

H. SAVILLE.
CONTINUOUS WIRE DRAWING MACHINE.
APPLICATION FILED MAY 13, 1910.

975,641.

Patented Nov. 15, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

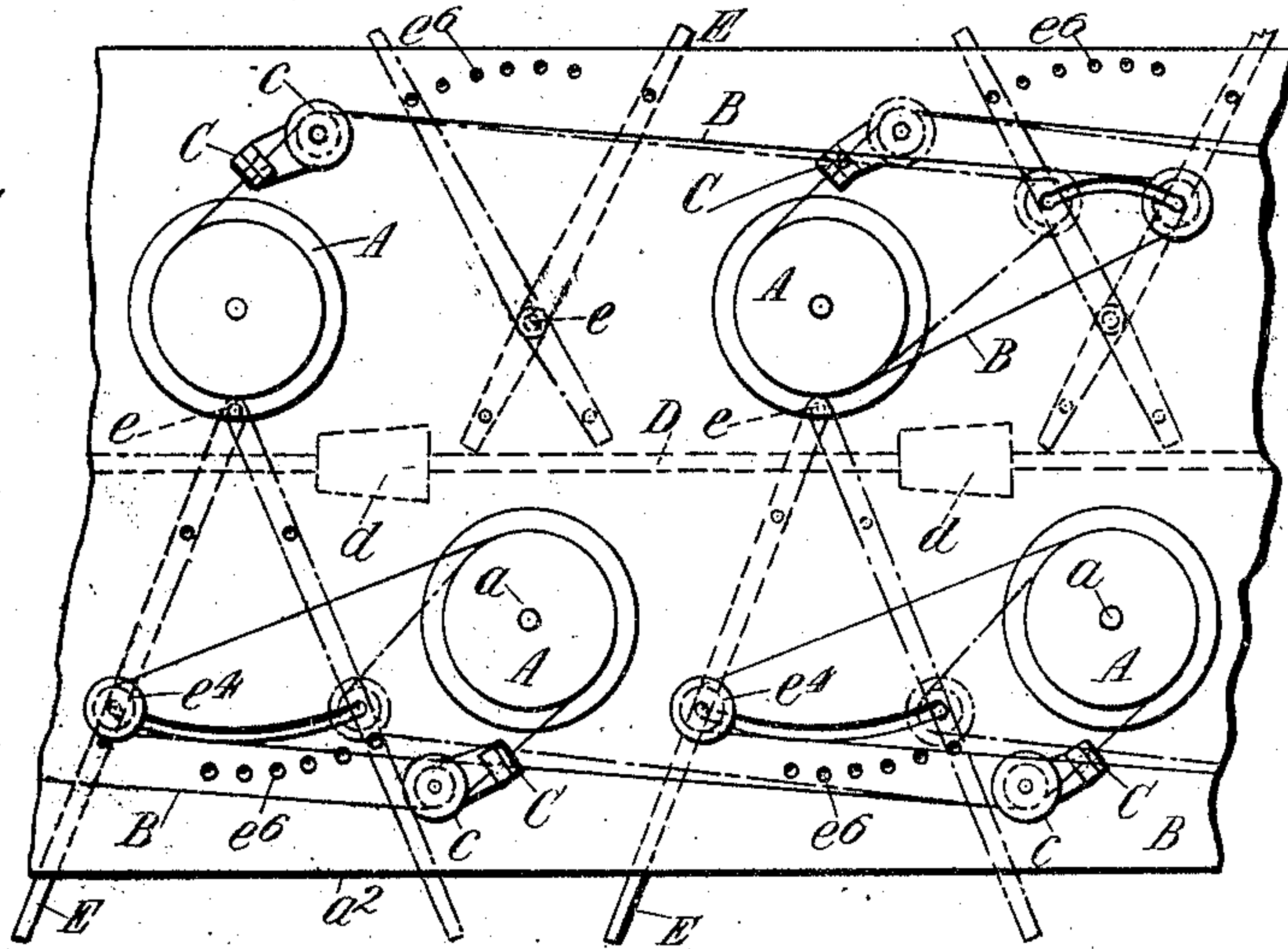


Fig. 2.

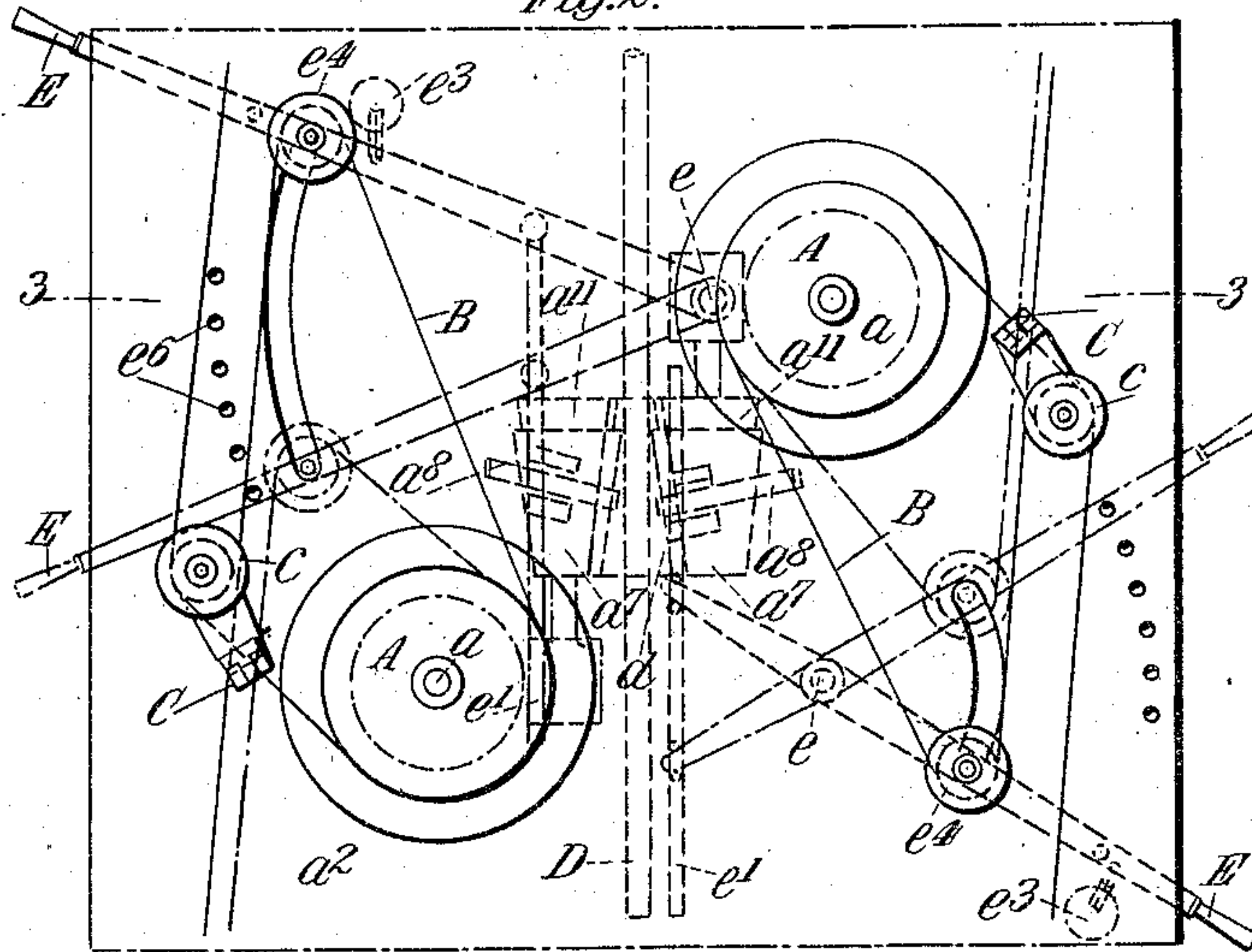
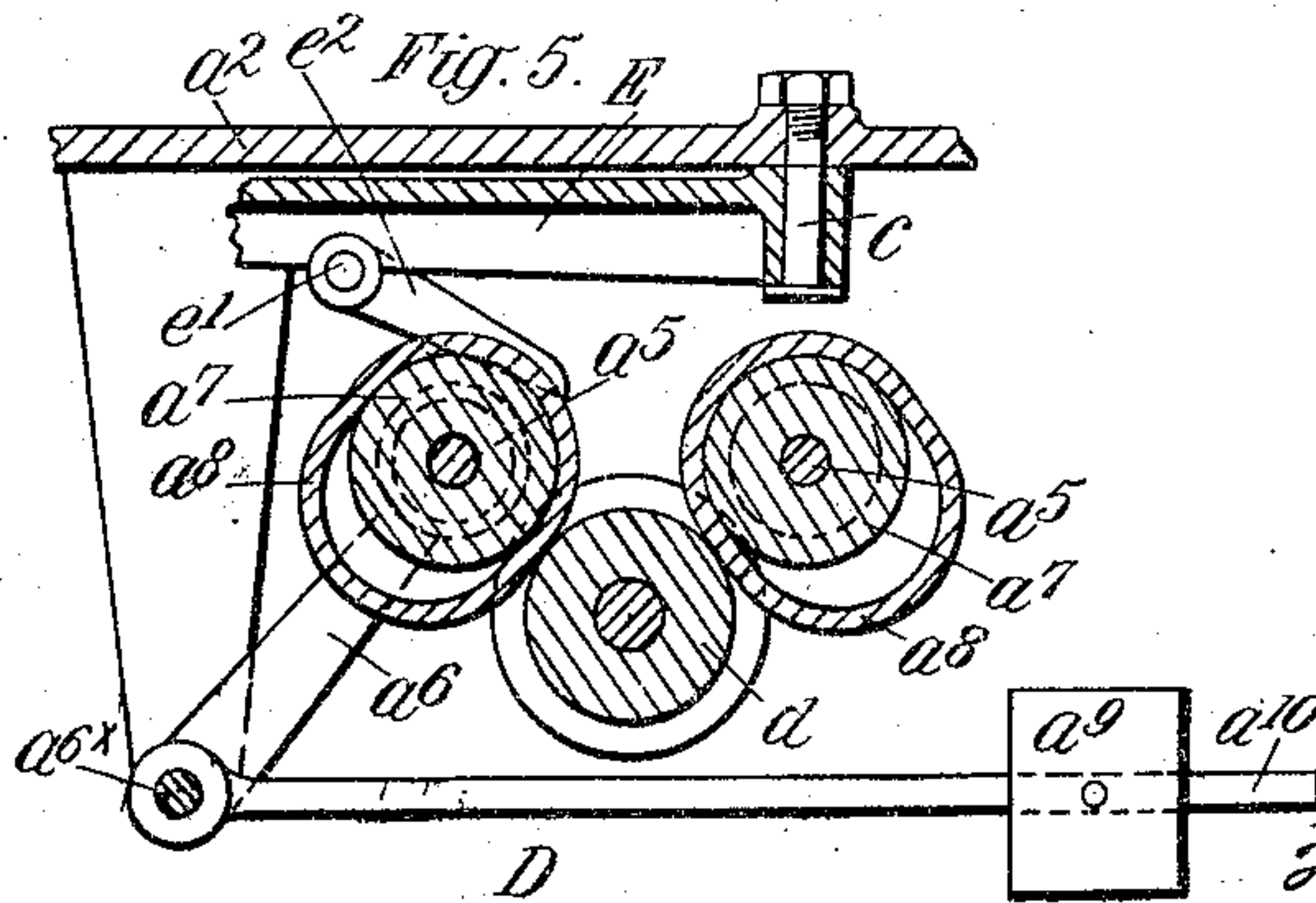


Fig. 5.



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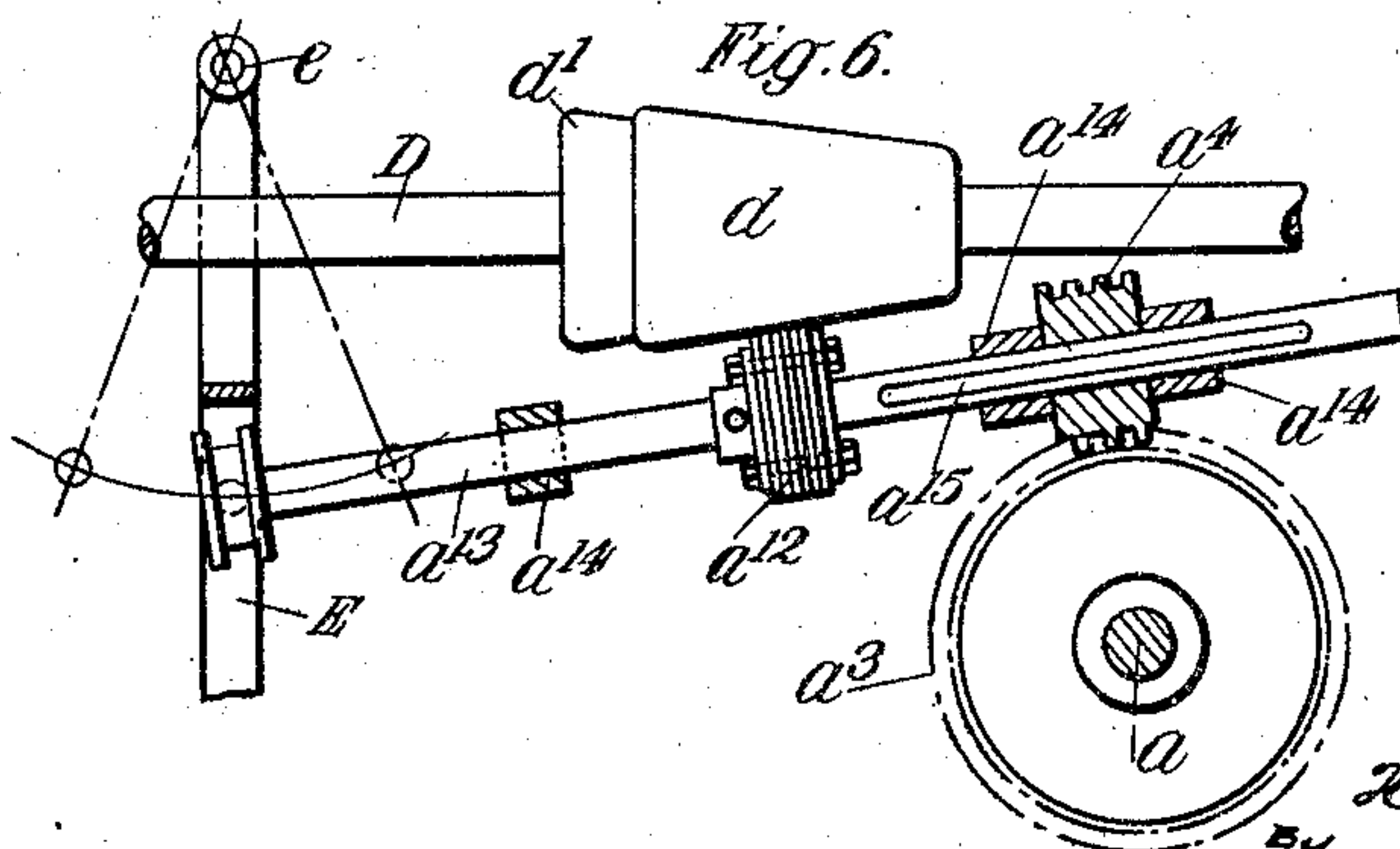
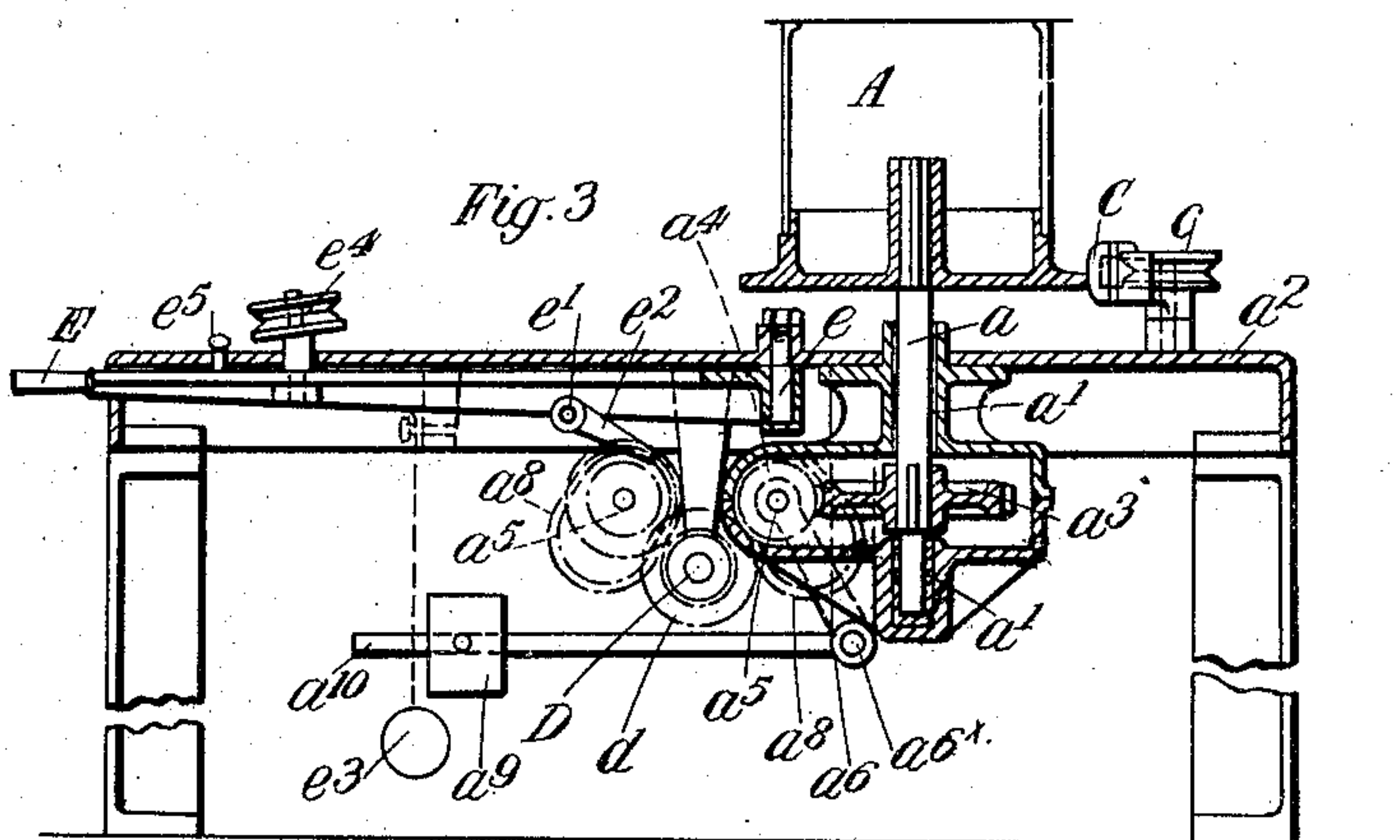
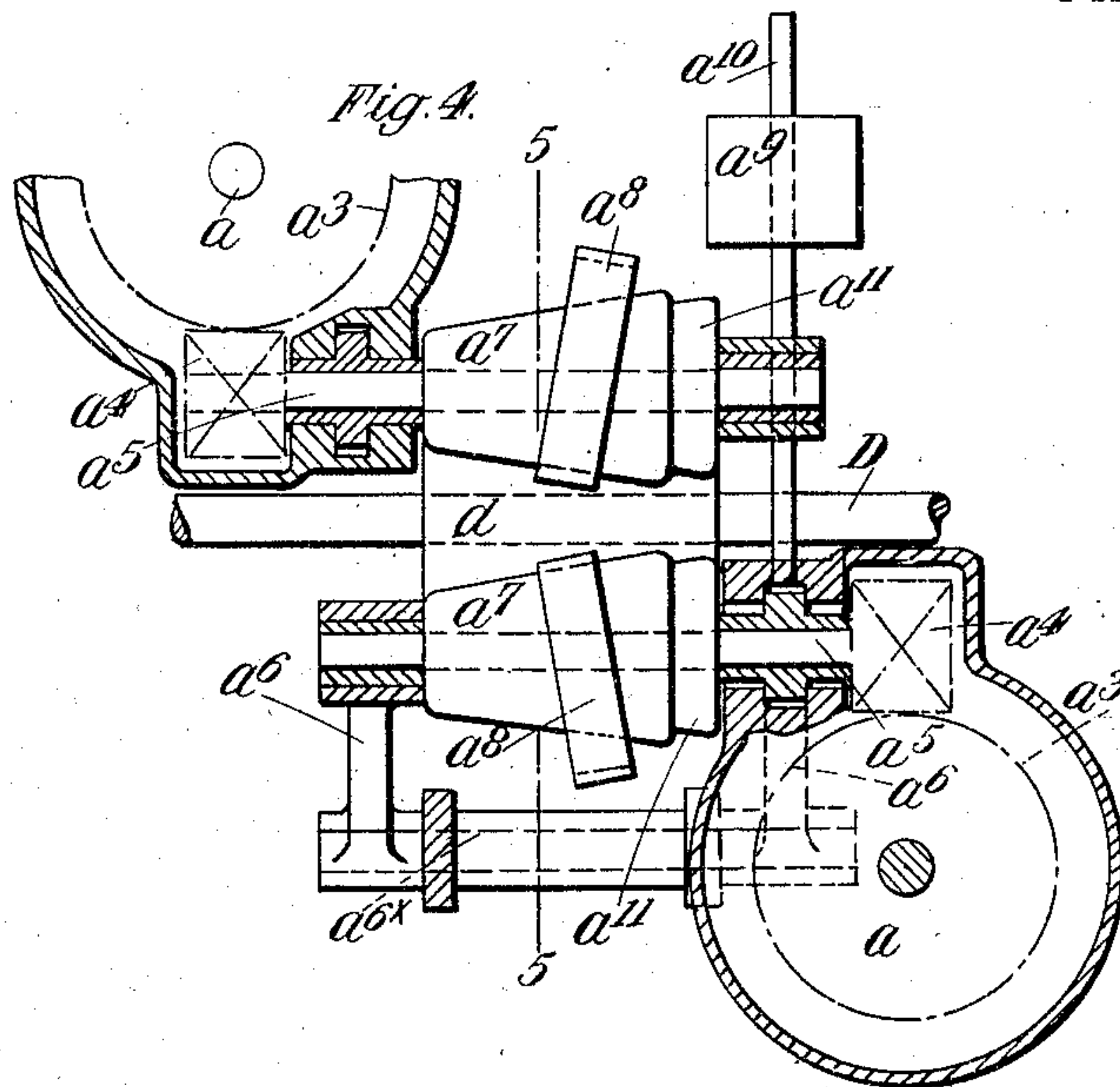
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

HARRY SAVILLE, OF MANCHESTER, ENGLAND, ASSIGNOR TO THE BRITISH STEEL & WIRE COMPANY, LIMITED, OF MANCHESTER, ENGLAND.

CONTINUOUS-WIRE-DRAWING MACHINE.

975,641.

Specification of Letters Patent.

Patented Nov. 15, 1910.

Application filed May 13, 1910. Serial No. 561,206.

To all whom it may concern:

Be it known that I, HARRY SAVILLE, a subject of the King of Great Britain, residing at Wire Works, Trafford Park, Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Continuous-Wire-Drawing Machinery, of which the following is a specification.

10 This invention relates to continuous wire drawing machinery wherein the wire to be drawn is reduced a number of times by being passed through a series of dies in one continuous drawing process.

15 In drawing wire by the continuous process it is necessary in practice to revolve each forwarding drum faster than the preceding one in order to allow for the elongation of the wire due to its reduction in thickness. The required speed is only obtainable approximately by calculation, as the variation in the size of a die and the wear which takes place during each wire drawing operation makes it necessary to revolve the forwarding drums at a speed greater than would deliver the theoretically ascertained amount for elongation. Also when different sizes of wire are to be drawn, and the reductions vary at each die from what was calculated for some other size of dies, a certain amount of slip takes place between the wire and the forwarding drums owing to the latter revolving at a peripheral speed in excess of the speed at which the wire is traveling. This slipping of the wire around the forwarding drums, removes the coating, scratches the wire, and destroys the wire forwarding seats of the drums. With a view to obviating this objection it has been proposed to control the speed at which each of the forwarding drums is driven through a mechanical variable speed device controlled by the pull exerted upon the wire by the next succeeding drum.

According to this invention each drum is driven through one or more cones and a friction device arranged to be traversed longitudinally with respect to the cones by variation in the pull exerted upon the wire by the next succeeding drum and of being put out of engagement with the said cones.

In order that the said invention may be clearly understood and be readily carried into effect the same will be described more fully with reference to the accompanying drawings, in which:—

Figure 1 is a plan of a portion of a wire drawing machine constructed in accordance with this invention. Fig. 2 is a similar view drawn to an enlarged scale. Fig. 3 is a transverse section taken on line 3, 3, of Fig. 2. Fig. 4 is a horizontal section of the variable speed device drawn to an enlarged scale. Fig. 5 is a transverse section taken on line 5, 5, of Fig. 4, and Fig. 6 is a horizontal section of a modified form of the variable speed device.

A represents the wire drawing drums, B the wire, and C the dies.

Referring more particularly to Figs. 1 to 5, each of the drums A is mounted upon an upright spindle a journaled in bearings a' supported by the machine frame a'' at opposite sides of a main driving shaft D that extends from one end to the other of the machine. Each spindle a carries a worm wheel a^3 that gears with a worm a^4 formed on or rigidly secured to a short rotatably mounted shaft a^5 which is arranged parallel to the main driving shaft D from which the drive is transmitted to each of the drums A in the manner hereinafter described. Each short shaft a^5 is mounted in pivoted arms a^6 supported from a shaft a^{6x} and carries a cone a^7 on which is loosely mounted a frictional driving band a^8 adapted by means of a weight a^9 or other suitable device to be retained in yielding frictional contact with a corresponding cone d mounted inversely upon the main driving shaft D, the said weight being adjustably mounted upon an arm a^{10} that is arranged in rigid connection with one of the arms a^6 . The frictional driving band a^8 is capable of being traversed to any required position between the cones a^7 and d by means of a hand lever E pivoted at e to the machine frame and constituting a starting and control lever. Connected to this lever is a slidably mounted rod e' on which is pivoted a pair of fingers e^2 adapted to engage with the opposite edges of the band a^8 . Each hand lever E is arranged to be mechanically operated in one direction by a weight e^3 or other suitable device and carries a grooved pulley e^4 suitably arranged in relation to its respective wire drawing drum and to a guide pulley c over which the wire passes on its way to each wire drawing die. Each weight e^3 is connected to its respective lever E by a cord or chain indicated by dotted lines in Fig. 3, said connection

passing over a pulley supported by a bracket depending from the frame or table (see also Fig. 2). Each hand lever E is capable of being permanently fixed in a number of predetermined positions by means of a locking pin e^5 adapted to engage with one or other of a number of suitably spaced holes e^6 or recesses formed in the machine frame. When the hand lever E is moved into a position for putting its respective wire drawing drum out of operation, the frictional driving band a^8 , is put out of gear with the adjacent cone on the main driving shaft D. This is effected by forming the large end of each cone a^7 with a portion a^{11} of reduced diameter so that when the frictional driving band a^8 occupies a position upon such reduced portion it exerts no frictional driving power upon the cone on the main driving shaft. The same effect can be obtained by forming the large end of the driving cone d with a portion d' of reduced diameter as shown in Fig. 6.

When the apparatus is being used as a continuous wire drawing machine the end of the wire B is pointed in the usual way, and a sufficient length is drawn through the first die C to enable its end to be secured to the first drum A. The hand lever E relating to such drum is then operated to transfer the frictional driving band a^8 into frictional contact between the driving cone a^7 and the driven cone d and so to set the drum gradually in motion. After several wraps of wire have been wound onto the drum, the latter is brought to rest by actuating the aforesaid hand lever to return the driving band a^8 to its inoperative position, whereupon the end of the wire is released from such drum and is passed over the pulley mounted upon the hand lever. The wire is then drawn through the second die C and is secured at its end to the second drum A which is set in motion by actuating its hand lever E to cause a number of turns of wire to be wound upon the second drum. After this operation has been effected the wire after being passed around the pulley e^4 appertaining to the lever of the second drum is then conveyed to the third drum and so on throughout the series to a finishing or storing drum. By this arrangement the pull exerted upon the wire B by any one drum causes the hand lever of the preceding drum to be moved in opposition to its weight e^3 or other device and to transfer the frictional driving band a^8 to the required position between the driving and driven cones thereby causing the said preceding drum to deliver the exact amount of wire required to supply the succeeding drum, the fixed speed of the finishing or storing drum controlling the speed of all the preceding forwarding drums.

If desired each drum may be used in-

dividually and may be driven at any predetermined constant speed by securing its hand lever in any predetermined position by means of its locking pin e^5 . Or any two or more of the said drums may be used independently of the others. It is known that friction cones with an interposed friction driving band actuated by hand have already been employed in connection with wire drawing machines and that such appliances constitute a well known form of change speed device.

The details of construction can be variously modified without departing from the nature of the invention; for example in lieu of the driven cone and the loosely mounted friction band above described with reference to Figs. 1 to 5, a friction wheel a^{12} see Fig. 6 may be fixed upon a shaft a^{13} arranged parallel with the adjacent side of the driving cone d and slidably mounted in bearings a^{14} suitably supported in relation to the machine frame. This shaft is connected with its respective hand lever E in such a manner that the friction wheel a^{12} can be traversed from end to end of the driving cone d or be moved out of contact therewith when required. In order to permit of this endwise movement the worm a^4 is loosely mounted on such shaft and drives the latter by means of an internal key engaging with a groove a^{15} in the shaft, endwise movement of the worm being prevented by two of the bearings a^{14} .

What I claim and desire to secure by Letters Patent of the United States is:—

1. In a continuous wire drawing machine, the combination with the dies and drums, of a plurality of driving cones, friction devices arranged to be traversed longitudinally with respect to the cones, and means whereby the pull exerted upon the wire by one drum controls such traversing of the friction devices for regulating the speed at which the preceding drum is driven.

2. In a continuous wire drawing machine, the combination with the dies and drums, of a plurality of driving cones, friction devices arranged to be traversed longitudinally with respect to the cones, levers operatively connected with the friction devices, means whereby said levers are actuated in one direction by the pull exerted upon the wire, and means for exerting a pull upon the levers in opposition to the pull exerted by the wire.

3. In a continuous wire drawing machine, the combination with the dies and drums, of a plurality of driving cones, friction devices arranged to be traversed longitudinally with respect to the cones, levers operatively connected with the friction devices, a pulley carried by each lever, said pulley being adapted to have a loop of wire bent therearound in the passage of the wire from one

drum to the next succeeding drum, and means for exerting a pull upon the levers in opposition to the pull exerted by the wire.

4. In a continuous wire drawing machine, 5 the combination with the dies and drums, of a plurality of driving cones, a friction driving band encircling one cone and arranged to make frictional contact with an adjacent cone, a lever operatively connected 10 with each driving band to traverse the latter longitudinally with respect to the cones, a pulley carried by each lever, said pulley being adapted to have a loop of wire bent therearound in the passage of the wire from 15 one drum to the next succeeding drum, and means for exerting a pull upon the levers in opposition to the pull exerted by the wire.

5. In a continuous wire drawing machine, the combination with the dies and drums, 20 of a plurality of driving cones, a plurality of driven cones arranged adjacent thereto, pivoted arms for carrying the driven cones, friction driving bands encircling the driven cones, means for compressing the friction 25 driving bands between the driving and the driven cones, means for rotating the drums from the driven cones, and means whereby the pull exerted upon the wire by one drum controls the position of the friction device 30 between the driving and the driven cones for regulating the speed at which the preceding drum is driven.

6. In a continuous wire drawing machine, the combination with the dies and drums, of 35 a plurality of driving cones, a plurality of driven cones arranged adjacent thereto, pivoted arms for carrying the driven cones, friction driving bands encircling the driven

cones, means for compressing the friction 40 driving bands between the driving and the driven cones, means for rotating the drums from the driven cones, levers operatively connected with the friction driving bands, a pulley carried by each lever, said pulley 45 being adapted to have a loop of wire bent therearound in the passage of the wire from one drum to the next succeeding drum and means for exerting a pull upon each lever in opposition to the pull exerted by the wire.

7. In a continuous wire drawing machine, 50 the combination with the dies and drums of a plurality of driving cones, a driving shaft on which such cones are fixed at intervals, two driven cones situated at opposite sides 55 of the driving shaft adjacent to each driving cone, pivoted arms for carrying the driven cones, friction driving bands encircling the driven cones, means for compressing the friction driving bands between the 60 driving and the driven cones, the cones being provided with means for releasing such compression, means for rotating the drums from the driven cones, levers operatively connected with the friction driving bands, a pulley 65 carried by each lever, said pulley being adapted to have a loop of wire bent therearound in the passage of the wire from one drum to the next succeeding drum, and means for exerting a pull upon each lever 70 in opposition to the pull exerted by the wire.

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

HARRY SAVILLE.

Witnesses:

W. ROBINSON,
N. K. MONTELL.