shoes, and means for raising and lowering the guide-way.

8. In a mechanical movement, the combination of the bed, a driving mechanism therefor, shoes mounted on the bed so as to be capable of a vertical movement thereon, two revolving wrist-pins, a guide-way controlling the vertical position of the shoes and means for moving the guide-way, and a squaring mechanism for the guide-way.

9. In a mechanical movement, the combination of the bed, a main driving mechanism therefor, shoes mounted on the bed so as to be capable of vertical movement thereon,



connections for operating the inner shoes  
arranged so as not to be affected by the ver-  
tical movement thereof, two revolving wrist-  
pins, and means for raising and lowering  
5 the shoes.

10. In a mechanical movement, the combi-  
nation of the bed, a main driving mechanism  
therefor, shoes mounted on the bed, so as to  
be capable of vertical movement thereon, two  
10 revolving wrist-pins, means for swinging

the inner shoes, and means for raising and  
lowering the shoes synchronously.

In testimony whereof I have hereunto set  
my hand, in the presence of two subscribing  
witnesses.

C. J. ROBERTSON.

Witnesses:

ROBERT T. JOHNSTON,  
FRED J. VIEWEG.