

(No Model.)

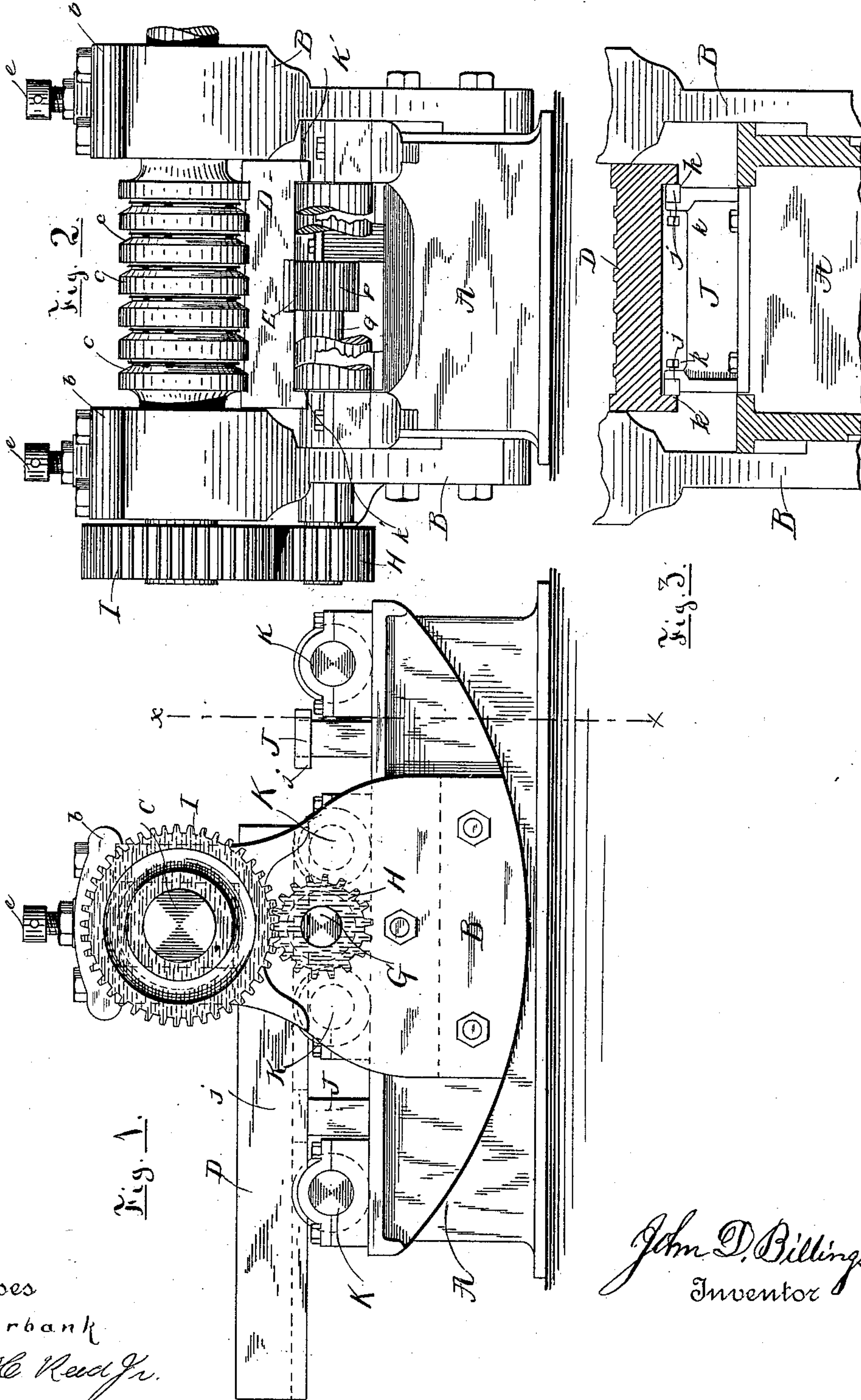
4 Sheets—Sheet 1.

J. D. BILLINGS.

MACHINE FOR FORMING BLANK BARS FOR HORSESHOES.

No. 422,564.

Patented Mar. 4, 1890.



Witnesses  
L. S. Burbank  
Chas. H. Reed Jr.

John D. Billings  
Inventor

(No Model.)

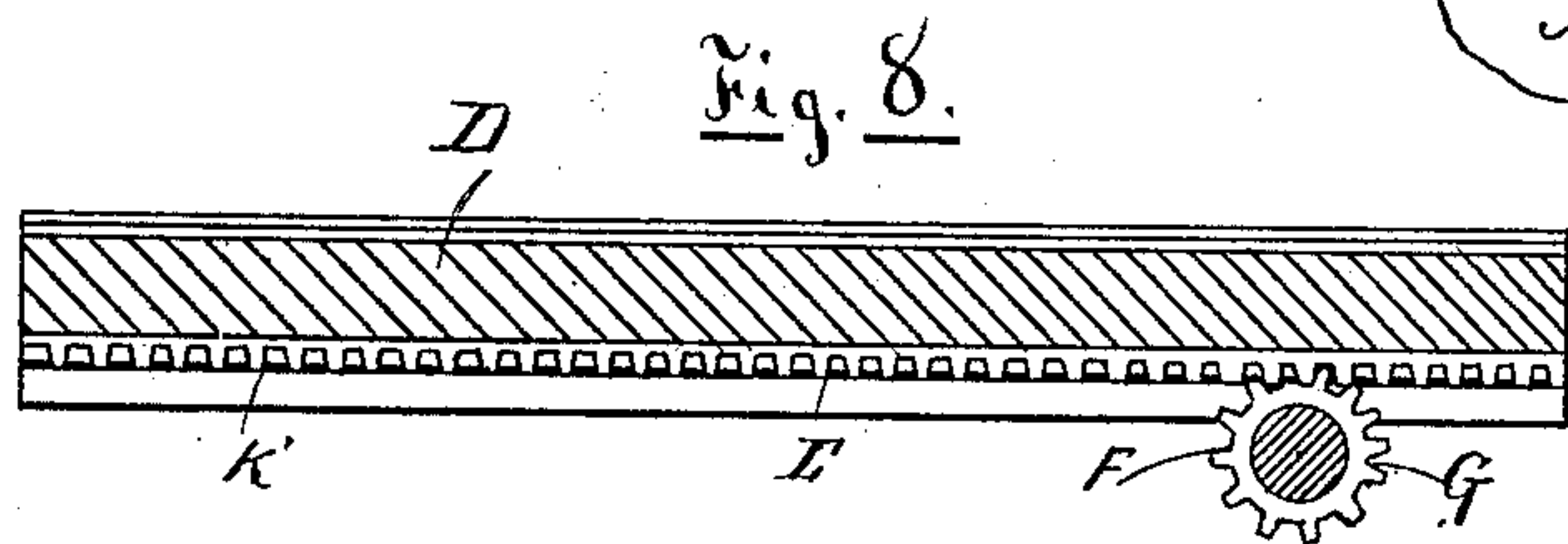
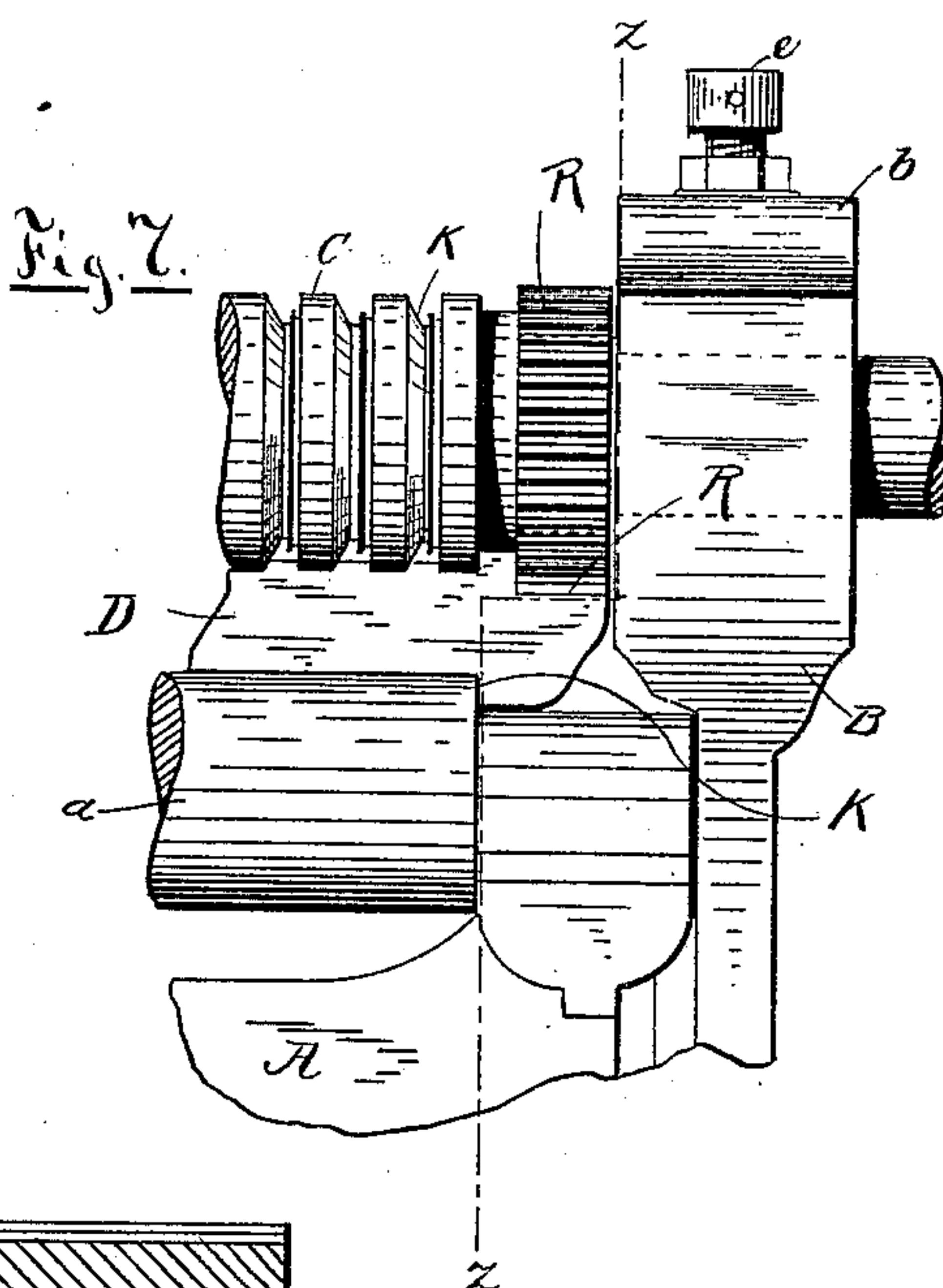
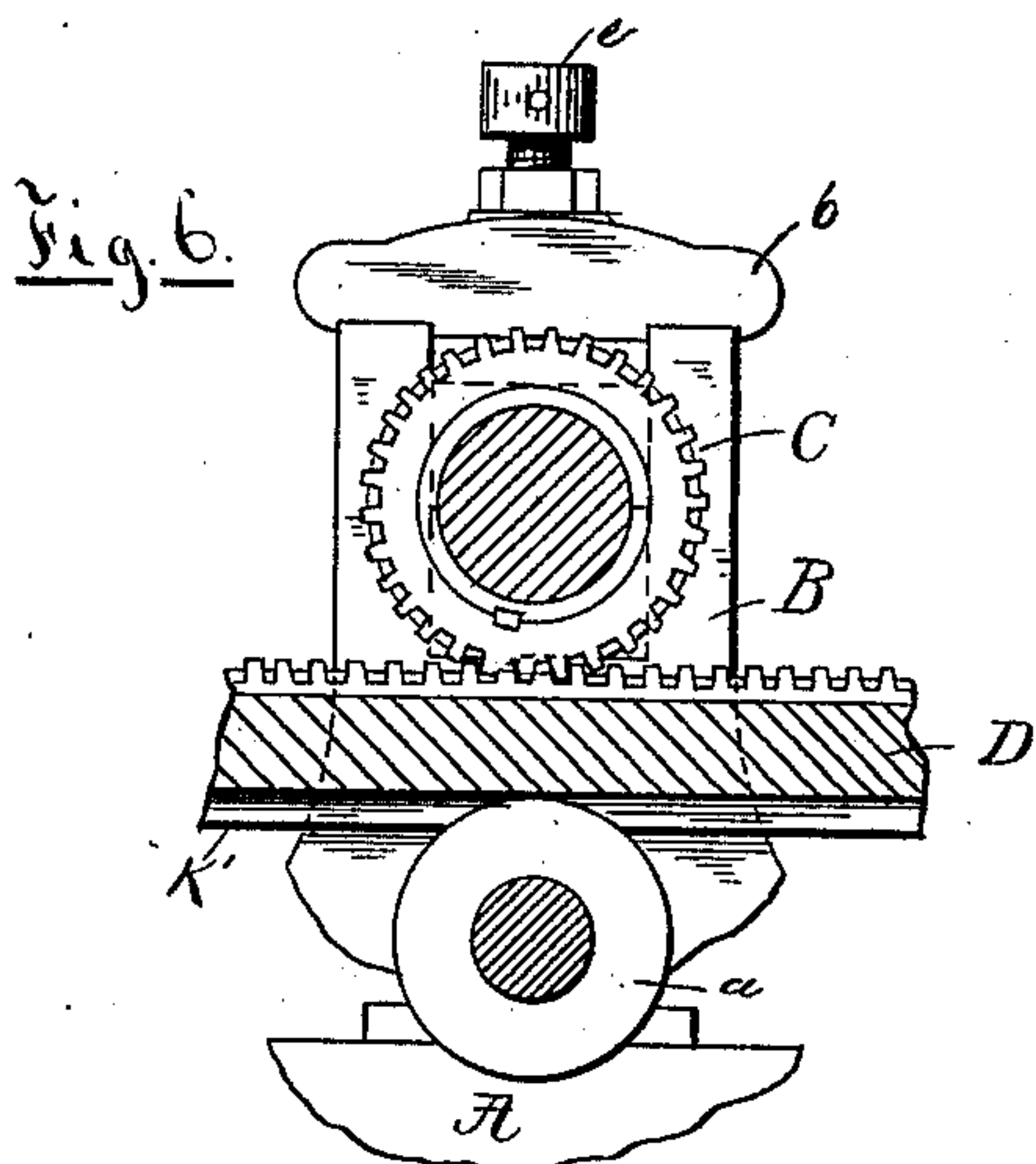
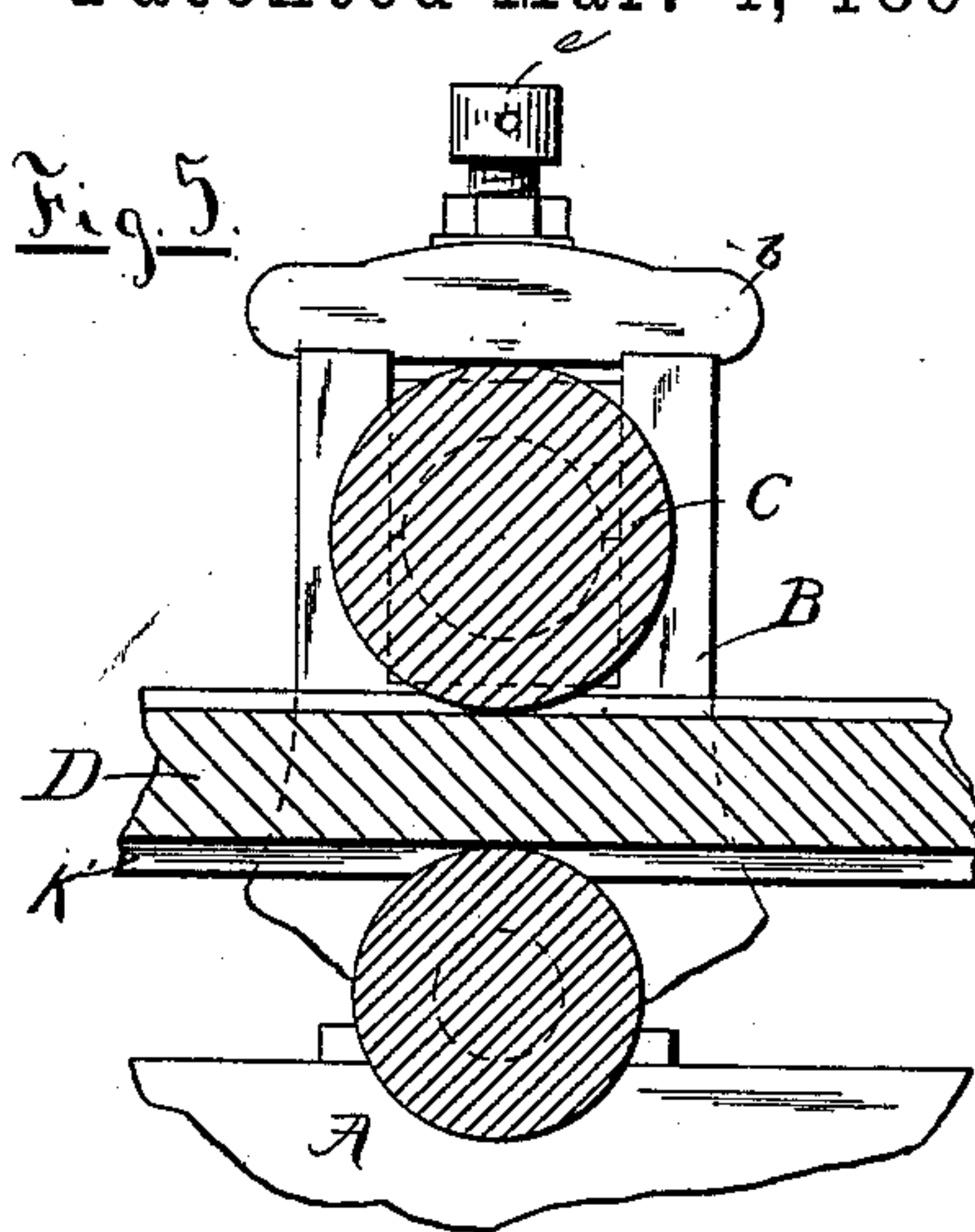
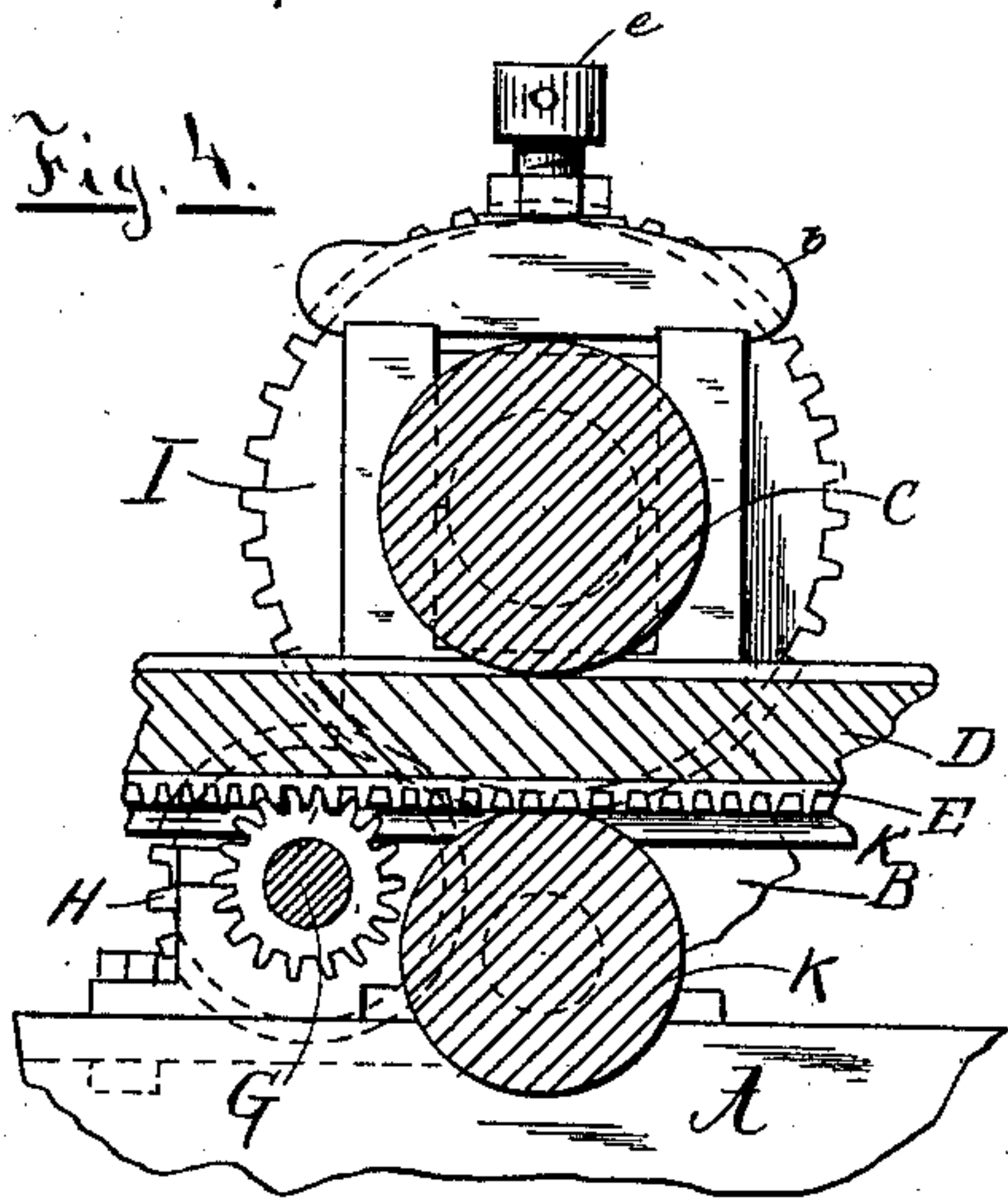
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Fig. 9.

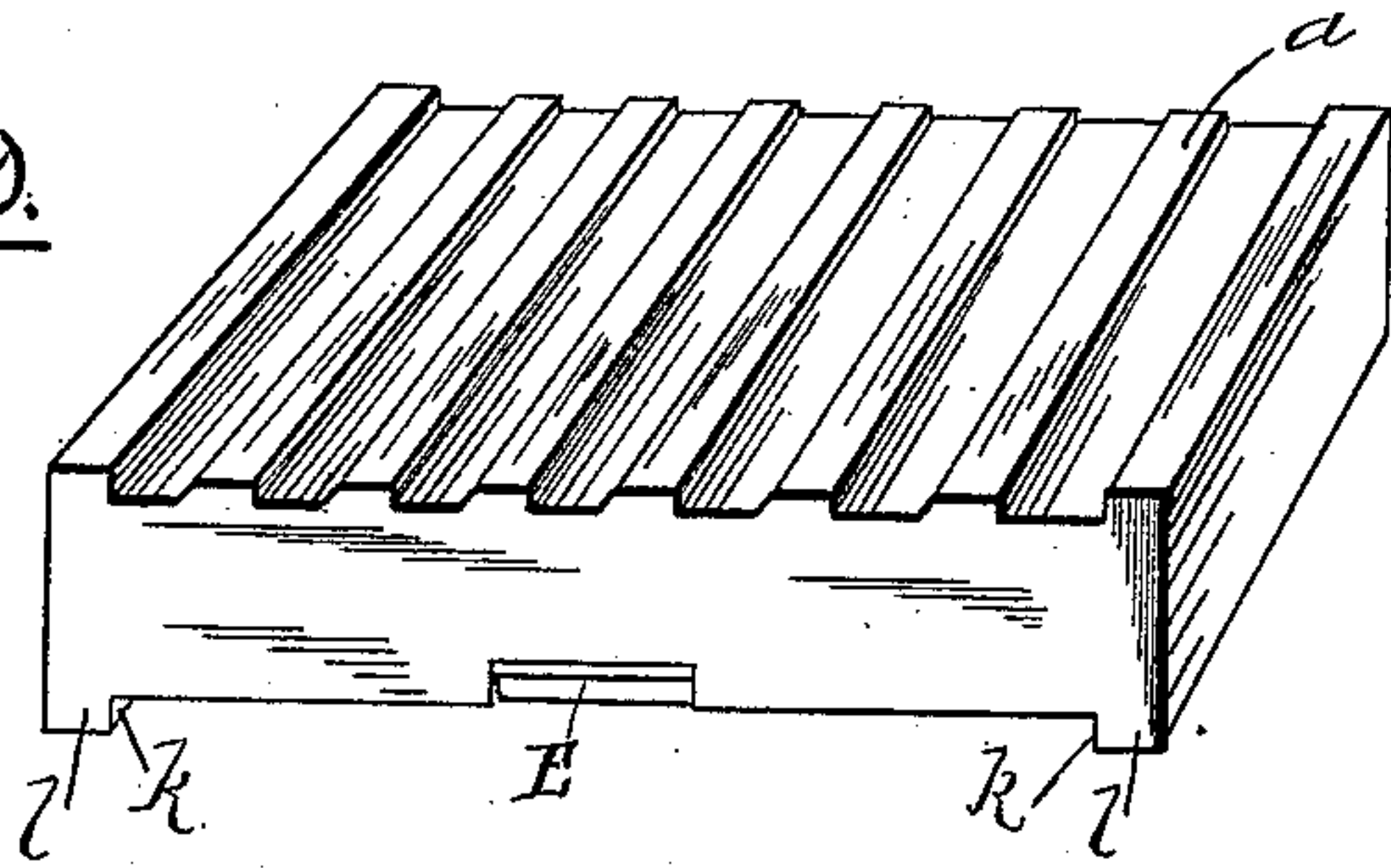
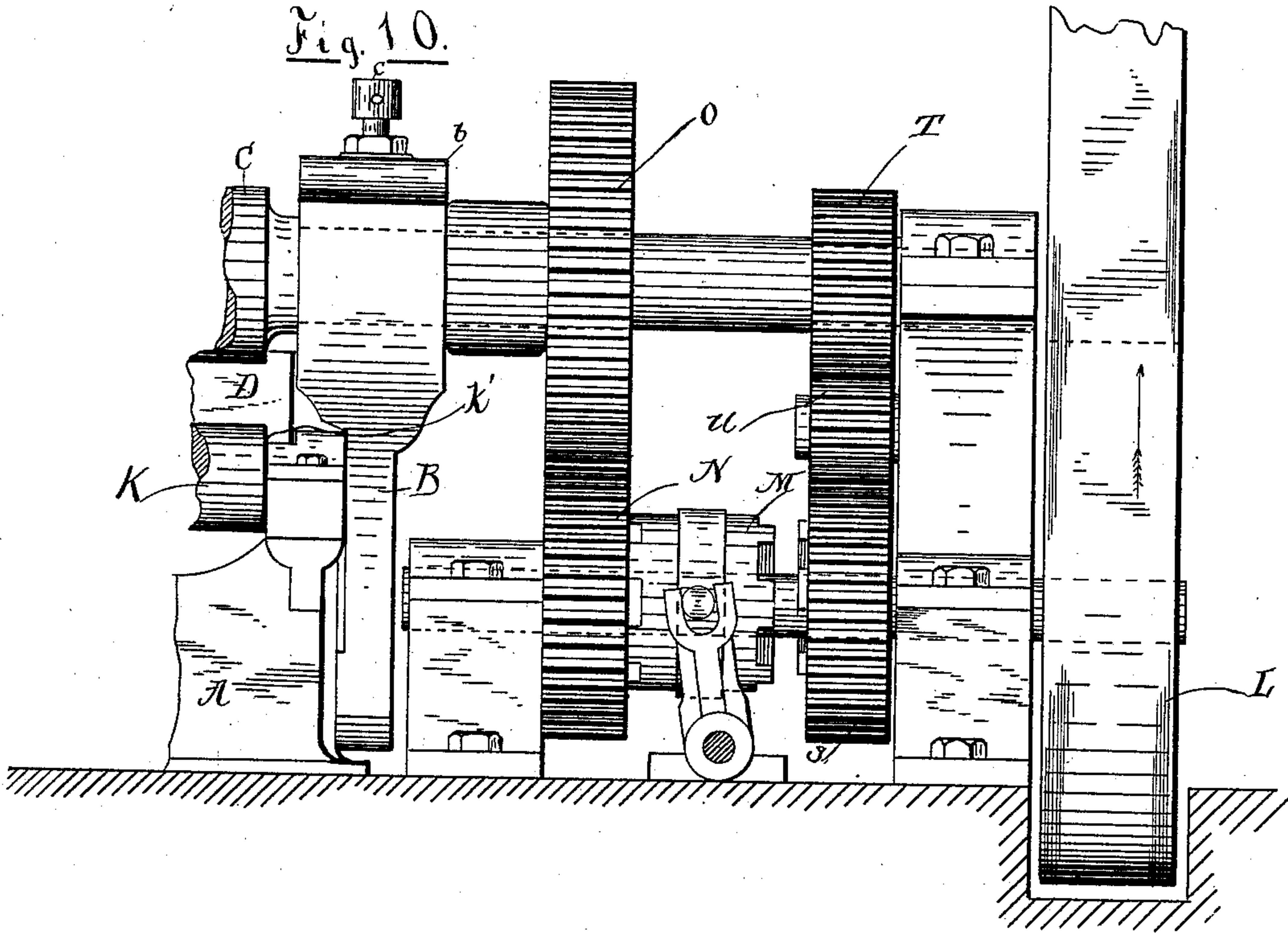


Fig. 10.



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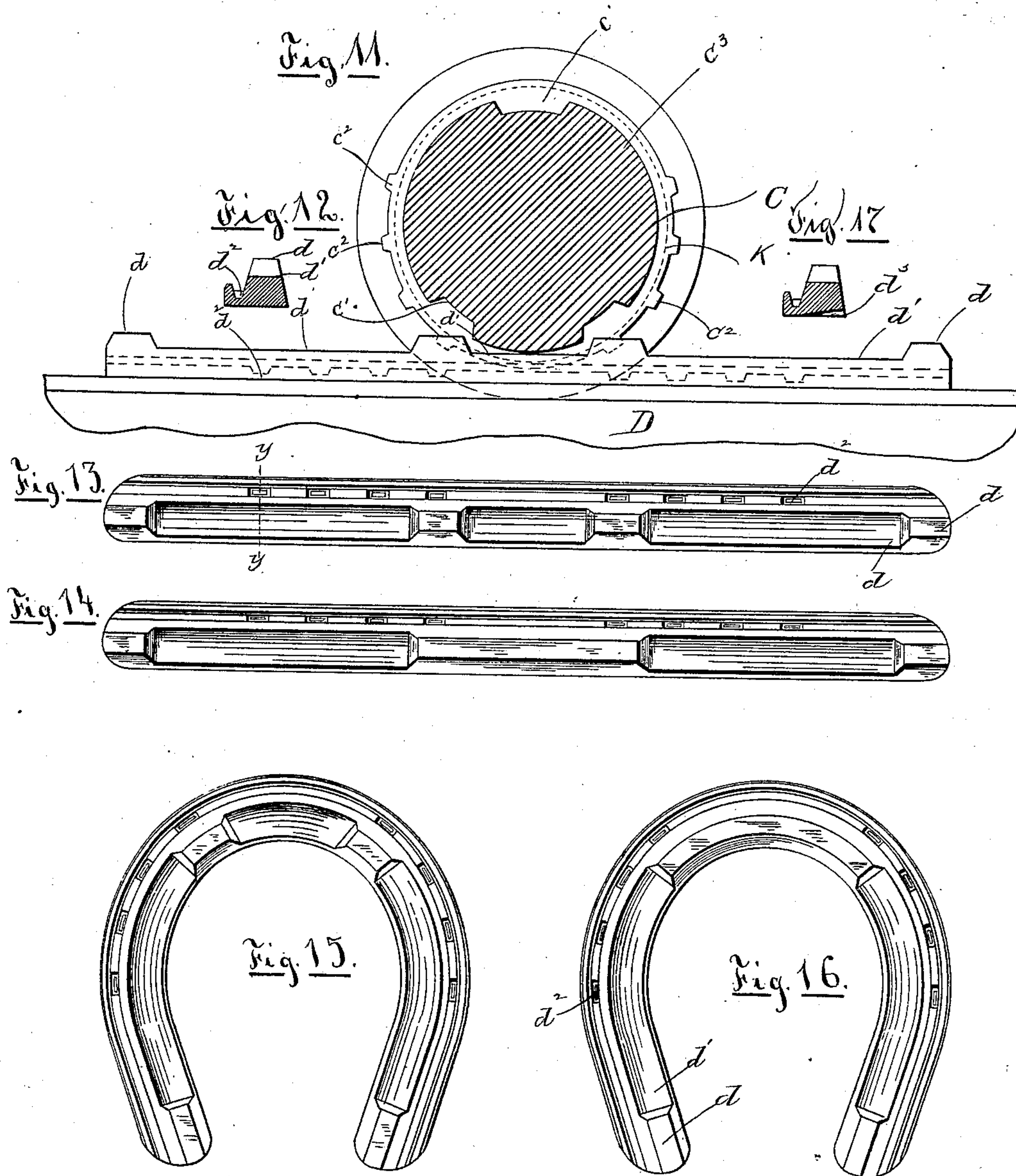
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# UNITED STATES PATENT OFFICE.

JOHN D. BILLINGS, OF NEW YORK, N. Y.

## MACHINE FOR FORMING BLANK BARS FOR HORSESHOES.

SPECIFICATION forming part of Letters Patent No. 422,564, dated March 4, 1890.

Application filed October 24, 1889. Serial No. 328,095. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN D. BILLINGS, of the city of New York, and State of New York, have invented certain new and useful Improvements in Machinery for Forming Blank Bars to be Used for Horse and Mule Shoes; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My object and purpose in this invention are to produce a practical machine which shall by its differently-constructed essential parts, when combined and working together, make, form, shape, and produce from iron and steel bars of the proper and required size for horse and mule shoe blanks with calks in their proper places, or with continuous calks, or made plain with proper bends and indentations or holes for nails, and when bent into the desired shape or contour to be used for horse and mule shoes.

The utility, novelty, and advantages of this invention for forming iron and steel bars of a required size into certain special shapes, and when bent into the usual forms to be used as horse and mule shoes, over the old and present devices, which are by two or more rolls and by a pass or quick roll movement, are as follows: Instead of rolling the bars by a rapid pass movement between the rolls, I make the depressions or spaces between the calks and leave the projections in the bar at the necessary places to be used as calks, and at the same time make the blank shoe-bar thus rolled of uniform lengths and the said spaces and calks of uniform lengths and sizes, and also prevent a waste of metal and further prevent the bar when passing through and leaving the rolls from twisting and clinging to the groove in and bending around the roller; and which has heretofore never been successfully and but imperfectly accomplished. The bars when heated are placed on the projections or raised die-slots on the die-plate and they remain in a straight level firm position during the passing of the die-plate under the top die-grooved roller, which latter acts as the female die, and the die-plate with the raised or projecting die-slots acting

as the male die, the said die-plate and the said top die-grooved roller moving in opposite directions, the top die-grooved roller making its revolution, being placed or resting at each end upon housings and held firmly in them, the die-plate passing under the said top roll and carrying the bars the whole length, the top die-grooved roll making at the same time one complete revolution and forming and shaping one complete shoe bar or blank, thus effecting the bars by making the depressions or spaces and leaving the projections in them for the calks, also at the same time making the small depressions for the nail-holes, and all this by a roll-forged die movement combined. The result of this manner of forming the bars or blanks is: The calks and spaces and indentations are of uniform size, shapes, and lengths, and the said bars do not twist nor bend nor cling onto the upper roll, and a waste of the bar is also prevented, as all the bars before being heated and placed on the die-plate are cut off the required length of the shoe-bar to be made. This novel mechanism does away entirely with the under roll, or, in other words, the blank shoe-bar is formed into the detailed shapes required for a horse or mule shoe by using one roll, and with the assistance of the said die-plate, which takes the place of the bottom roll.

By this improvement and process horse and mule shoes can be made much faster and cheaper and more perfect, and from one to six shoe-bars of different kinds of forms—to wit, a three-calked, a four-calked, a plain, a flat, or a continuous-calked shoe-blank, or a shoe-blank with series of calks—can be made at one and the same time by one revolution of the top roll and passing of the die-plate, as all these several shaped die-grooves can be made in the top roller, which will form these different shapes and styles of shoe-blanks.

The invention consists of a movable die-plate with a die-grooved or forming roller, between which iron or steel bars are carried and formed into shapes ready for bending into horse and mule shoes, and the mechanism for operating the same.

Figure 1 is a side elevation of the entire machine. Fig. 2 is a rear end elevation with parts broken to show the gearing arrangement of the die-plate. Fig. 3 is a vertical section on line *x x*, Fig. 1. Figs. 4, 5, 6, and



7 are modifications of the mechanism for the support and carrying of the die-plate. Fig. 8 is a detail in section of the die-plate, showing rack and pinion. Fig. 9 is a perspective view of the die-plate. Fig. 10 is an end elevation of the gearing by means of which the die-plate is carried forward and reversed. Fig. 11 is a detailed section of the die-grooved or forming roller, shown in connection with a rolled bar. Fig. 12 is a section of bar through  $y y$  as made for hind shoe. Figs. 13 and 14 are plans of completed bars. Figs. 15 and 16 are views of same bent to proper shapes. Fig. 17 is a section of bar as formed for front shoe.

A represents the bed; B, the houses in which turn the forming-roller C, running in conjunction with the die-plate D, which is carried by means of rack E and pinion F. The die-plate D moves with the roller C by means of their connection through the rack E, pinion F, shaft G, and pinions H and I.

J represents the frames supporting the guide-plates  $j$ , against which the webs  $l l$  work for the purpose of guiding the die-plate; K, the roller upon which the die-plate D moves; L, the driving-pulley, which has constant motion.

The operation is as follows: The iron or steel bars to be used having been rolled or formed into an approximate shape including the tread or creasing for the nail-holes and by the usual methods are cut into the proper lengths, then heated and placed upon the raised part  $a$  of the die-plate D while the latter is in its first position, the clutch M is then thrown into engagement with gear N, which transmits motion through gear O, roller C, gears I and H, shaft G, pinion F, and rack E to the die-plate D, carrying it forward with speed corresponding to that of roller C and guiding the iron into the annular grooves  $c$ , which contain the depressions  $c'$  and projections  $c^2$  and  $c^3$ , which form the calks  $d$  and depressions  $d'$ , and also depressions  $d^2$  for nail-heads. The depressions and projections in the annular grooves may be made of any form or shape to produce a blank bar with or without calks or a continuous calk or plain or flat and beveled shape. The bar having been carried through the former by means of gears O and N, the machine is stopped in position, as shown in Fig. 1, by disengaging the clutch M from the gear S, which transmits a quick reverse motion to the gear T through the intermediate gear U. The bars are then in condition shown in Figs. 13 and 14, having the flat face, as in Fig. 12, for hind shoes, or with bevel  $d^3$ , Fig. 17, for front shoes. The nail-openings are punched through  $d^2$  and bar bent to perfect shape by an invention already patented on the 25th of December, 1877.

What I claim as novel and useful, and desire to be protected by Letters Patent of the United States, is—

1. A machine for forming and shaping bars of iron and steel of the required size into blank bars provided with or without calks or with series of calks or continuous calks or plain or flat shapes with bevels and indentations for nail-holes and to be bent or formed into and used for horse and mule shoes, consisting of a movable die-plate D (shown in Fig. 9) to take the place of a roller, for the purpose and substantially as described.

2. The movable die-plate D, with the raised elevations  $a$ , the webs  $l l$ , and guide-plate  $j$ , substantially as and for the purpose described.

3. The movable die-plate D, raised elevations  $a$ , the webs  $l l$  and guide-plate  $j$ , rack E and pinion F, and the roller K, upon which the die-plate D moves, substantially as and for the purpose described.

4. The movable die-plate D, raised elevations  $a$ , webs  $l l$  and guide-plate  $j$ , rack E and pinion F, the roller K, the shaft G and pinions H and I, the frame J, which supports the guide-plate  $j$ , and the driving-pulley L, for the purpose substantially as described.

5. The movable die-plate D, raised elevations  $a$ , webs  $l l$  and guide-plate  $j$ , rack E and pinion F, and roller K with the shaft G and pinions H and I, the frame J, which supports the guide-plate  $j$ , and the driving-pulley L, housings B, and the die-grooved roller C, and the annular grooves  $c$ , through which the bars pass, the clutch M, and gear N, also gear O, through which motion is transmitted from gear N, for the purpose substantially as described.

6. The die-grooved roller C and annular grooves  $c$ , and which contain depressions  $c'$  and  $d^2$ , also projections  $c^2$  and  $c^3$ , also the housings B, and the movable die-plate D, as shown in Fig. 1, the clutch M, with the gear S, which transmits a quick reverse motion to the gear T, and also gears T and U, and the roller K, the guide-plate  $j$ , and frame J, for the purpose and substantially as described.

7. The die-grooved roller C, with annular grooves  $c$ , in which are depressions and projections for shaping the blank bars, the movable die-plate D, with webs  $l l$ , guide-plate  $j$ , driving-pulley L, the clutch M, and roller K, the shaft G and pinions H and I, the frame J, the housings B, together with gears N and O, for the purpose substantially as described.

8. The movable die-plate D, with the raised elevations  $a$ , with webs  $l l$ , and guide-plate  $j$ , in combination with die-grooved roller C, with annular grooves  $c$  in roller, and depressions  $c'$  and  $d^2$  and projections  $c^2$  and  $c^3$ , for the purpose and substantially as described.

In testimony that I claim the foregoing as my own invention I affix my signature in presence of two witnesses.

JOHN D. BILLINGS.

Witnesses:

G. W. TROWBRIDGE,  
CHAS. HALL ADAMS.