H. C. BREHMER.

VALVE CONTROLLED MOTOR DEVICE.

APPLICATION FILED AUG. 6, 1913.

1,120,019.

Patented Dec. 8, 1914.

2 SHEETS—SHEET 1.

FIG. 2.

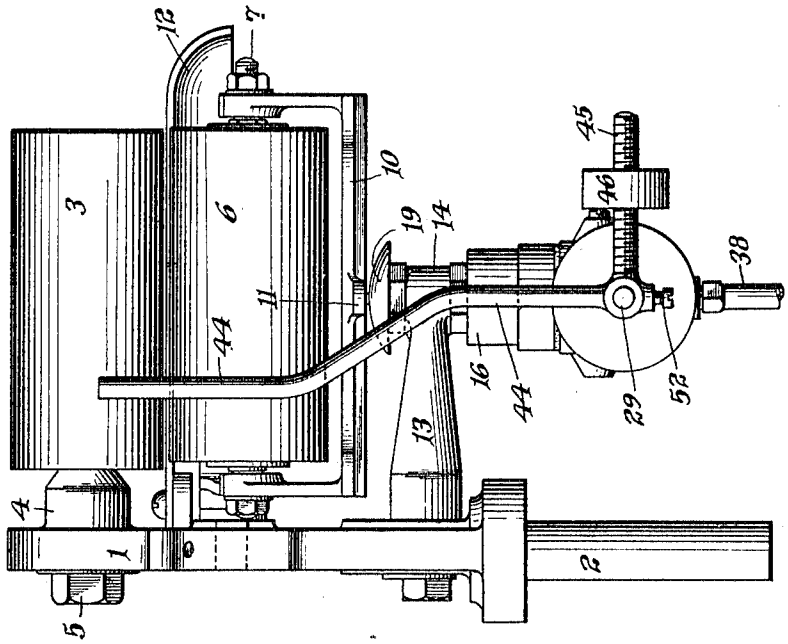
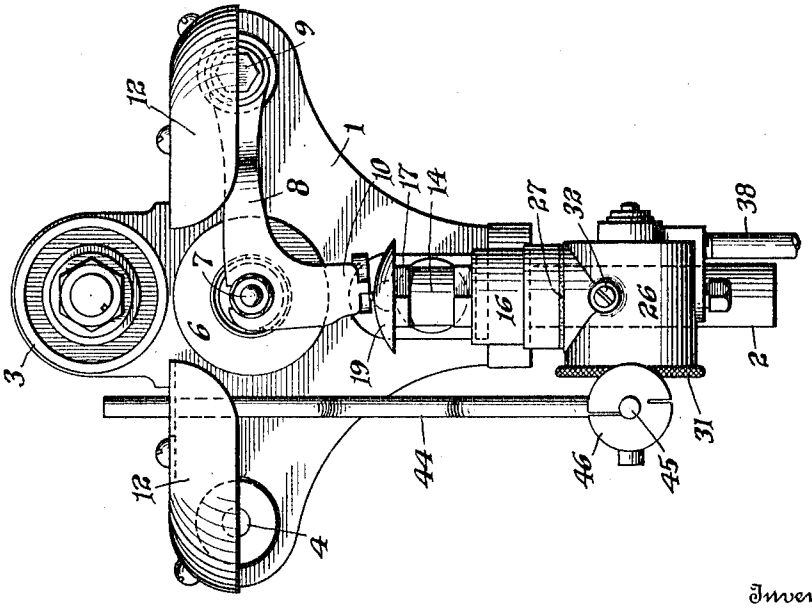


FIG. 1.



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2 SHEETS—SHEET 2.

FIG. 4.

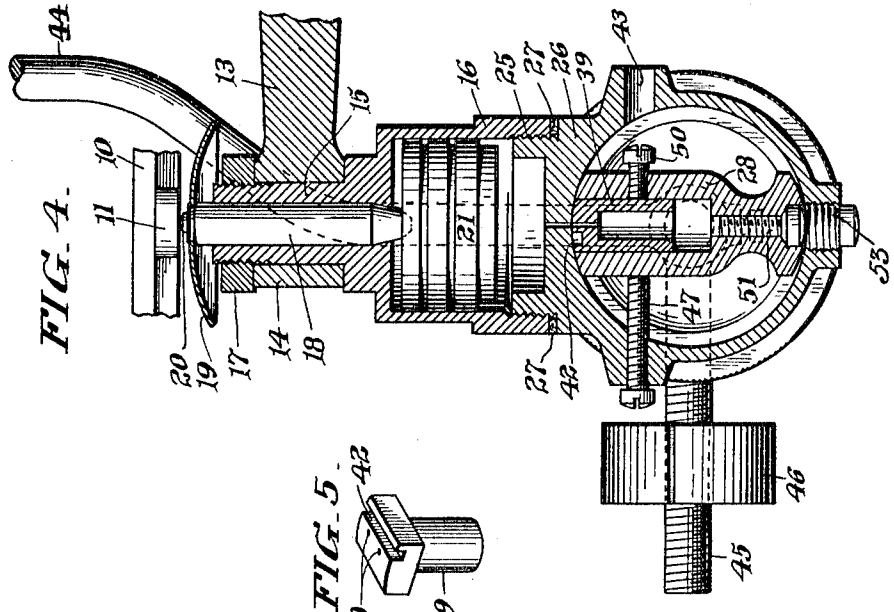
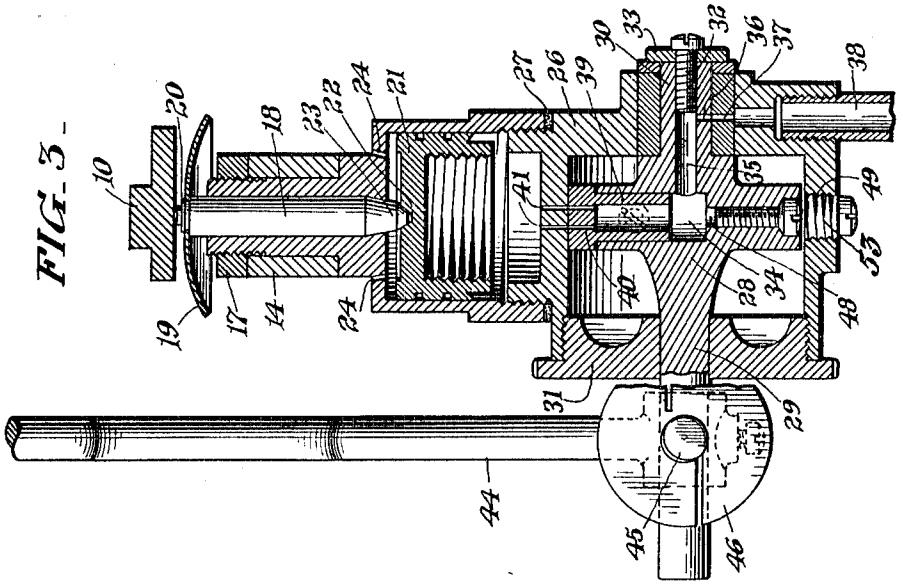


FIG. 5.

FIG. 3.



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UNITED STATES PATENT OFFICE.

HERMAN C. BREHMER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO H. W. BUTTERWORTH & SONS COMPANY, A CORPORATION OF PENNSYLVANIA.

VALVE-CONTROLLED MOTOR DEVICE.

1,120,019. Specification of Letters Patent. Patented Dec. 8, 1914.

Application filed August 6, 1913. Serial No. 783,242.

To all whom it may concern:

Be it known that I, HERMAN C. BREHMER, citizen of the United States, and resident of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Valve-Controlled Motor Devices, of which the following is a specification.

This invention relates to valve mechanisms especially intended for tentering machines or the like, and has for an object to provide a valve control which is simple in construction, efficient in operation and sufficiently sensitive in action to respond instantaneously to delicate changes of working conditions to cause the required periods of release of the material feeding mechanism. In devices of this character as heretofore devised, it has been proposed to control the actuation of the tentering tension rolls by pressure means whose action is not sensitively governed, and in practice it has been found that such valves have not been adapted to fulfil the requirements of delicate and sensitive operation necessary, with the result that the material being fed, has been damaged through the failure of the valve to respond and release the tension at the desired time.

By my present invention I have devised an automatic means for regulating the pressure or gripping action of the tension rolls of an automatic feeding mechanism for delivering material to a tentering machine or machine of like character, whereby I am enabled to relieve the pressure upon the cloth with certainty and precision at the time prior to when the strength of the fabric would reach its limit of stretching without rupture.

It further consists of other novel features of construction, as will be hereinafter fully set forth.

While the more specific use of my improved valve device is intended for cloth feeding devices for tentering machines and is combined with the tension applying rolls, nevertheless my improvements especially reside in the valve mechanism itself and these improvements form an essential portion of this application.

For the purpose of illustrating my invention, I have shown in the accompanying drawings one form thereof which is at present preferred by me, since the same has been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged; and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents an end elevation of a guide and tension device of a tentering machine, embodying my invention; Fig. 2 represents a side elevation of the same; Fig. 3 represents a vertical section of the valve mechanism; Fig. 4 represents a similar section taken at right angles to Fig. 3; and Fig. 5 represents a perspective view of a portion of the valve body.

1 designates a head or bracket provided with a stud 2 adapted to form a suitable removable connection with the main frame of the tentering machine, the said bracket being adapted to serve as upright for properly positioning certain of the guide elements with respect to the material or fabric carried by the machine.

3 designates a metal guide roll rotatively mounted on a spindle 4, which latter in the present instance is suitably bolted to the bracket 1 by means of the nut 5, as will be readily understood. 6 designates a second guide roll, preferably of rubber, mounted in opposed relation to the roll 3, and which, as here shown, is adjustable with respect thereto in order to vary the space between the two rollers and thus regulate the tension or gripping action of the rollers upon the fabric which is normally passing between the aforesaid rollers. As here shown, the roll 6 is rotatively mounted upon the spindle 7, and the latter is carried by a yoke 8 pivotally mounted in any suitable manner, as shown at 9, to the bracket 1 and which yoke also embodies a depending strip 10 by means of which the said yoke and roll 6 are moved by suitable actuating mechanism, to be presently described. In connection with the strip 10 it will be noted that a lug 11 is preferably formed integral therewith and serves the purpose of an abutment or contact piece with which the actuating mechanism engages.

It will of course be understood that the rolls 3 and 6 may be of any suitable material for properly gripping and feeding the material through the machine, though in the

preferred form of my invention, as before stated, I preferably make the roll 3 of metal while the roll 6 is of rubber or material of a like nature.

12 designates guide plates fixed to the bracket 1, in any desired or well known manner, and suitably located with respect to the rolls 3 and 6, so as to properly guide the material between the two rolls and also prevent the same from becoming entangled with the operating mechanism.

13 designates a post, adjustably carried by the bracket 1 and having an apertured end 14 adapted to receive the tubular extension 15 of a cylinder 16, said extension projecting through the apertured end 14 and being screw threaded to receive the nut 17, by which the parts are secured in assembled condition. The extension 15 receives the plunger 18 having a button or cap 19, and providing a contact member 20 for the purpose of engaging the lug 11 of the strip 10.

21 designates a piston freely movable within the cylinder 16 and preferably provided on one side thereof with a depression 22 adapted to receive the tapered extremity 23 of the plunger 18, whereby movement of the said piston is transmitted at certain times, to the parts controlled by the plunger 18.

24 designates a port or ports positioned at suitable intervals in the cylinder 16 in order to relieve the pressure on one side of the piston 21, so that the same may move freely in the desired direction.

The cylinder 16, as here shown, has screw threaded engagement at 25 with a casing 26 of a valve mechanism for controlling the operation of the piston 21 just described. It will be noted that suitable packing 27 is interposed between the cylinder 16 and the casing 26 in order to prevent leakage at the joint.

The casing 26 is of annular construction to receive a valve member comprising, in the present instance, a body portion 28 having oppositely projecting spindles 29 and 30, the former passing through cap 31 at one end of the casing 26, while the latter 30 projects through the opposite side of the casing 26 where it is held by means of the screw 32 and washers 33, but is freely movable with respect to said casing. It will be noted that the body 28 is formed with a bore 34 having communication with the passage 35, while a port 36 is adapted to form a communication between said passage 35 and the inlet port 37 from a conduit 38, this latter being supplied with compressed air or other motive fluid, from any suitable source.

39 designates the valve plug, which is preferably of tubular form for a portion of its length in order to communicate with the chamber 34 of the valve body 28, upon which it is seated. This plug 39 is also provided with a port or ports 40, which, at certain times, are adapted to aline with an inlet port or ports 41 leading to the interior of the cylinder 16. In addition to the inlet ports 40, the plug 39 is also provided with an exhaust channel 42 which preferably extends from one side of the plug to the other, so that when it is in alinement with the ports 41, the pressure in the cylinder 16 will be relieved and the motive fluid exhausted by way of the port 43 in the casing 26.

44 designates a trip arm adjustably fixed to the projecting end 29 of the valve member 28 by a set screw 52 or the like, and having a threaded stem 45 angularly disposed with respect thereto and carrying a counter weight 46 which is normally adjusted so that the valve body 28 is positioned with the ports 36 and 37 and ports 40 and 41 in alinement, so that pressure fluid is admitted to the piston 21 and the yoke 8, thereby maintained in proper position to cause the roll 6 to grip or exert pressure upon the material passing between the two rolls 3 and 6. By this construction it will be seen that the valve body 28 may be rocked within the casing 26, therefore when the trip 44 is moved (through the action of the fabric) to raise the counter weight 46, the valve plug 28 will be shifted to exhaust the cylinder 16; but when the said trip arm 44 is not in contact with the fabric, the counter weight 46 returns the parts to normal position (Fig. 4).

47 designates a stud or screw, threaded through the casing 26 and positioned in the path of movement of the valve body 28, thus serving as a stop to limit its movement in one direction. To provide for adjustment of the plug 39 which may be necessary owing to wear between the parts, I have preferably provided an opening 48 through the valve body 28 in alinement with which there is an opening 49 in the casing 26 of enlarged diameter, in order to permit a suitable implement to be inserted to move the valve plug 39 into frictional bearing relation with the side of the casing 26 adjacent to the ports 41. The valve plug 39 is held in adjusted position by a set screw 50 located at a suitable point. A screw 51 is also provided to close the opening 48 and prevent the compressed air or pressure fluid escaping directly to the exhaust, though it will of course be understood that this screw is temporarily removed when the adjustment of the plug is necessary. The aforesaid opening 49 is preferably closed by a screw threaded plug 53 or like device, though this is not necessary.

The operation of the device is as follows: The device, embodying the principles of my present invention is adapted to be used in connetcion with the automatic feeding

and guiding of cloth to a suitable machine, such as tentering machine or the like, and serves to automatically regulate or limit the tension put upon the cloth by the guiding mechanism. The brackets 1 are preferably mounted at opposite sides of the machane as will be understood, being suitably placed to bring similar sets of rolls 3 and 6 into the path of movement of the selvage edges of the material or cloth passing through the machine. The pairs of rolls 3 and 6 are placed adjacent or in close proximity to the traveling cloth engaging clips, or clamps, and the movable roll 6 of each pair is normally under the pressure of the pressure fluid actuating the piston 21. With the machine in operation, the cloth passes between the rolls 3 and 6 on its way to the conveyer clips or clamps and at this time the counter weight 46 maintains the valve body 28 in such a position that the supply ports 40 are in alinement with the ports 41. The pressure from the pipe line 38 is therefore admitted directly to the piston 21, which is of course shifted as shown in Fig. 3 and maintains sufficient pressure upon the yoke 8 to hold the roll 6 in gripping engagement with the fabric as long as this condition exists. The trip arm 44 is adjusted upon the valve spindle 29 so that its free end is in a position corresponding to near the limit of the strength of the stretched fabric when of a delicate structure. That is to say, as the material enters the machine and passes through the guide rolls and feeding mechanism, it undergoes a stretching operation, which, if continued beyond a certain point, may result in the fabric being torn, and it is at the point corresponding to the limit of allowable stretching that the arm 44 is set. Consequently, when the cloth is fully stretched, its selvage strikes the arm 44 and shifts the spindle 29, thereby causing the control valve 28 to move slightly so as to close the inlet 37 and cause the cylinder 16 to exhaust by way of the channel 42 in the plug 39. This action results in permitting the roll 6 moving away by gravity from roll 3 and releasing the gripping action upon the cloth, and the latter is thereupon prevented from becoming torn or damaged. As the tension due to transverse stretching is relieved, the selvage releases the trip 44 and it again operates the valve to supply compressed air to the piston cylinder 16 and the operation is repeated. In this way the proper degree of lateral stretching may be insured in a more or less continuous manner, so that the fabric is delivered to the cloth clamps of the tentering machine in a uniform and proper way.

It will now be apparent that I have devised a complete unitary valve mechanism for accomplishing the desired end and one in which the parts are so arranged and collocated as to produce a mechanism which is extremely sensitive in operation.

One of the important features of construction resides in the fact that there is only a very small surface of the valve plug in contact with the casing, so that there is but little resistance to the movement of the valve body. Also the parts are so made that only a minimum throw of the valve plug 39 is necessary and as the trip arm 44 is relatively long as compared to the radius of the valve body and its plug, very little power is actually required to cause the valve to be operated; a matter of great importance where the fabric is of a delicate nature, such as lace goods. Another important feature resides in the provision for supplying the air pressure through the axis and the body of the valve piece thereby reducing the loss from leakage and preventing friction owing to air currents due to leakage when the air under pressure fills the casing; moreover by having the pressure fluid supplied through the valve body and the latter rocking in a casing having atmospheric pressure only, the construction is simple and no packed or ground joints are required. The adjustment of the plug 39 of the valve body is also important since it enables a close fit to be made without expensive construction and also permits adjustment to compensate for wear.

The construction is satisfactory and while I prefer it in commercial practice, I do not restrict myself thereto, as the details may be varied without departing from the spirit of the invention.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a valve device of the character stated, the combination of a casing forming a hollow chamber, said casing having a port extending therethrough and communicating with said chamber, a hollow valve body journaled in the casing and provided with a port and an exhaust channel, said port opening into the hollow interior of the valve body and terminating therein, and said channel opening into said hollow chamber of the casing, said valve body having means for introducing a fluid pressure thereinto, and means for rocking said valve body whereby its exhaust channel and port are alternately brought into alinement with the port in the casing.

2. In a valve device of the character stated, the combination of a casing forming a hollow chamber, said casing having a port therethrough communicating with said chamber, a hollow valve body journaled in the casing, an adjustable plug for said valve body having a port and an exhaust channel close together circumferentially considered, said port opening into the hollow interior of

the valve body and said channel opening into the hollow chamber of the casing, means for permitting adjustment of the plug in the valve body, means for supplying the hollow chamber of the valve body with a pressure fluid, and means for rocking the valve body whereby its exhaust channel and port are alternately brought into alinement with the port in the casing.

3. In a valve device, a main casing having means for establishing communication with the interior thereof, a movable hollow valve body in said casing having a peripheral outlet port and an axial inlet port communicating with its interior and a peripherally arranged exhaust passage communicating with the atmosphere, said outlet port and passage being arranged to be brought alternately in alinement with the means of communication of the main casing, communicating means for supplying fluid pressure to the interior of the hollow valve body through the axial port and therefrom through the peripheral port, and means for moving the valve body and main casing relatively to each other.

4. In a valve device, a main casing having a curved inner surface having a port, combined with a hollow valve body journaled in the main casing and arranged for having its interior in communication with a source of fluid pressure, a radially adjustable part on the valve body having a port opening through it into the hollow space within the valve body and also a transverse channel adjacent to the port, means for holding the adjustable part in adjusted positions on the valve body, and means to rock the valve body to bring the port and the channel of its adjustable part alternately into alinement with the port in the main casing.

5. In a valve device, a main casing having a curved inner surface provided with a port, combined with a hollow valve body journaled in the main casing and arranged to have its interior in communication with a source of fluid pressure, a radially adjustable part on the valve body having a port opening through it into the hollow space within the valve body and also a transverse channel adjacent to the port, means for holding the adjustable part in adjusted positions on the valve body, means to rock the valve body to bring the port and the channel of its adjustable part alternately into alinement with the port in the main casing, and a removable closure for said valve body whereby provision is made for inserting a suitable implement into the interior of said valve body to adjust the position of said adjustable part.

6. In a valve device, a main casing having a curved inner surface provided with a port, combined with a hollow valve body journaled in the main casing and arranged to have its interior in communication with a source of fluid pressure, a radially adjustable part on the valve body having a port opening through it into the hollow space within the valve body and also a transverse channel adjacent to the port, means for holding the adjustable part in adjusted positions on the valve body, means to rock the valve body to bring the port and the channel of its adjustable part alternately into alinement with the port in the main casing, means to limit the throw of said valve body in one direction, and a removable closure for said valve body whereby provision is made for inserting a suitable implement into the interior of said valve body to adjust the position of said adjustable part.

In testimony of which invention, I hereunto set my hand.

HERMAN C. BREHMER.

Witnesses:
R. M. HUNTER,
E. W. SMITH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."