J. J. WARREN.

WIRE GUIDE.

APPLICATION FILED MAR. 12, 1912.

1,066,687.

Patented July 8, 1913.

3 SHEETS—SHEET 1.

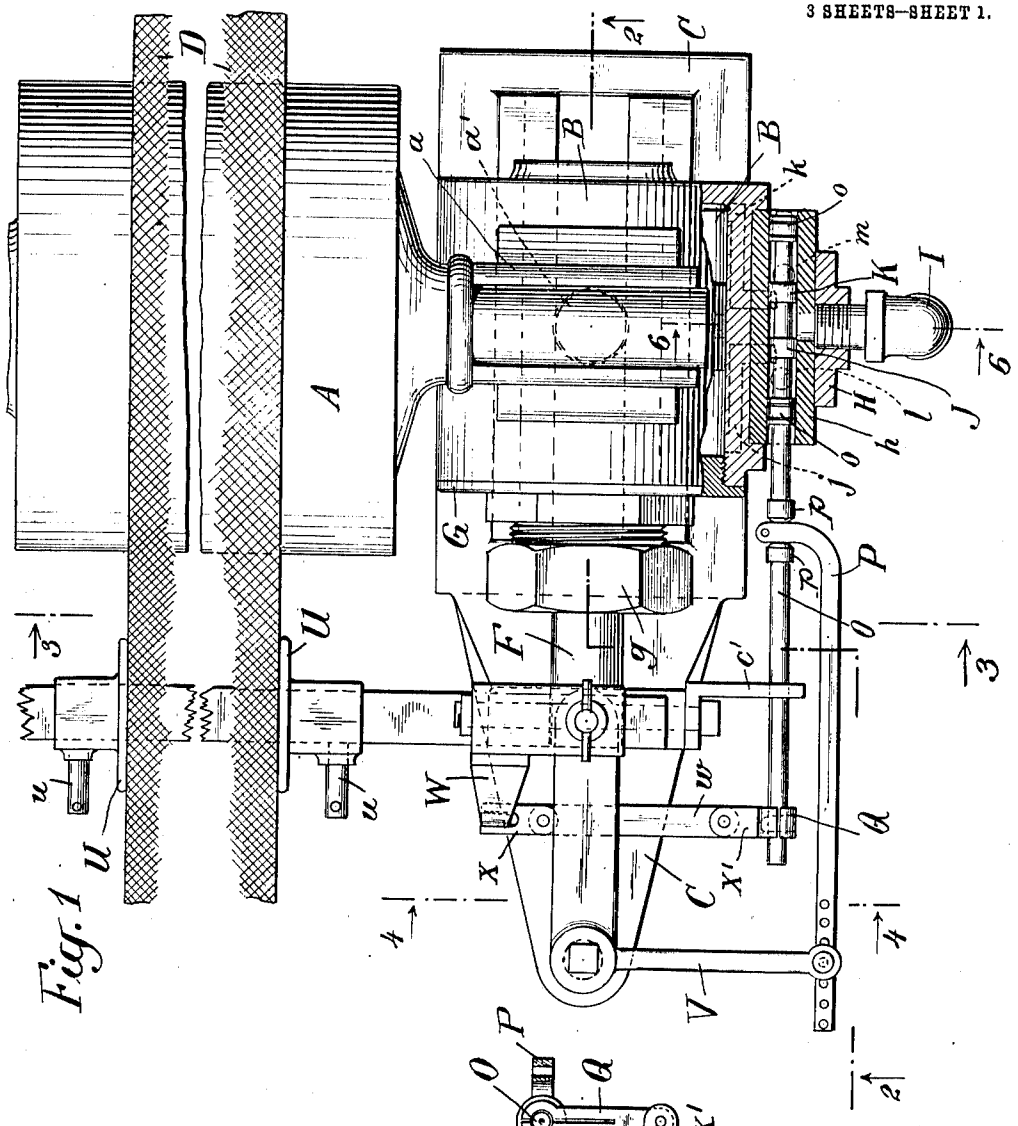


Fig. 1

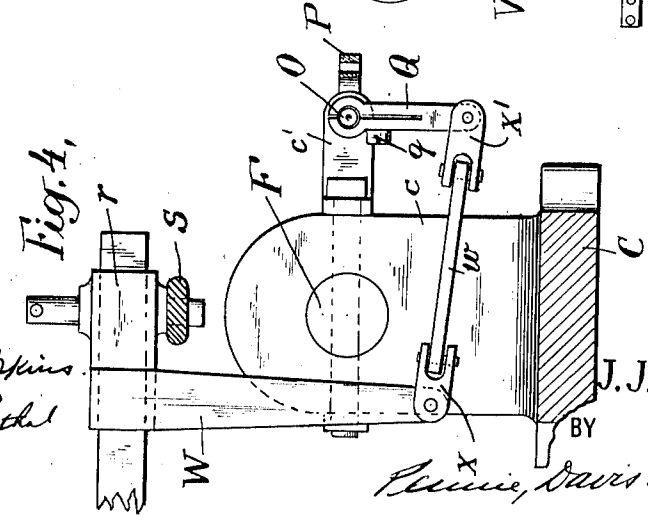


Fig. 4.

WITNESSES:

Marian P. Hopkins

Lemuel W. Serrell

INVENTOR:

J. J. Warren,

BY

Pennie, Davis & Goldsborough

ATTORNEYS

J. J. WARREN.

WIRE GUIDE.

APPLICATION FILED MAR. 12, 1912.

1,066,687.

Patented July 8, 1913.

3 SHEETS—SHEET 2.

Fig. 2.

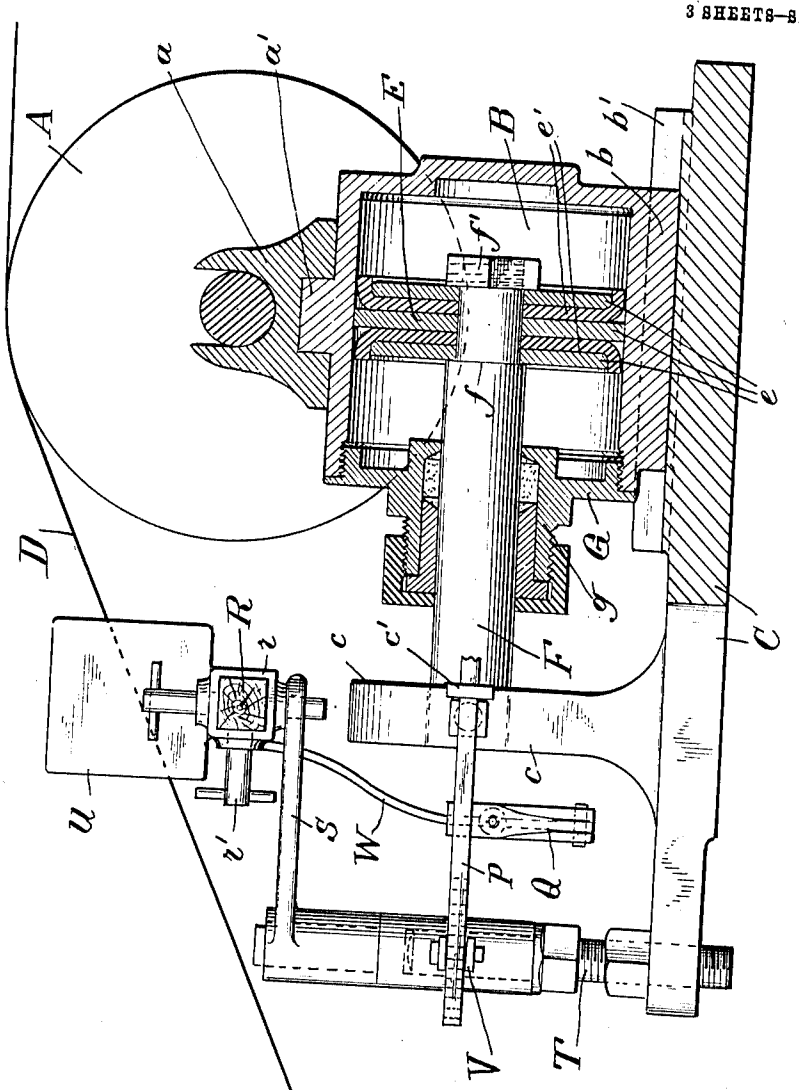
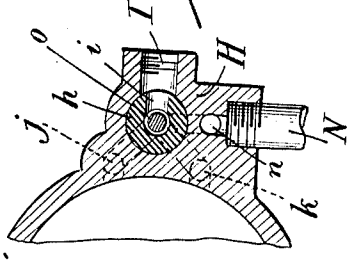


Fig. 6.



WITNESSES:

Marcus B. Hopkins.

Lemuel Wisnedal

INVENTOR:

John J. Warren,

BY

Kennie, Davis & Goldsborough

ATTORNEYS.

J. J. WARREN.

WIRE GUIDE.

APPLICATION FILED MAR. 12, 1912.

1,066,687.

Patented July 8, 1913.

3 SHEETS—SHEET 3.

Fig. 3.

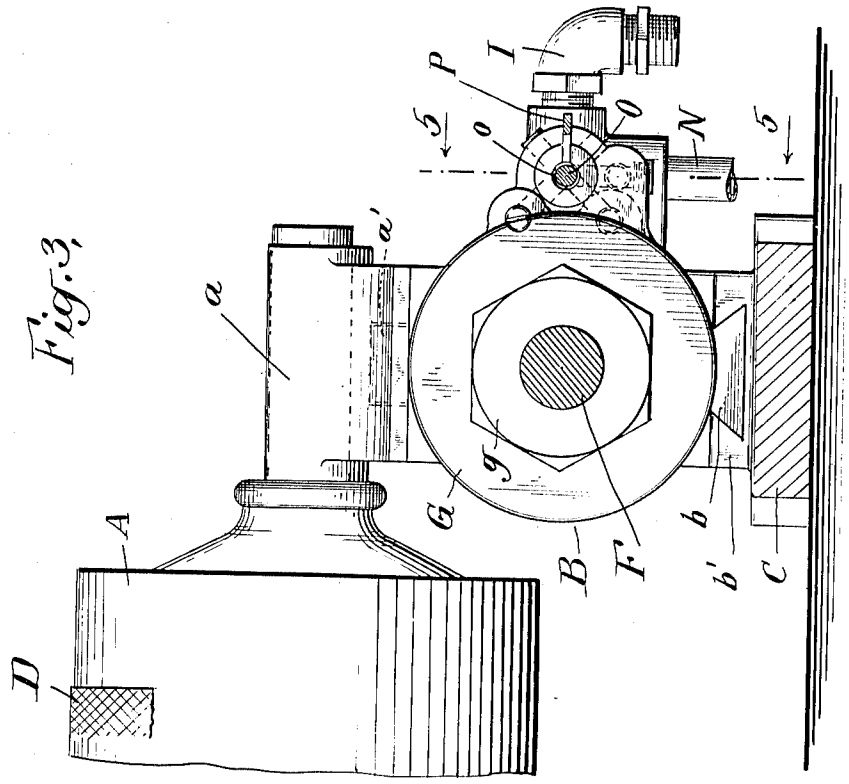
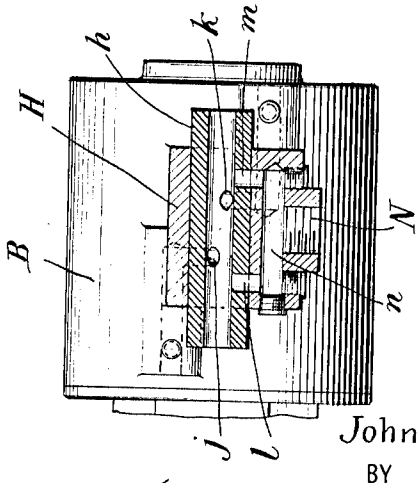


Fig. 5.



WITNESSES:

Marcus B. Hopkins

Lewis N. Crisenbal

INVENTOR:

John J. Warren,

BY

Kennie, Davis & Goldsborough,

ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN JAMES WARREN, OF BROWNVILLE, NEW YORK.

WIRE-GUIDE.

1,066,687. Specification of Letters Patent. Patented July 8, 1913.

Application filed March 12, 1912. Serial No. 683,382.

To all whom it may concern:

Be it known that I, JOHN J. WARREN, a citizen of the United States, and resident of Brownville, Jefferson county, New York State, have invented certain new and useful Improvements in Wire-Guides; 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.

The invention relates to paper making machinery and is more particularly directed to apparatus for guiding the wire, web or felt of a paper making machine on its rolls in order that it may not run to the ends of the rolls but may maintain an intermediate position at all times.

The invention consists in a device similar in many respects to that forming the subject matter of Patent No. 711139, granted to me October 14, 1902, but differs therefrom in that an improved organization and structure is presented wherein a more compact and simplified structure is attained by mounting the bearing for the roll upon a movable cylinder and in which the coöperating members of the controlling valve in automatically seeking a neutral position cut off the fluid pressure entirely from the actuating cylinder and the packings of that cylinder are consequently relieved from the strains and wear incident to the maintenance of high pressure thereon.

Further advantages accrue from the particular arrangement and structure hereinafter described in connection with the appended drawings which illustrate a preferred embodiment of my invention, and in which—

Figure 1 is a plan showing the valve chamber in section; Fig. 2 is a side elevation in which the cylinder and piston are shown in a section taken on line 2—2 of Fig. 1; Fig. 3 is a vertical cross section taken on line 3—3 of Fig. 1; Fig. 4 is a similar view taken on line 4—4 of Fig. 1; Fig. 5 is an elevation of the cylinder showing the valve in a section taken on line 5—5 of Fig. 3; and Fig. 6 is a cross-section of the valve chest taken on line 6—6 of Fig. 1.

Referring to the drawings, one end of the spindle of a guide roll A is journaled in a yoke bearing *a* which is in turn mounted for angular movement upon a vertical pivot *a'* on the top of a horizontal cylinder B. The cylinder B is provided upon its under side with a dove-tail guide *b* which is designed to slide in a dove-tail guideway *b'* upon the base plate C of the machine. By movement of the cylinder B upon the guideway *b'* which lies at right angles to the vertical plane of mounting of the roll A, that end of the roll A supported upon the cylinder may be carried forward or back of its normal position and the roll thereby angularly displaced so that a belt D of wire, felt, or the like, running thereon and having approached one or the other end of the roll will again ride to the center. As the cylinder A travels in a straight line the pivot *a'* is provided for the yoke bearing *a* to admit of the necessary varying angular relation between the cylinder B and roll A.

A piston E comprises three disks *e* and two cup leathers *e'* held between these disks, the whole being mounted between a shoulder *f* on a piston rod F and a compression nut *f'* screwed upon the end of the piston rod. The piston E is held stationary within the cylinder B as the outer end of its piston rod F is rigidly mounted in a standard *c* upstanding from the base plate C. The piston rod passes through a stuffing box *g* in a removable head G of the cylinder B. A valve chest H cast upon the side of the cylinder B is preferably bored to receive a valve cylinder or bushing *h* having a cylindrical bore. A fluid supply pipe I enters the valve chest H and communicates with a port *i* leading into the valve bore at a point midway of its length (see Fig. 6). Two ports *j* and *k* (see Fig. 5) lead from the valve bore, at points at each side of the middle portion which is occupied by the intake port *i*, and to the interior of the cylinder B near the ends thereof. Two exhaust ports *l* and *m* lead from the valve bore beyond the ports *j* and *k*, to a common port *n* and thence to an exhaust pipe N. A valve stem O carries two piston valves J and K which, in their neutral position, cover the ports *j* and *k* respectively. Two end plugs *o*, *o*, also carried by the valve stem O close the ends of the valve bore at all times. The projecting end of the valve stem O is supported in a bracket *c'* projecting from the standard *c*. The valve stem O is moved longitudinally by a bar P which loosely embraces it between two fast thrust collars *p*, *p*, and is further given a slight rotative movement by the oscillation of an arm Q

which tightly grips it. The arm Q has a split jaw which is drawn together by a binding screw *a* to grip the stem O and by this means the stem O may be adjusted with relation to the arm Q both to position the arm longitudinally and to rotate the stem to compensate for wear.

A light bar R shown as of wood is mounted transversely of the belt D preferably just under the upper or acting reach of the belt, and one end of this bar is pivotally supported upon a crank S mounted for angular movement about a vertical post T upstanding from the base plate C of the machine. The pivot *s* which engages with a hole in the crank S, projects downwardly from a box *r* in which the bar R is adjustably secured by a set screw *r'*. The bar R is provided with two contact plates U which may be adjustably fixed to the bar by set screws *u*, and which are designed to provide contacts against which the edges of the belt D may bear and move the bar R transversely of the machine. Movement of the bar by the edges of the belt will impart an angular movement to the crank S which is adjustably secured to a second crank V and will, therefore, impart a similar movement to the crank V projecting at right angles to crank S. The crank V is pivoted in one of a number of holes in a bar P and imparts a longitudinal movement to valve stem O. A rigid arm W depends from the box *r* on the bar R and is connected by pivoted links *w*, X and *x'* with the arm Q secured to valve stem O, in such manner that the transverse movements of the bar R effect a slight rotative or oscillating movement of the valve stem O, insuring the valves free movement in order that they may offer as little resistance as possible to movement by the edge of the belt. Vertical pivots between the links *w*, X and *x'* permit of the longitudinal and oscillatory movements of the valve stem O without interference. The opposite end of the bar R may be mounted in any suitable manner which will admit of its being freely reciprocated, or, if both bearings of the guide roll should be equipped with this mechanism, the opposite end of the bar R would then be connected to the corresponding crank S of the duplicate device. Owing to the movement of the cylinder the intake and exhaust pipes I and N must be provided with suitable flexible connections such as rubber or flexible metallic hose, sliding joints, or articulate pipe sections.

The operation is as follows: The neutral position or position of rest is reached when the valves J and K are directly over and closing the ports *j* and *k* and we will suppose the belt D to be running in the correct or central position upon the roll A with the ports so disposed. Now, if the belt runs toward that end of the roll which is journaled on the cylinder (see Fig. 1) its near edge pressing against the near plate U pushes the bar R in that direction and the motion is transmitted through the cranks S and V and the bar *p* moving the valve stem O and the valves carried thereby to the left (Fig. 1). The ports in this position admit the motive fluid, which is preferably water under pressure, which is always ready in the space between valves J and K, into the left-hand end of the cylinder B, where it reacts on the stationary piston E and moves the cylinder on its guideway to the left. At the same time an equal quantity of water leaves the right-hand end of the cylinder by the port *k*, exhaust ports *m* and *n* and exhaust pipe N. This movement of the cylinder to the left follows that of the valves until the ports reach the neutral position under the valves again when the movement of the cylinder stops as no water can then enter or leave. When the cylinder is moved to the left carrying the bearing *a* the roll A is given an angular relation to the belt B which causes the belt to recede from that end of the roll which it has approached. When the belt approaches the opposite end of the roll, the bar R is moved in that direction and the reverse operation takes place in consequence of the far edge of the belt pressing the far plate U and thereby moving the bar R in the opposite direction. The plates U are so disposed upon the bar R with reference to the width and normal position of the belt that the belt is kept very closely to its normal position intermediate the ends of the roll. Whenever the bar R is moved and moves the valve, the link *u* and crank arm Q provide means for slightly rotating the valve, which frees it from the walls of its cylinder and prevents any sticking which would increase the resistance offered to the edges of the belt and consequently cause an excessive wear of these edges.

It will be noticed that the several parts of the device are so correlated that the only place at which the bar R and the guide roll A do not produce effects which will react upon one or the other of them is that at which the belt assumes its normal or central position, and that when the belt is moved to one or the other side of this position the cylinder must effect, in seeking the normal closed position of the ports, an angular position of the guide roll which will produce a correcting feed of the belt to one or the other side.

Having now described the mechanism forming the subject matter of this invention and the manner in which it is to be operated, what I claim is:

1. In apparatus for guiding a wire, web or felt on a paper machine, the combination with the guide roll, of a support for said roll comprising a movable power cylinder,

upon which said roll is journaled, a valve chest upon said movable cylinder, and a valve working in said chest to control the entrance and exit of the motive fluid to and from said cylinder; substantially as described.

2. In apparatus for guiding a wire, web or felt on a paper machine, the combination with the guide roll of a support for said roll comprising a movable power cylinder, a bearing pivoted for angular movement on said cylinder, in which bearing said roll is journaled, a valve chest upon said movable cylinder, and a valve working in said chest to control the entrance and exit of the motive fluid to and from said cylinder; substantially as described.

3. In apparatus for guiding a wire, web or felt on a paper machine, the combination with the guide roll, of a support for said roll, comprising a power cylinder mounted for movement in the direction of its axis, a bearing for said roll carried by said cylinder and pivoted for angular movement about a vertical axis, a valve chest upon said power cylinder, and a valve working in said valve chest in the direction of movement of said cylinder to control the entrance and exit of the motive fluid to and from said cylinder; substantially as described.

4. In apparatus for guiding a wire, web or felt on a paper machine, the combination with the guide roll and the frame of the machine, of a power cylinder mounted for movement in the direction of its axis in guideways on said frame, a piston mounted within said cylinder and secured against movement by attachment to said frame, a bearing for said roll carried by said cylinder, a valve cylinder carried by said power cylinder and having its axis parallel to the line of movement of said power cylinder, and a valve working in said valve cylinder to control the entrance and exit of the motive fluid to and from said cylinder and close, when in its neutral position, said cylinder against the entrance or exit of the motive fluid; substantially as described.

5. In apparatus for guiding a wire, web or felt on a paper machine, the combination with the guide roll and frame of said machine, of a bearing for said guide roll, a piston and cylinder operatively interposed between said bearing and said frame to effect an angular displacement of said guide roll, a valve comprising two movable members, one of which members is carried by the moving component of said piston and cylinder, said valve being arranged to close said cylinder, when in its neutral position, against ingress and egress of the motive fluid and means on said frame operatable by said belt for changing the position of another member of said valve; substantially as described.

6. In apparatus for guiding a wire, web or felt on a paper machine, the combination with the guide roll and frame of said machine, of guideways on said frame, a cylinder movably mounted upon said guideways, a bearing support for one end of said guide roll carried by said cylinder, a piston working in said cylinder and immovably connected to said frame, a valve housing on said cylinder, contact plates mounted to be shifted by the edges of said belt and a valve mounted in said valve housing and connected to said contact plates in a manner to be moved thereby, said valve being designed to offer ingress or egress to motive fluid into or out of said cylinder to effect a movement thereof to a neutral position at which said valve prevents ingress or egress of motive fluid to or from said cylinder; substantially as described.

7. In apparatus for guiding a wire, web or felt on a paper machine, the combination with the guide roll and frame of said machine, of a movable power cylinder carrying a supporting bearing for said roll, a member adapted to be moved by lateral movement of said wire, web or felt, a valve for said cylinder operatively connected to said member to be axially moved thereby, and an independent connection between said member and said valve for imparting, when said member is moved, an angular movement to said valve about its axis; substantially as and for the purpose described.

8. In apparatus for guiding a wire, web or felt on a paper machine, the combination with the guide roll and frame of said machine, of guideways on said frame, a cylinder movably mounted upon said guideways and provided with a power bore and a valve bore, the axes of said bores being parallel to the direction of movement of said cylinder, a bearing support for one end of said guide-roll carried by said cylinder, a stationary piston in the power bore of said cylinder, a valve in the valve bore of said cylinder, and means actuated by the edges of the wire, web or felt of the paper machine for moving said valve in the direction of movement of said cylinder; substantially as described.

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

JOHN JAMES WARREN.

Witnesses:
E. H. ROORBACH,
LILLIAN M. DANIELS.