

J. H. REECE.
CLUTCH FOR WIRE BLOCKS.
APPLICATION FILED MAY 1, 1909.

944,346.

Patented Dec. 28, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

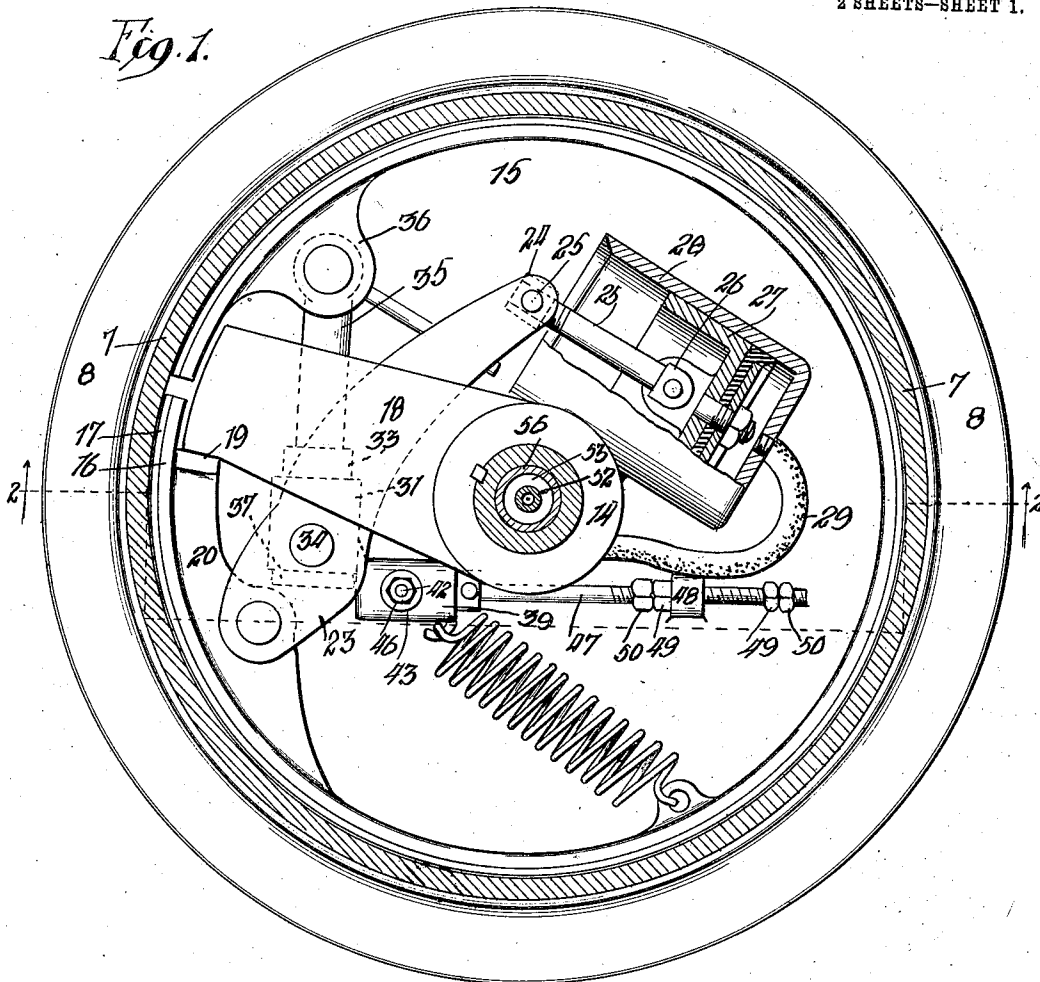
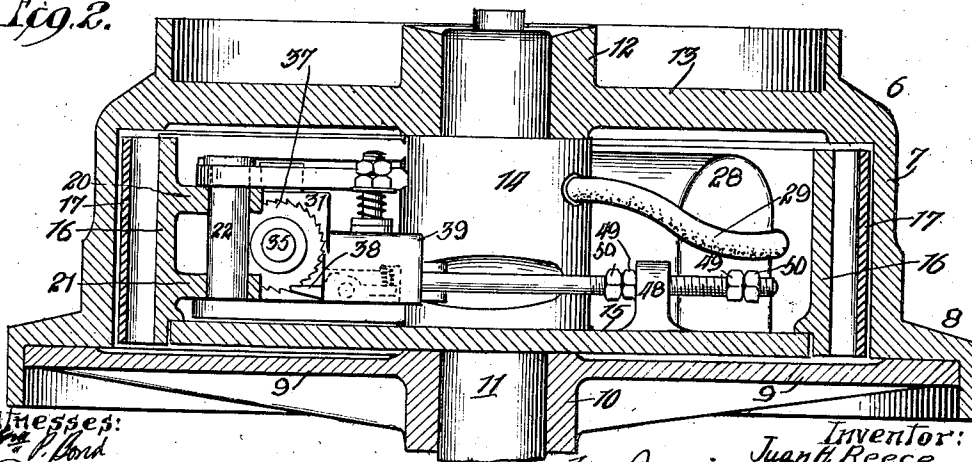


Fig. 2.



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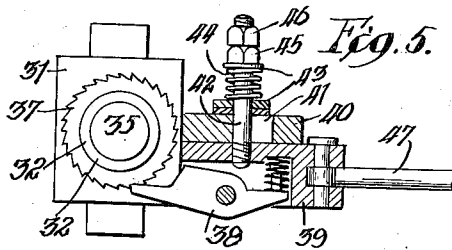
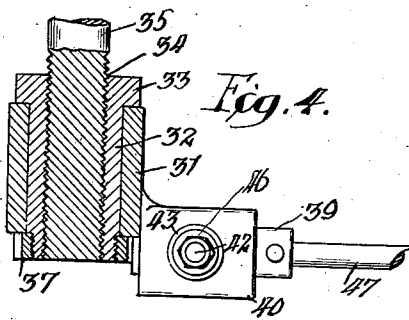
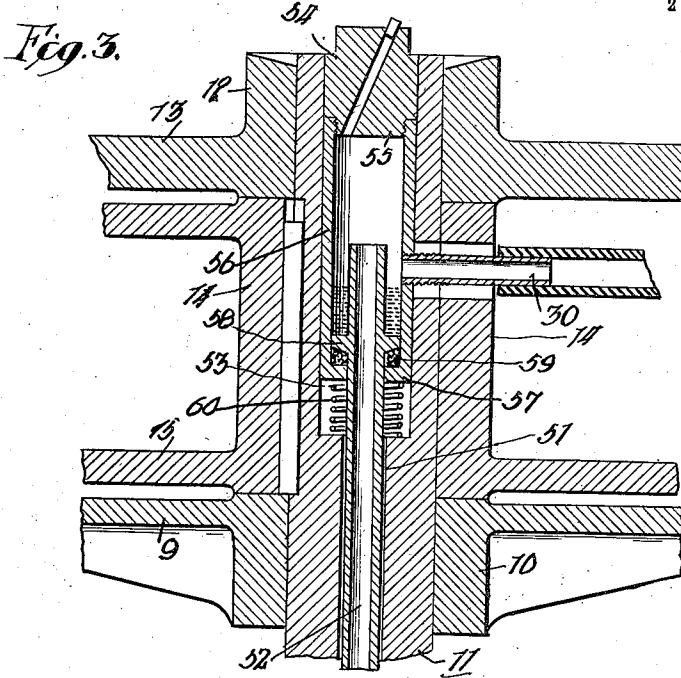
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JUAN H. REECE, OF JOLIET, ILLINOIS, ASSIGNOR TO HUMPHREY & SONS, OF JOLIET, ILLINOIS, A COPARTNERSHIP.

CLUTCH FOR WIRE-BLOCKS.

944,346.

Specification of Letters Patent.

Patented Dec. 28, 1909.

Application filed May 1, 1909. Serial No. 493,434.

To all whom it may concern:

Be it known that I, JUAN H. REECE, a citizen of the United States, residing at Joliet, in the county of Will and State of Illinois, have invented certain new and useful Improvements in Clutches for Wire-Blocks, of which the following is a specification.

The present invention relates more particularly to the construction and arrangement of the friction clutch mechanism which imparts rotary movement to the wire drawing block, and to the self-regulating means for maintaining the frictional members in predetermined positions of adjustment with respect to one another, so that frictional engaging action of the clutch members will be uniformly maintained despite the wear incident to the operation of the device.

Further objects will appear from a detail description of the invention, which consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is a sectional plan view of the drawing block, showing the friction members mainly in elevation; Fig. 2 a sectional elevation taken through the wire drawing block on line 2—2 of Fig. 1; Fig. 3 a sectional detail of the spindle and hub, showing the method of conveying air to the cylinder; and Figs. 4 and 5 details of the automatic adjusting mechanism.

The mechanism of the present invention is applied to a wire drawing block 6, having a substantially cylindrical wall 7 offset and flanged around its lower edge 8 to embrace the rim of a spider 9, provided at its center with a hub 10 which is loosely mounted upon a spindle 11, the outer end of which is entered through a collar 12 formed in the center of the roof or top 13 of the block. Located within the interior of the block and keyed to the spindle 11 is a cylindrical sleeve 14 which merges into a floor plate 15, around the edge of which extends a split expansible friction ring 16 which carries around its outer face a band 17 of suitable friction material, which is adapted to be forced against the inner face of the surrounding wall of the block by the expansion of the split ring. The split ring, which is disconnected from the rotating floor plate 15 which it surrounds, is given a rotary impetus in the proper direction by an arm 18, which ex-

tends outwardly from the upper end of the sleeve 14 and engages a lug 19 on the inner face of the split expansible ring, which lug is located near the split end of the ring, which split is bridged over by the outer end of the arm 18. The lug 19 merges into an upper rib 20 which coöperates with a lower rib 21 to afford a mounting for a pivot pin 22 extending vertically through upper and lower toggle arms 23, which pair of arms engage the outer sides of the upper and lower ribs 20 and 21, as indicated in Fig. 2. The free ends of the toggle arms are spaced and connected by means of a block 24 which is pivoted between the ends of the toggle arms and receives the outer end of a piston rod 25, the inner end of which is pivoted between ears 26 on a piston 27 located within a cylinder 28 adapted to receive a charge of compressed air through an air hose 29 which leads from the head of the cylinder and connects with a nipple 30, as best shown in Fig. 3. Between the toggle arms is trunnioned a block 31 which has entered therethrough a bushing collar 32 provided with an enlarged head 33, as shown in Fig. 4. The collar is bored out and threaded to receive the threaded end 34 of a toggle rod 35, the outer end of which is pivoted between ears 36 formed on the inner face of the split ring on the section of the ring opposite to that which carries the ribs 20. The arrangement is such that a forward movement of the piston serves to extend the toggle and thereby expand the split ring to the extent necessary to clutch the surrounding block.

In order to compensate for wear and to maintain the necessary adjustment of the parts, the bushing collar 32 has screw threaded to its outer end a ratchet wheel 37, the elevation of which in the proper direction serves to feed back the toggle rod to the extent necessary to compensate for the wearing down of the friction band carried by the split ring. The ratchet wheel is adapted to be engaged by a spring-supported dog 38, which is pivoted within a block 39 slidably mounted within a guide block 40 which projects inwardly from one side of the trunnioned block 31. The guide block is provided in its upper surface with a slot 41, which affords a clearance through which projects a guide bolt 42 which is surrounded by washers 43 and an interposed spring 44

which can be regulated and locked by means of nuts 45 and 46, thereby holding the dog block and guide block in sliding contact with one another. The guide block will move with each movement of the toggle members, but the dog block can be adjusted to the desired position by means of a rod 47 which is entered and pinned into the end of the block and passed through a lug 48 on the floor plate 15, to which the rod can be locked in adjusted position by means of inner and outer adjusting nuts 49 and jam nuts 50.

The spindle 11 is provided in its center with a bore 51 which affords space for the passage of a stationary compressed air pipe 52 adapted to supply air to the nipple 30. The bore 51 merges into an enlarged chamber 53 which extends to the top of the spindle and is closed at its upper end by a block 54, the inner end 55 of which is reduced and threaded to receive the upper end of a bushing 56, through the lower end 57 of which the stationary pipe is entered. The pipe is provided with a ring shoulder 58, which serves to compress a fiber packing 59 and is of a diameter to closely engage the walls of the bushing and afford a closed receptacle for grease which serves to form an air seal around the upper end of the pipe and at the same time to allow the spindle with its bushing and connected parts to revolve around the pipe as a center. Between the bushing and the floor of the chamber 53 is interposed a coil spring 60, which forces the bushing upward and serves to hold the fiber packing 59 into close engagement with the under bevel face of the ring or shoulder 58, which alone prevents the upward displacement of the bushing.

In use, the split friction ring can be inserted into the block without adjustment and subjected to the action of the air which will be admitted to the cylinder through the stationary pipe and rubber hose. The admission of air serves to thrust forward the piston rod, which movement straightens the toggle to the extent necessary to spread the ends of the split ring; and this movement of the toggle will move the ratchet wheel outwardly with respect to the dog which occupies a fixed position. Thereafter, when pressure is released from the cylinder, the split ring, by reason of its spring action, will tend to return to its normal or contracted position, and this return movement, with one of the ratchet teeth against the dog, will serve to rotate the bushing 32 which surrounds the threaded nut of the toggle rod, with the result that the toggle rod will be rotated and given a longitudinal movement, thereby lengthening the span of the toggle and spreading the split friction ring accordingly. By repeating the same operation several times, the toggle rod will be automatically projected

until the span of the toggle is such that the clutching or expanding movement of the split ring will be too slight to carry a given tooth beyond the dog, and this will constitute a proper adjustment of the parts. Thereafter the movement of the split ring necessary to throw the clutch will be just sufficient to release the parts on the return movement, and this adjustment will be maintained until the continued wearing of the friction band, incident to the operation of the clutch, has reduced the diameter of the band to such a degree as to produce an excessive movement of the parts, at which time the ratchet wheel will be moved sufficiently to permit the dog to spring into engagement with the next tooth on the ratchet wheel, thereby again adjusting the toggle rod and proportionately spreading the split ring to compensate for the wear in the friction band.

The operation of the device, both as regards the initial adjustment and as regards the automatic maintenance of the clutch members in proper position, is such that the parts can be regulated and maintained with extreme nicety, and the uniform tension of the wire regulated accordingly to a much more perfect degree than would be possible in the absence of the automatic adjusting mechanism. The mounting for the rotating parts, moreover, is one which permits air to be supplied to the block, at the most convenient point, without leakage and without complicating the bearings to a marked extent. The use of automatic means for throwing the clutch permits the tension of the wire to be varied to any desired extent, and permits a very powerful clutching action to be applied to the block when desirable.

What I claim as new and desire to secure by Letters Patent is:

1. In a clutch, the combination of fixed and movable clutch elements, toggle mechanism adapted when spread to throw the movable clutch element into clutching position, a ratchet wheel on the toggle mechanism adapted when rotated to increase the spread of the toggle, and a dog mounted adjacent to said ratchet wheel and adapted to rotate the same when the throw of the toggle becomes excessive, substantially as described.

2. In a clutch, the combination of a fixed clutch element in the form of a cylindrical wall, a movable clutch element in the form of a split expansible ring having a friction surface adapted to engage the wall, a toggle mechanism connected with the ends of the split ring and adapted when spread to expand the ring to clutching position, means for actuating the toggle, and automatic means adapted to increase the length of the toggle when the movement thereof becomes excessive, substantially as described.

3. In a clutch, the combination of a fixed clutch element in the form of a cylindrical wall, a movable clutch element in the form of a split expansible ring having a friction surface adapted to engage the wall, a toggle mechanism connected with the ends of the split ring and adapted when spread to expand the ring to clutching position, means for actuating the toggle, a ratchet wheel connected with the toggle and adapted to increase the spread thereof to compensate for the wearing of the clutching surfaces, and a dog mounted adjacent to the ratchet wheel and adapted to impart rotation thereto when the movement of the toggle is increased to the extent of carrying a ratchet tooth past the dog, substantially as described.

4. In a clutch, the combination of a fixed element in the form of a cylindrical wall, a movable element in the form of a split ring having a clutching surface adapted to engage the wall, a rotating spindle, an arm connected with the spindle and adapted to engage the split ring, a toggle comprising an arm pivoted to the split ring near one end thereof and a rod pivoted to the other end of the split ring and pivotally connected to the arm, means for imparting movement to the free end of the arm, and means for automatically extending the toggle rod when the latter is subjected to excessive movement due to a wearing of the friction surfaces, substantially as described.

5. In a clutch, the combination of a fixed element in the form of a cylindrical wall, a movable element in the form of a split ring having a clutching surface adapted to engage the wall, a rotating spindle, an arm connected with the spindle and adapted to engage the split ring, a toggle comprising an arm pivoted to the split ring near one end thereof and a rod pivoted to the other end of the split ring and pivotally connected to the arm, means for imparting movement to the free end of the arm, a ratchet wheel adapted when rotated to impart an adjusting movement adapted to lengthen the toggle rod, and a dog adapted to engage the ratchet wheel and to rotate the same when said wheel is subjected to excessive lateral movement, substantially as described.

6. In a clutch, the combination of a fixed element in the form of a cylindrical wall, a movable element in the form of a split ring having a clutching surface adapted to engage the wall, a rotating spindle, an arm connected with the spindle and adapted to engage the split ring, a toggle comprising an arm pivoted to the split ring near one end thereof and a rod pivoted to the other end of the split ring and pivotally connected to the arm, a cylinder and piston for imparting movement to the free end of the arm, and means for automatically extending the toggle rod when the latter is subjected to ex-

cessive movement due to a wearing of the friction surfaces, substantially as described.

7. In a clutch, the combination of a fixed element in the form of a cylindrical wall, a movable element in the form of a split ring having a clutching surface adapted to engage the wall, a rotating spindle, an arm connected with the spindle and adapted to engage the split ring, a toggle comprising an arm pivoted to the split ring near one end thereof and a rod pivoted to the other end of the split ring and pivotally connected to the arm, a cylinder and piston for imparting movement to the free end of the arm, a ratchet wheel adapted when rotated to impart an adjusting movement adapted to lengthen the toggle rod, and a dog adapted to engage the ratchet wheel and to rotate the same when said wheel is subjected to excessive lateral movement, substantially as described.

8. In a clutch, the combination of a fixed clutch element in the form of a cylindrical wall, a movable clutch element in the form of a split expansible ring having a friction surface adapted to engage said wall, two arms pivoted to the expansible ring near one end thereof, a block trunnioned between the arms, a toggle rod having its inner end adjustably mounted within the trunnioned block and having its outer end pivoted to the expansible split ring near the other end thereof, means for imparting a clutching movement to the arms, a ratchet wheel mounted on the inner end of the toggle rod and adapted when rotated to extend the same, and a dog positioned to engage the teeth of the ratchet wheel and impart rotation thereto when the clutching movement becomes excessive due to wearing of the clutching surfaces, substantially as described.

9. In a clutch, the combination of a fixed clutch element in the form of a cylindrical wall, a movable clutch element in the form of a split expansible ring having a friction surface adapted to engage said wall, two arms pivoted to the expansible ring near one end thereof, a block trunnioned between the arms, a toggle rod having its inner end adjustably mounted within the trunnioned block and having its outer end pivoted to the expansible split ring near the other end thereof, a piston rod and piston connected with the free ends of the arms, a cylinder within which the piston operates, a pipe for supplying air to the cylinder, a spindle for mounting the movable elements, a stationary air pipe entered through the center of the spindle, a packing for the upper end of said pipe, a ratchet wheel mounted on the inner end of the toggle rod and adapted when rotated to extend the same, and a dog positioned to engage the teeth of the ratchet wheel and impart rotation thereto when the

clutching movement becomes excessive due to wearing of the clutching surfaces, substantially as described.

10. In a clutch, a fixed element in the form of a cylindrical wall, a movable element in the form of a split ring having a friction surface adapted to engage said wall, means for expanding said ring, a frame for supporting said means, a spindle to which said frame is rigidly secured, a stationary air supply pipe passing up through said spindle and provided near its upper end with a ring or shoulder, a bushing surrounding the upper end of said air supply pipe, a packing

between the lower end of the bushing and the ring or shoulder, a spring located within the spindle and bearing against the bushing and adapted to force the packing into contact with the ring or shoulder, a nipple connected with said bushing, a piston and cylinder for moving the clutch actuating means, and a connection between the cylinder and the nipple for supplying air to the cylinder, substantially as described.

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Witnesses:

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