J. STUART.

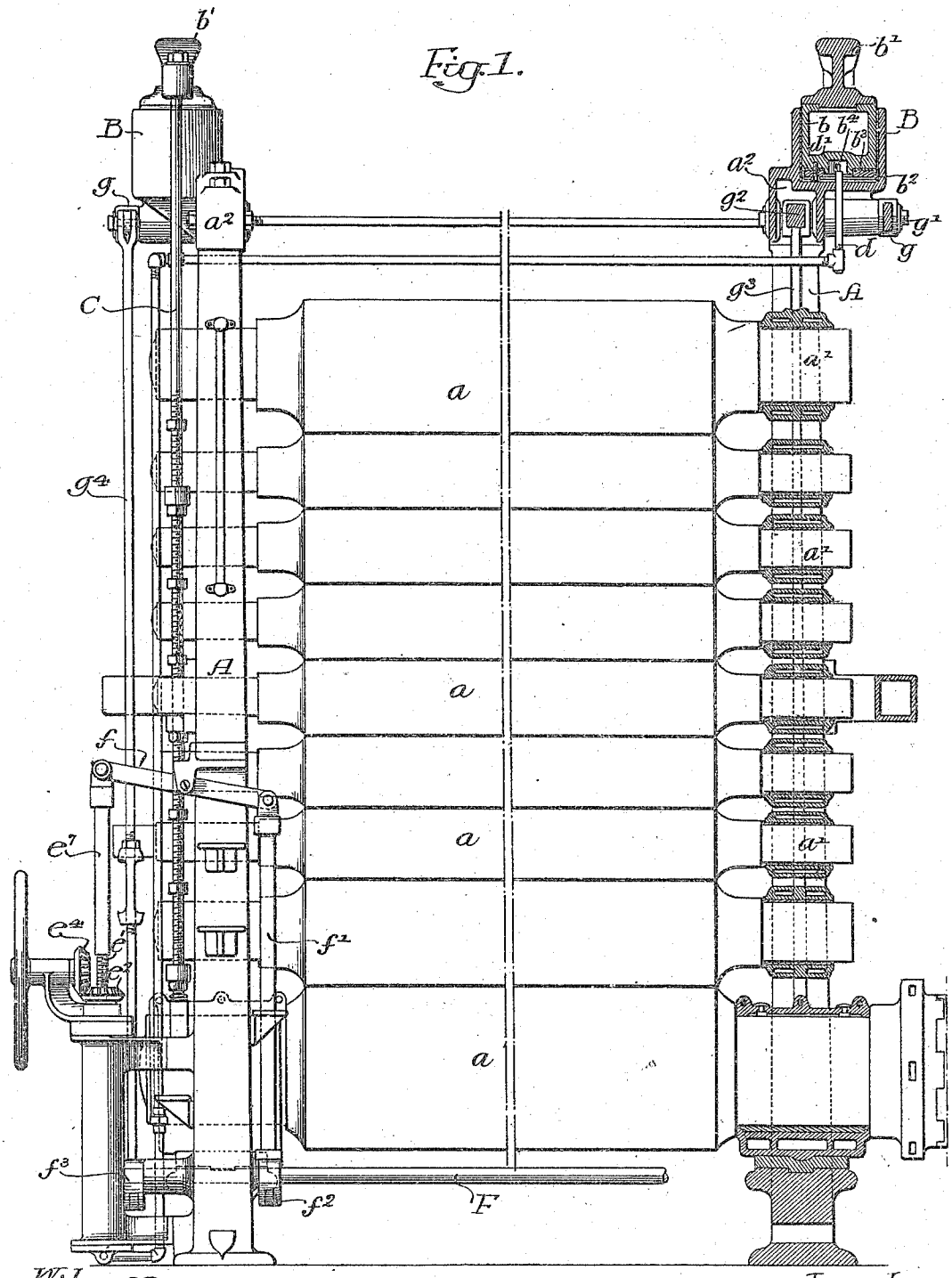
ATTACHMENT FOR CALENDER MACHINES.

APPLICATION FILED MAY 5, 1909.

957,812. Patented May 10, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

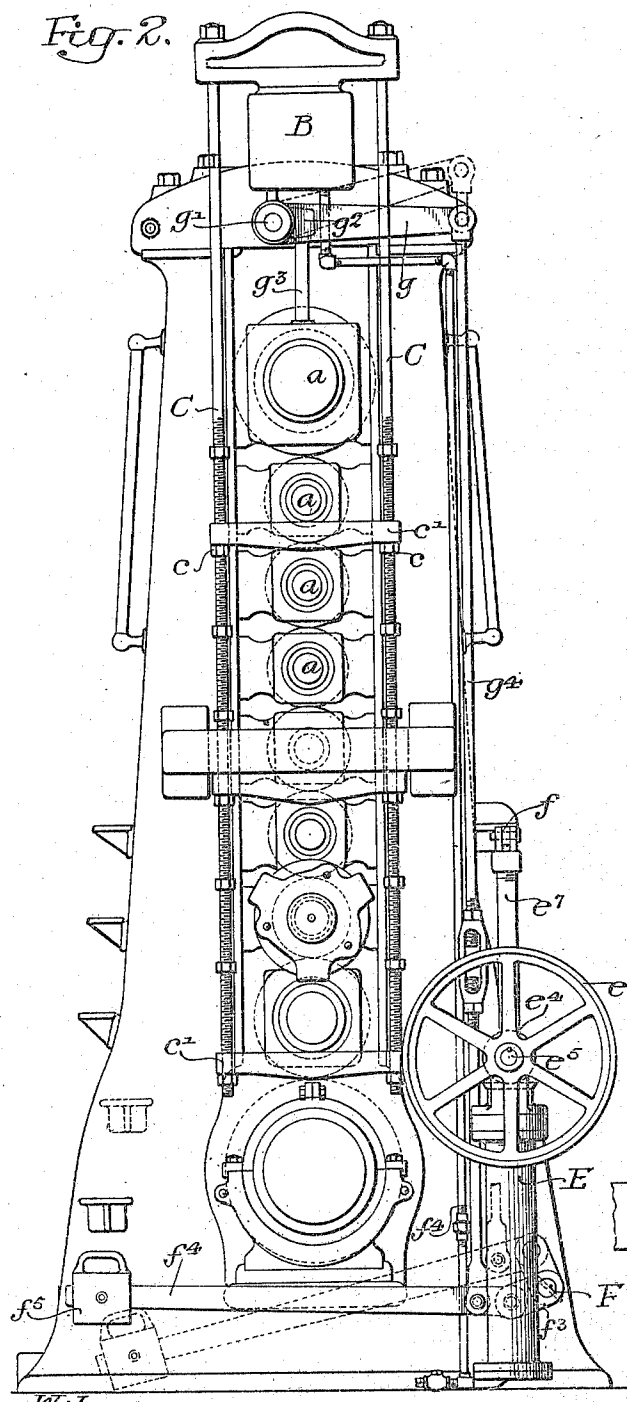
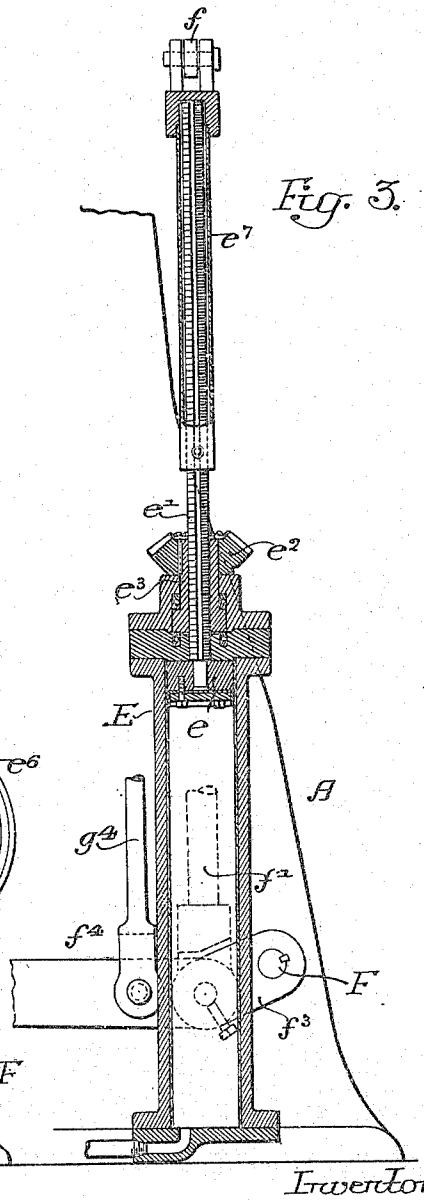


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH STUART, OF WILMINGTON, DELAWARE, ASSIGNOR TO LOBDELL CAR WHEEL COMPANY, OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE.

ATTACHMENT FOR CALENDER-MACHINES.

957,812. Specification of Letters Patent. Patented May 10, 1910.

Application filed May 5, 1909. Serial No. 494,102.

To all whom it may concern:

Be it known that I, JOSEPH STUART, a citizen of the United States, residing in Wilmington, Delaware, have invented certain Improvements in Attachments for Calender-Machines, of which the following is a specification.

I desire to provide a novel form of operating mechanism for raising the rolls, which shall be so designed as to first release the pressure upon the rolls and afterward to raise any particular roll or rolls. I also desire to provide an improved form of hydraulic lifting apparatus for the rolls of the calender machine, which shall be of strong and compact construction, and in which means is provided for preventing drying of the plunger packing and consequent leakage.

Another object of my invention is to provide novel means for applying pressure to the rolls of the machine; the same being constructed with a view to permitting of a relatively great separation of the rolls.

These objects and other advantageous ends I secure as hereinafter set forth, reference being had to the accompanying drawings, in which:—

Figure 1, is a front elevation, partly in section, of a calender machine showing my invention as applied thereto; Fig. 2, is an end elevation of the machine shown in Fig. 1; and Fig. 3, is an enlarged vertical section of the pump cylinder, showing certain of the parts associated therewith.

In the above drawings A is the housing of a calender machine in which are mounted calender rolls a and it will be noted that in each instance the necks a' of these rolls project beyond the outside of the side or vertical members of said housing. On the cap or cover a^2 of each side member is mounted a hydraulic cylinder B and each of these cylinders has a plunger b carrying a yoke b'. From each end of each yoke there depends a screw threaded rod C, and the two rods from each yoke extend on opposite sides of the necks of the rolls a.

Nuts c are mounted at intervals upon the rods C and serve to support cross bars c' on each pair of the same which are held by them under the neck of any desired roll.

From Fig. 1, it will be seen that the plunger b of the cylinder B is provided with packing b^2 held in place by a follower b^3 and has on the center of its lower face an upwardly extending recess b^4. The fluid supply pipe d for said cylinder enters the bottom of the same and extends upwardly into the recess b^4, of the plunger, as does also an air vent pipe d', it being noted that both of said pipes end above the level of the packing b^2 when the plunger is in its lowest position, in order that under operating conditions there shall always be a body of liquid within the cylinder B in contact with said packing. For supplying liquid under pressure to the cylinders B and also for releasing or applying pressure to the cylinder rolls, I provide a cylinder E connected by pipes d with said cylinders B. This is mounted in any convenient manner upon the housing or frame of the machine and has a suitably packed plunger e to which is connected a plunger rod e' passing out through the top of the cylinder. Said plunger rod is threaded and has mounted on it a correspondingly threaded sleeve e^3 carried in suitable ball bearings in the top of the cylinder, while a beveled gear e^2 fixed to said sleeve meshes with a second beveled gear e^4 fixed to a shaft e^5 mounted in suitable bearings having connected to it an operating wheel e^6.

From Fig. 3, it will be seen that the plunger rod e' enters a tubular rod e^7 which is connected to one end of a lever f fulcrumed on the housing of the machine, the arrangement being such that said plunger rod is capable of moving independently of the lever under certain conditions hereinafter noted.

The opposite end of the lever f is loosely connected to a rod f' whose lower end is connected to an arm f^2 keyed or otherwise fixed to the shaft F extending across the machine, while at each end of this shaft are fixed other arms f^3 to each of which is pivoted a lever f^4 having a weight f^5. Mounted on the cap or cover of each side member of the housing is a lever g fixed to a short spindle g' to which is also fixed a second arm g^2, a strut g^3 extending between this second arm and a suitable bearing for the

neck of the uppermost roll *a*. A link g^4 connects the end of the lever *g* to the lever f^4, and when it is desired to raise any particular roll, one pair of the cross bars *c* is adjusted so as to be in engagement with the necks of the roll to be raised, the cylinder E and the piping being filled with oil or other suitable liquid. If now the hand-wheel e^6 be turned, power is transmitted through the spindle and the gear wheels e^4 and e^2 to the plunger rod *e'*, which in turn forces the plunger *e* downwardly in the cylinder E, thereby forcing out of said cylinder a certain amount of fluid and causing it to flow into cylinders B. Before enough of said fluid has entered these latter cylinders to cause a materially upward movement of their plungers *b*, the plunger rod *e* permits a lowering of the end of the lever *f* with which it is in engagement. As a consequence, the weights f^5 of the levers f^4 are permitted to drop into the positions shown in dotted lines in Fig. 2, so as to rest upon the foundation of the machine, and in such case it is obvious that the pressure otherwise exerted by said weights through the rods g^4, arms *g*, spindles *g'*, arms g^2 and struts g^3 upon the various rolls, is released, and as the plunger rod end of the lever *f* is free to move down for a considerable distance, it is obvious that the arms *g* and g^2 are likewise capable of considerable upward movement so that any one of the rolls may be separated from that adjacent to it for a much greater distance than would be possible in any other arrangement or apparatus with which I am acquainted.

The continued downward movement of the plunger *e* in the cylinder E causes the plungers *b* to be forced out of their cylinders so that the yokes *b'* and their attached rods C are raised, as are also the rolls above the cross bars *c'*.

The above described operation is reversed when it is desired to lower the rolls, by turning the handwheel e^6 in a direction the reverse of that previously noted, in which case the plunger *e* is raised in the cylinder E so that plungers *b* fall in their cylinders B. As a consequence the rolls again come together in their normal positions and the continued upward movement of the plunger rod *e'* caused by the continued operation of the hand wheel causes it to move upwardly the adjacent end of the lever *f* with a corresponding downward movement of its opposite end. As a consequence the transverse shaft F is turned downwardly so that the levers f^4 which are hung on the rods g^4 as fulcrums are turned so as to raise their weights f^5, thereby bringing pressure to bear upon the stack of rolls through said rods g^4, levers *g*, spindles *g'*, arms g^2 and struts g^3.

By the particular arrangement of intake and vent pipes in the cylinders B there is always a body liquid trapped within each of said cylinders so that the plunger packing is prevented from drying, and the possibility of its leaking is thus prevented.

I claim:—

1. The combination with a calender machine of a device for applying pressure to the rolls thereof; fluid operated means for raising the roll or rolls; and a pump capable of supplying fluid under pressure to the roll raising means; said pump including a member capable of actuating the pressure applying device.

2. The combination with a calender machine of fluid actuated apparatus for raising a roll or rolls, a cylinder and piston for forcing fluid to said roll raising apparatus, means for applying pressure to the rolls, and means actuated by said piston for relieving said pressure before the raising of a roll or rolls.

3. The combination with a calender machine of a cylinder having a piston and a piston rod, means for raising the rolls of the machine including other cylinders also having pistons, conduits connecting said latter cylinders with the first cylinder, and means operatively connected to the piston rod of said first cylinder for controlling the pressure on the rolls of the machine.

4. The combination with a calender machine of a cylinder, a piston and a piston rod, means for applying pressure to the rolls of the machine consisting of a weighted lever, means for connecting the piston rod with said weighted lever, fluid operated means for raising the rolls of the machine, and conduits connecting said latter means with the cylinder.

5. The combination with a calender machine of means for raising the rolls thereof including a cylinder and a plunger provided with packing, means including a conduit for forcing fluid to said cylinder, said conduit entering the cylinder above the level of the packing so as to trap a body of fluid in the cylinder in contact with said packing.

6. The combination with a calender machine of means for applying pressure to the rolls thereof consisting of struts, levers operative on the struts and fulcrumed to the frame of the machine, links connected to the levers, a shaft mounted on the frame of the machine and having arms fixed to it, a weighted lever pivoted to each arm and fulcrumed on one of the links, there being a structure capable of supporting the weight of each lever when the latter is in a certain position, and means for turning said shaft at will.

7. The combination with a calender machine of mechanism for raising the rolls thereof, means for applying pressure to said

rolls, said means including a weighted lever, a rotatable arm pivotally connected to one arm of said lever, and means for rotating the lever-supporting arm to bodily move said lever so as to permit of the rolls being raised a relatively great distance.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOSEPH STUART.

Witnesses:
WILLIAM E. BRADLEY,
WM. A. BARR.