

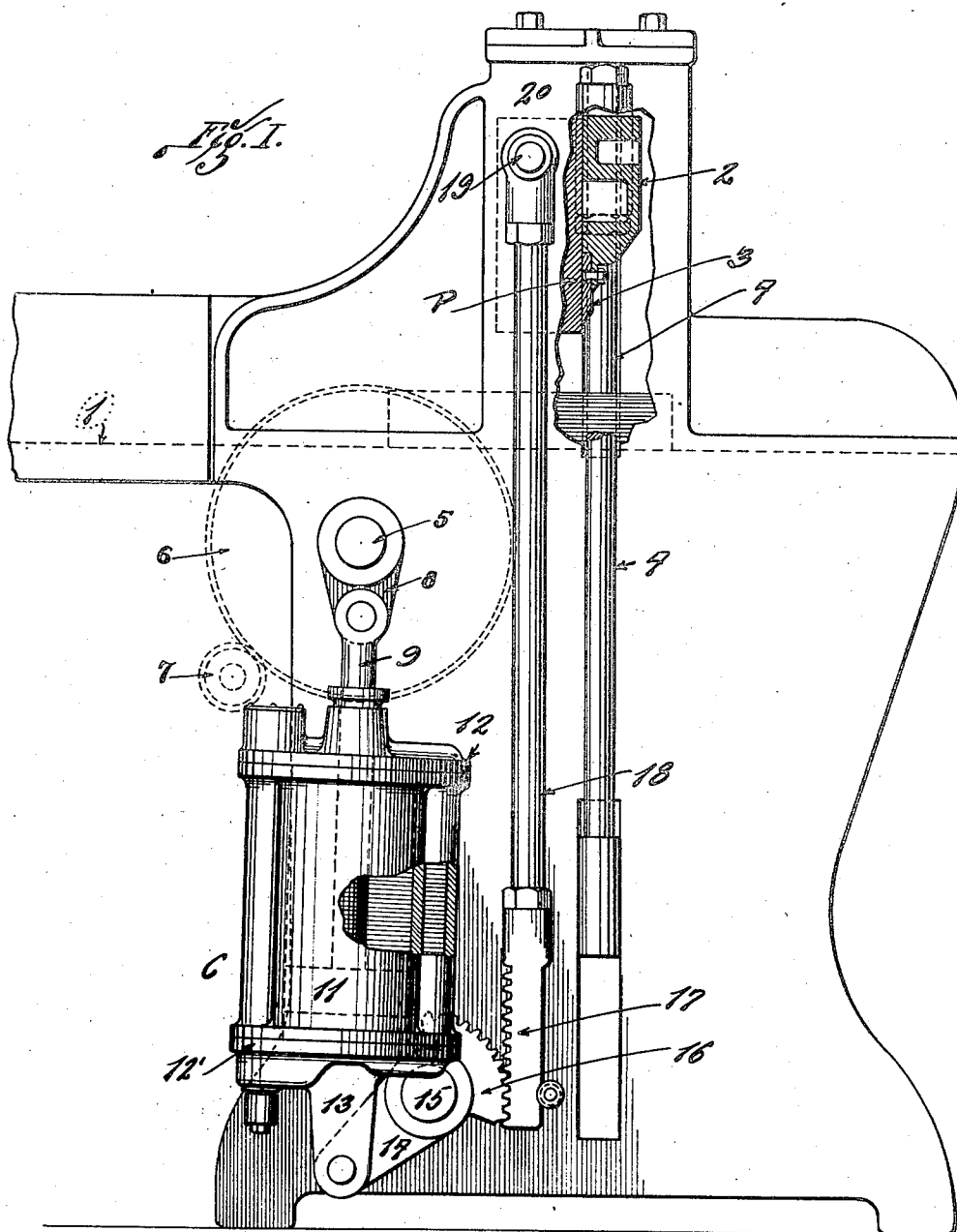
B. F. BERRY.
CLAMPING DEVICE.

APPLICATION FILED FEB. 8, 1917.

1,279,972.

Patented Sept. 24, 1918.

3 SHEETS—SHEET 1.



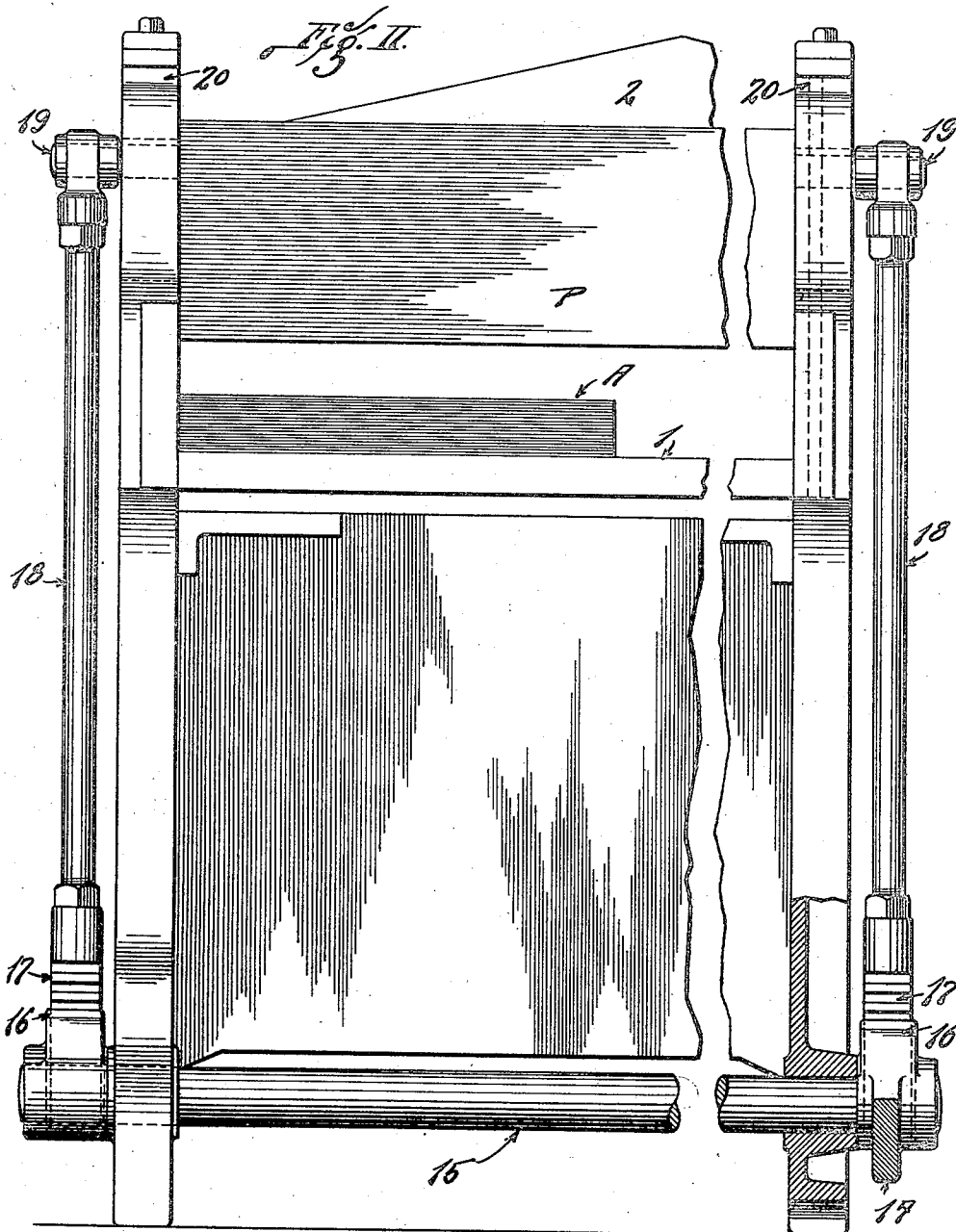
Inventor

B. F. BERRY,
by *Knight & Cook*
Attorneys

B. F. BERRY.
CLAMPING DEVICE.
APPLICATION FILED FEB. 8, 1917.

1,279,972.

Patented Sept. 24, 1918.
3 SHEETS—SHEET 2.

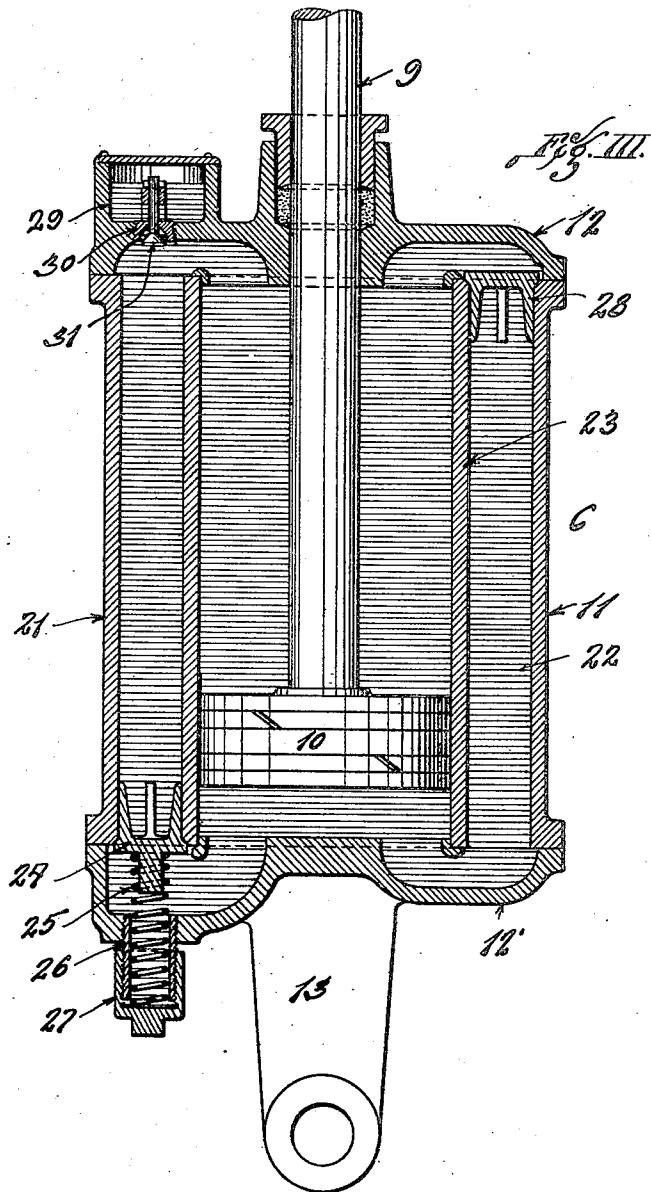


Inventor
B. F. BERRY,
by *Knight & Cook*
Attorneys

B. F. BERRY.
CLAMPING DEVICE.
APPLICATION FILED FEB. 8, 1917.

1,279,972.

Patented Sept. 24, 1918.
3 SHEETS—SHEET 3.



Inventor
B. F. BERRY
by *Knight & Cook*
ATTORNEYS

UNITED STATES PATENT OFFICE.

BENJAMIN F. BERRY, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE BERRY MACHINE COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

CLAMPING DEVICE.

1,279,972.

Specification of Letters Patent. Patented Sept. 24, 1918.

Application filed February 8, 1917. Serial No. 147,326.

To all whom it may concern:

Be it known that I, BENJAMIN F. BERRY, a citizen of the United States of America, a resident of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Clamping Devices, of which the following is a full, clear and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to a clamping device adapted for use in clamping sheets of paper while they are being acted upon by a paper cutter. From the following description, it will be understood that certain features of the invention are also adapted for use in various kinds of machines wherein it is necessary or desirable to transmit a predetermined degree of power to a driven member.

Briefly stated, the preferred form of the invention comprises a presser member adapted to move into engagement with the material to be operated upon and also adapted to exert a constant and uniform predetermined degree of pressure on said material. When the device is applied to a paper cutting machine, the sheets of paper to be cut are preferably placed under the presser member, and the latter moves downwardly to engage and clamp the paper during the cutting operation. The travel of the presser member varies to compensate for variations in the thickness of the paper, or other material, and when the presser member stops in its operative position it is held there under a predetermined degree of pressure. To accomplish these results in a simple and practical manner, my apparatus preferably includes a driver which travels a fixed distance during each operation, and a yieldable transmission device for transmitting power from said driver to the presser member. Movement is transmitted to the presser member until the latter reaches its operative position, and the driver then moves independently of the presser member. During the last mentioned part of the operation the presser member is stationary and the continued movement of the driver will result in the transmission of a constant and uniform degree of pressure to said presser member.

The yieldable transmission device preferably includes fluid circulating elements through which the power is transmitted,

and a regulating valve adapted to open in response to a predetermined degree of fluid pressure. When the resistance offered to the movement of the transmission device rises to a predetermined degree, the regulating valve opens to permit the fluid circulating elements to move without transmitting movement to the presser member, and during this part of the operation a uniform degree of power is transmitted from the driver to the presser member.

Figure I is a side elevation, partly in section, illustrating a paper cutting machine equipped with a clamping device embodying the features of my invention.

Fig. II is a rear elevation, partly in section, of the apparatus shown in Fig. I.

Fig. III is an enlarged vertical section through the yieldable transmission device.

To illustrate the preferred form of the invention I have shown a paper cutting machine provided with a table 1 adapted to receive the sheets of paper A. 2 designates a vertically movable knife holder provided with a knife 3. Pull rods 4, depending from the knife holder, may be operated by any suitable mechanism.

P designates a presser member fitted to the knife holder and adapted to engage the sheets of paper during the cutting operations. This presser member is moved downwardly as will be hereinafter described, so as to clamp the paper onto the table during the cutting operations, and when the presser member occupies its operative position it exerts a uniform predetermined degree of pressure on the paper. The object is to clamp the paper very firmly during the cutting operation, without varying the pressure of the clamp, so that the action of the knife will not be impaired by a change of the condition of the paper during the cutting operation.

The means for operating the presser member comprises a rotatable power shaft 5, a gear wheel 6 secured to said power shaft and a pinion 7 meshing with said gear wheel, the gear and pinion being shown diagrammatically in Fig. I. The driving device also includes a crank 8 fixed to the power shaft 5.

The means for transmitting power from the crank 8 to the presser member P comprises a piston rod 9 pivotally connected to said crank, a piston head 10 carried by said rod to a cylinder C within which said pis-

ton head operates. The cylinder C includes a body portion 11, heads 12 and 12', and structural features which will be hereinafter fully described.

5 The piston rod 9 operates through the cylinder head 12 and the opposite cylinder head 12' carries an arm 13 pivotally connected to a rocker arm 14, which is fixed to a rock shaft 15 on which are mounted sectors 16. Said sectors 16 are fixed to the rock shaft and are provided with teeth in engagement with rack bars 17 fixed to ends of pull rods 18. The opposite ends of said pull rods are fitted to studs 19 on the presser member P, which extend through slots in guide members 20 at opposite sides of the table 1.

Referring again to the cylinder C, 21 and 22 are ducts leading longitudinally of the cylinder, parallel with the chamber 23 in which the piston head 10 operates. These ducts are in communication with the chamber 23 at both ends so that circulation of fluid, with which the cylinder is filled, may be effected through said ducts from the ends of the chamber 23, in response to pressure exerted against the fluid by the piston head 10. The end of the duct 21 nearest the cylinder head 12 is constantly in communication with the chamber 23 and the end of the duct 22 nearest the cylinder head 12' is constantly in communication with said chamber 23, means being provided at the opposite ends of said ducts for controlling the flow of fluid through the ducts. In the duct 21, preferably at its end farthest from the cylinder head 12, is a pressure regulating valve 24 which is normally held in position to close the duct by a spring 25 seated in a spring pocket, secured to the adjacent cylinder head. Said spring pocket comprises a neck 26 and a cap 27 adjustably secured thereto by which the tension of the spring 25 may be varied. In the duct 22 preferably at the end of the cylinder is a check valve 28, which is adapted to open outwardly in response to pressure exerted thereagainst by fluid in the cylinder C during movement of the piston head 10 toward the cylinder head 12'. When said piston head is moved in the opposite direction the check valve 28 is held closed by fluid pressure and the fluid back of the piston head 10 must necessarily pass through the duct 21 and press against the regulating valve 24, as will hereinafter more particularly appear.

We will assume that the parts of the herein described paper cutting machine, including the power transmitting device, are in the positions illustrated in Figs. I and II. When the crank 8 is moved upwardly with the shaft 5 through the medium of the gear wheel 6, the pinion 7, and suitable driving mechanism such as is common to a paper cutting machine, said crank acts to move

the piston rod 9 upwardly. In the initial operation the degree of resistance is insufficient to unseat the regulating valve 24, and the piston head 10 and cylinder C are moved upwardly together from the position seen in Fig. I with the result of exerting a pull upon the arm 14 and the imparting of a partial rotation to the rock shaft 15. As said rock shaft rotates the sectors 16, by cooperation with the rack 17, act to move the pull rods 18 downwardly and said pull rods carry the presser member P from its elevated position into one in which it is in contact with the paper A resting on the table 1. After the presser member P has reached the position last mentioned the crank 8 continues its upward movement, but subsequent to a predetermined degree of pressure by the presser member P upon the paper A the crank will cease to continue the pulling action exerted by the pull rods 18 upon said presser member. This is due to the opening of the regulating valve 24 when the predetermined degree of pressure, dependent upon the tension of the spring 25, is reached. Therefore, during the continued movement of the crank 8, after the predetermined pressure by the presser member P has been reached, the piston head 10 is moved upwardly, and as the cylinder C is held from movement by the presser member operating parts connected to said cylinder, the cylinder remains stationary and the fluid back of the piston head 10 is necessarily forced through the duct 21 with a sufficient degree of pressure to open the regulating valve 24 so that a part of the fluid previously above or back of the piston head and in the duct 21 passes into the chamber 23 in front of or beneath the piston head. While this operation is taking place the check valve 28 is held closed by fluid pressure and it will be understood that the movement of the piston head 10 toward the cylinder head 12 may continue until the crank 8 has made one-half of a revolution, up to which time the predetermined pressure by the presser member P upon the paper A will remain stationary.

When the crank 8 has completed one-half of a revolution from the position shown in Fig. I the piston head 10 is moved in a reverse direction and fluid in front of or beneath said piston head is returned through the duct 22 to the chamber 23, the check valve 28 opening at this time in response to the fluid pressure. Upon the piston head 10 reaching its lowermost position in the cylinder C power is transmitted through the cylinder to the rocker arm 14, rock shaft 15, toothed sectors 16 and pull rods 18, whereby the presser member P is lifted from the paper A into the position shown in Figs. I and II.

From the foregoing it will be understood that the degree of movement imparted to the

presser member P will depend upon the thickness of the material A, and the travel of the presser member will therefore vary in different operations. However, the travel of the drive crank 8 is the same during each operation, and the transmission device will yield when the presser member reaches its operative position, thus transmitting a uniform degree of power from the crank 8 to the presser member P when the latter occupies its operative position.

It is highly desirable that the supply of fluid in the cylinder C should remain constantly the same, and it is obvious that there may be some loss of fluid from the cylinder by leakage which may take place, for example, around the piston rod 9. I therefore provide a reserve chamber 29 which contains a replenishing supply of fluid. This chamber is preferably located upon the cylinder head 12 and communication between it and the interior of the cylinder is provided for by a port 30. Said port is controlled by a check valve 31 adapted to be closed in response to pressure in the cylinder C during movement of the piston head 10 toward the cylinder head 12. When said piston head moves in the opposite direction the check valve 31 opens, and if there is any deficiency in the supply of fluid in the cylinder it is compensated for by flow of fluid from the reserve chamber to the cylinder.

While I have shown and described my transmission device as used in connection with a paper cutting machine, it is obvious that it may be used with various other forms of mechanism, being shown and described in connection with a particular mechanism only for the purpose of illustration.

I claim:

1. A transmission device of the character described comprising a cylinder having a piston chamber therein, a piston operable in said piston chamber, a pair of ducts associated with said cylinder and communicating at their ends with said piston chamber at opposite sides of said piston, a pressure regulating valve in one of said ducts, a check valve in the other duct, one of said valves being operable in response to fluid pressure delivered from one end of said piston chamber, and the other valve being operable in response to fluid pressure delivered from the other end of said piston chamber.

2. A transmission device of the character described comprising a cylinder provided

with a piston chamber and with ducts communicating at their ends with the ends of said piston chamber, a piston operable in said piston chamber, a pressure regulating valve in one of said ducts, a check valve in the other duct, one of said valves being operable in response to fluid pressure delivered from one end of said piston chamber, and the other valve being operable in response to fluid pressure delivered from the other end of said piston chamber.

3. An apparatus of the character described comprising a presser member, a driver, and a transmission device for transmitting power from said driver to said presser member; said transmission device including a cylinder and a piston operable in said cylinder, the cylinder being provided with a piston chamber and with ducts communicating at their ends with the ends of said piston chamber, a pressure regulating valve in one of said ducts adapted to open in response to a predetermined degree of fluid pressure in said duct, and a check valve in the other duct adapted to open in response to fluid pressure in said last named duct to permit the return of fluid to the end of said cylinder from which the fluid passes to said pressure regulating valve.

4. A transmission device of the character described comprising a cylinder provided with a piston chamber and ducts communicating at their ends with the ends of said chamber, a pressure regulating valve in one of said ducts and a check valve in the other duct, a reserve fluid supply chamber in communication with the interior of said cylinder, and a valve for automatically controlling communication between said reserve chamber and the interior of said cylinder.

5. A transmission device of the character described comprising a cylinder having a piston chamber, a piston in said chamber, a plurality of passageways in communication with said chamber at each side of said piston, yieldable means in one of said passageways for resisting the flow of fluid in one direction through said passageway, and means in another passageway for checking the flow of fluid therethrough while fluid is being forced through the first mentioned passageway.

In testimony that I claim the foregoing I hereunto affix my signature.

BENJAMIN F. BERRY.