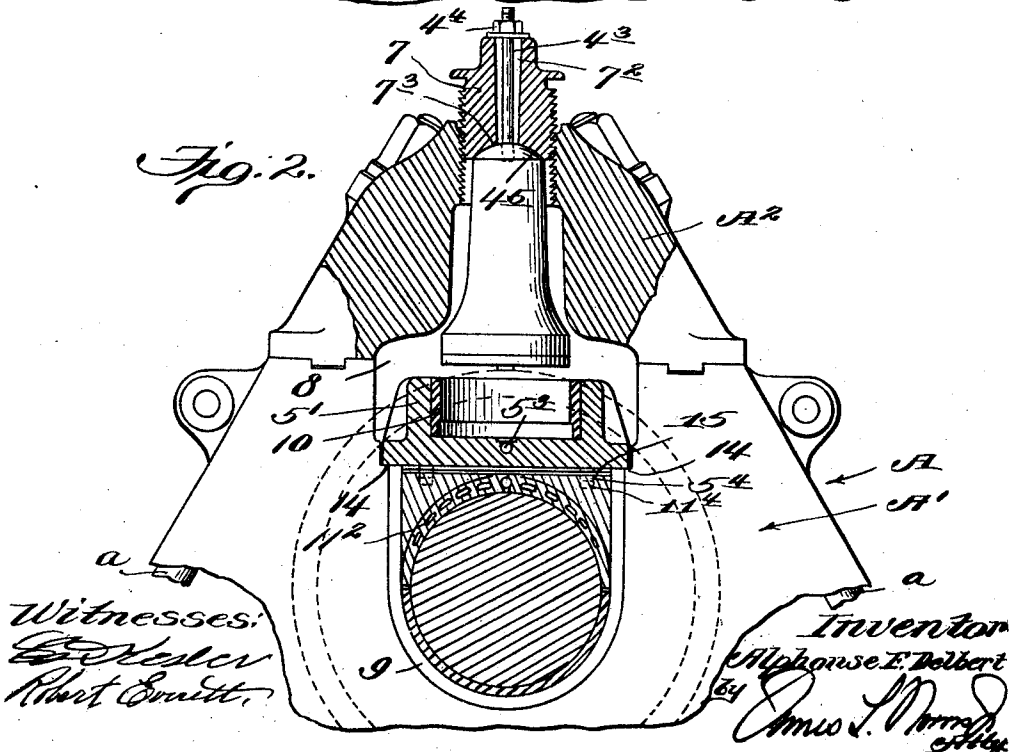
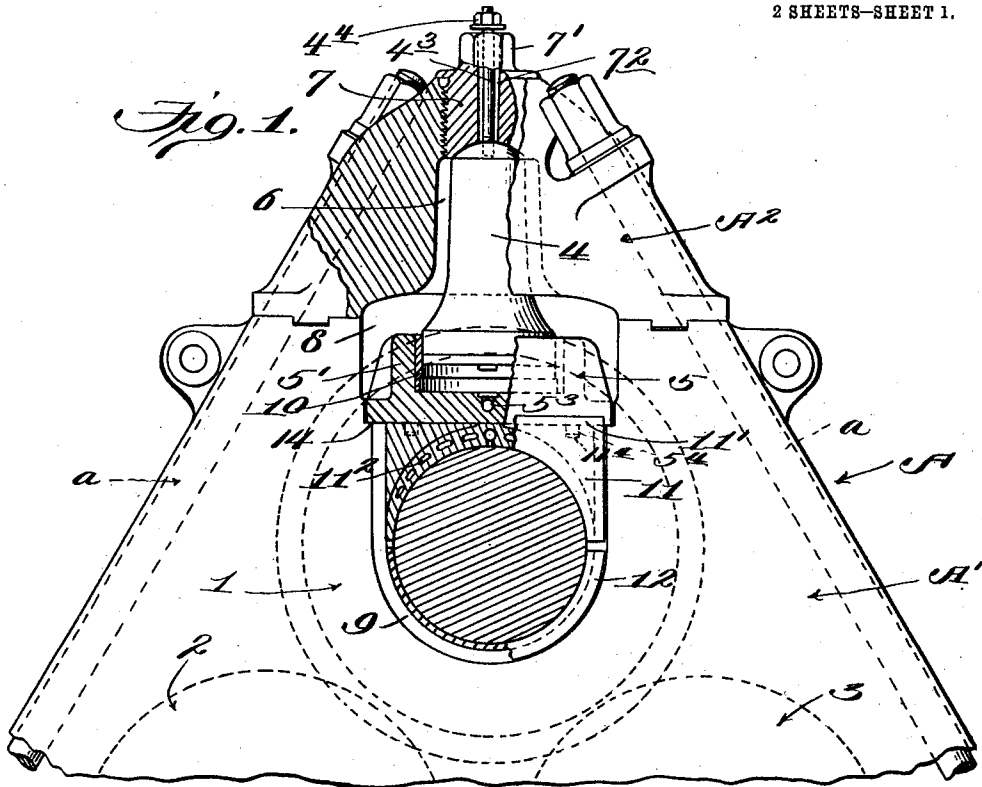


A. F. DELBERT.
CANE MILL.
APPLICATION FILED JUNE 10, 1911.

1,056,640.

Patented Mar. 18, 1913.

2 SHEETS—SHEET 1.



A. F. DELBERT.

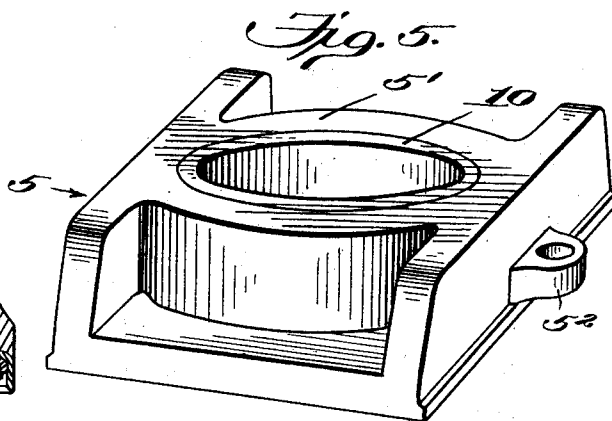
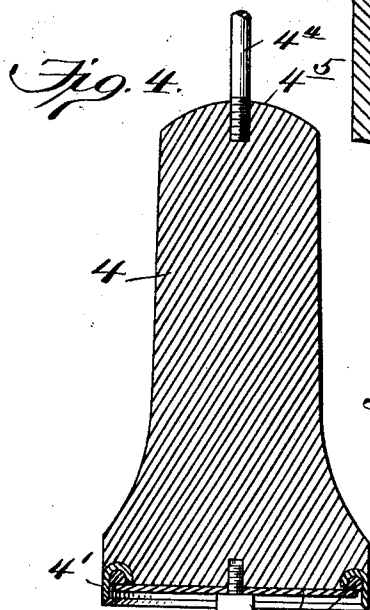
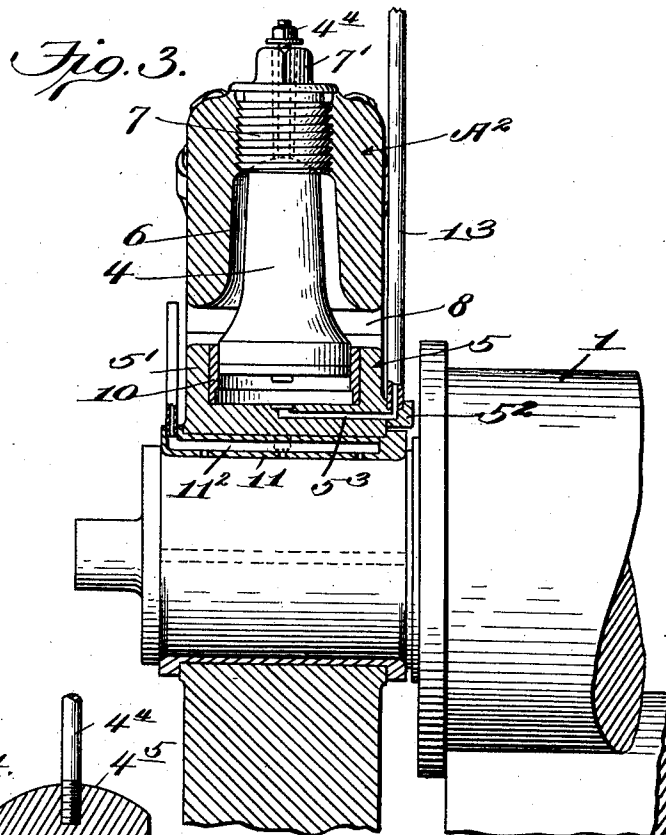
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2 SHEETS—SHEET 2.



Witnesses
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UNITED STATES PATENT OFFICE.

ALPHONSE F. DELBERT, OF NEW ORLEANS, LOUISIANA.

CANE-MILL.

1,056,640.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed June 10, 1911. Serial No. 632,409.

To all whom it may concern:

Be it known that I, ALPHONSE F. DELBERT, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented new and useful Improvements in Cane-Mills, of which the following is a specification.

The present invention has reference to improvements in cane mills, and more especially in or relating to the roll caps and the therewith-associated hydraulic pressure-regulating devices.

It aims essentially to correct and overcome certain defects and objectionable features, hereinafter specified, which are ordinarily present in all or nearly all of the makes of cane mill now in general use.

In all modern mills for grinding cane, the caps of one of the rolls, (usually, though not necessarily, the top roll), are provided, for well-understood reasons, with a hydraulic pressure regulator, which, in most cases, is of the type known as "movable ram and fixed cylinder." In their ordinary form, these devices are extremely heavy, clumsy and costly, as well as generally inaccessible; above all, they are open to grave objection in that they are incapable of ready and instant inspection in the event of failure to operate, but, on the contrary, can be repaired only after the lapse of a considerable period of time, thereby entailing more or less serious financial losses. Again, no provision is made for neutralizing the effect on the ram of the angular lift of either end of the roll due to eccentric feed of the cane, in consequence whereof the ram is caused to bind against the cylinder walls, rendering the device extremely non-sensitive and occasioning wear both upon the said cylinder walls and the ram; this binding also frequently results in cracking and leaking of the leathers and in chipping of the end of the ram.

So far as the most important features of this invention are concerned, it may be stated, therefore, that they comprise a pressure-regulator construction wherein, in contradistinction to the usual forms of types of such devices, access may be had both to the cylinder and to the ram upon the instant that stoppage or injury takes place, to examine, remove and replace the leathers; the cylinder itself may be readily and quickly

removed bodily from the housing; and the attendant can readily detect beginnings of leather leaks, even during operation, by watching the joint between ram and cylinder. The ram is so connected with its cap as to enable it to completely accommodate itself to any irregularity in the movement of the roll with which it is associated, this alone being the chief requisite for great sensitiveness of action; and no intensifier is necessary, as with other types.

For its further objects, the invention comprehends the provision of means for rigidly supporting the roll acted upon by the pressure device at the limit of its inward movement, thereby obviating the wear upon the main roll brass and the general needless grinding strains which would otherwise take place during an interval when no cane passes between the rolls, as very often happens; and for taking up wear upon the main brasses, so as to avoid the injurious thumping and hammering caused by back-lash or play ordinarily incidental to such wear, when the roller suddenly lifts to the entering cane.

A structural embodiment of the invention is illustrated in the accompanying drawings, whereof—

Figure 1 is a fragmental end elevation, partly in section, of the improved mill, the component parts of the pressure device being shown in their normal or operative position; Fig. 2 is a view similar to Fig. 1, but showing the said parts in inoperative position to permit access thereto, and showing, also, the preferred form and disposition of the wear-compensating devices; Fig. 3 is a transverse vertical sectional view of Fig. 1; Fig. 4 is a vertical sectional view of the ram; Fig. 5 is a perspective view of the cylinder.

In the said drawings, the reference characters 1, 2, and 3 designate, generally, the three rolls of the mill, and A the housing wherein the same are journaled. In the present embodiment of the invention, the said housing is of the triangular type shown and described in my prior Patent No. 895005, granted August 4, 1908, to which reference may be had for an extended description, although it is to be understood that other preferred or conventional forms of housing may be substituted for such form without impairing the efficiency of the invention in

the least. The aforesaid rolls 1, 2 and 3 are arranged with their axes in triangular relation.

The present housing consists essentially of the central core portion A', and a series of caps A², (of which, however, only the top one is shown), arranged at the corners of said core and coöperatively connected with one another through the intermediary of the tie-bolts a, the said bolts serving to draw the caps into firm engagement with the core and thus practically obviating breakage of the housing. The rolls are provided with the usual journals which are received in recesses or seats formed in the core at the proper points, as in the patented construction.

The hydraulic pressure device, hereinafter described, may be applied to or associated with any one of the caps, but, preferably, to the top cap, and is here shown in such connection. Hence, the description will be limited correspondingly to the cap specified, but it will be understood as applying equally to an arrangement wherein said device is associated with either of the bottom caps. The device in question is, as has already been stated, of the ram and cylinder type, but whereas in the ordinary construction the first of these two elements is movable and is designed to be forced downwardly toward the adjacent face of the upper brass, in the present instance the ram, or its equivalent element, is to all intents stationary, so far as the pressing operation is concerned, and its lower end is normally received in the cylinder element, the latter element being arranged to approach and recede from the ram during the variations in the pressure opposed to the load thereon and, hence, constituting the movable part. The term "ram" employed does not, therefore, convey any limitation to a member which is necessarily movable bodily during its operations.

In the illustrated embodiment, the aforesaid ram, plunger or the like part or element of the device is indicated by the numeral 4, and its companion cylindrical element by the numeral 5. The stem portion of the former element is loosely received in a passage or bore 6 formed diametrically through the apex of the triangular cap A², the said passage having its outer end portion closed by a block 7 and its inner end portion flared in conformity with the opening or recess 8 in the core A' wherein the cylinder is disposed, the said opening 8 constituting a continuation of the journal recess 9. The enlarged lower end of the ram is designed to work, under normal conditions, within an upstanding annular flange 5' formed upon the base portion of the element 5 and constituting the cylinder proper, the flange being lined by a shell 10 of phosphor bronze

or other suitable material. The said cylinder, as opposed to its ordinary construction, wherein it is fashioned in and forms part of the ponderous top cap itself, consists merely of a light steel casting which is wholly separate from the cap and core and is accurately fitted to the top face of the upper brass 11, resting on same without bolting; it is held in place against lateral and endwise movement solely by the side walls of the recess 8 and by the usual flanges 11' formed on the brass 11, which latter is opposed to the lower brass 12 and has a portion thereof of the so-called "lantern" formation, (indicated by the numeral 11²), to provide for the circulation of water or other cooling medium through it.

Motive fluid is admitted into the interior of the cylinder, preferably as shown in Figs. 3 and 5, by means of a pipe 13 whose lower end seats in a recessed lug 5² formed on one side of said cylinder, the base of the latter being formed with a passage 5³ which opens at one end into said lug and at the other end through the center of the bottom wall of the cylinder proper. Consequently, when the fluid enters the cylinder under pressure it will tend to force the cylinder, (being the movable element), away from the ram, the latter being held fixed in place by the fluid with its stem engaged with the block 7, which block thus receives the thrust. The usual leather employed in connection with the cylinder is omitted in this construction; the ram, however, is provided with an annular leather 4' which is secured to its lower end face by means of suitable fastening devices 4², (Fig. 4).

It has been stated as the principal feature of the invention that the pressure device is so constructed as to admit of complete access thereto for the purpose of examining the ram leather and the cylinder proper, and of removing the cylinder itself bodily prior to repairing the same and to correcting wear upon the brasses. To accomplish this, means is provided for effecting a positive connection of the ram at times to the block 7, and the said block is movably fitted in the passage 6, so that on being raised therein it will carry the ram upwardly with it sufficiently far above the cylinder to permit the desired inspection of both the ram and the cylinder and also to permit the latter to be removed bodily from the housing. The upper portion of the inner surface of the aforesaid passage 6 is formed with "butfress" threads which are engaged with similar threads provided upon the thrust block 7, the upper end of said block having formed thereon a shouldered nut 7', the shoulder part of which normally bears against the apex of the cap A². Through said block and also through nut 7' is formed a tapered longitudinal bore 7², through which, in turn,

extends a threaded vertical bolt 4³ secured axially to the upper end of the ram stem. This bolt carries upon its outer end a shouldered nut 4⁴ that is designed to be tightened against the upper end face of the nut 7' when making ready to lift the ram from the cylinder, so as to cause the abutting end faces of the thrust block and ram to contact closely with each other; rotation of the thrust block, (by means of a wrench or other tool), will then result in raising both said block and said ram, as shown in Fig. 2, the two series of "buttress" threads being so loosely engaged as to permit the rotation of the block to be readily effected. Under ordinary circumstances, the nut 4⁴ carried by bolt 4³ is maintained above and out of contact with nut 7', (see Figs. 1 and 3), when the mill is running. Provision is also made for neutralizing the angular lift of either end of the roll due to irregular feed, as has also been stated. This is preferably carried out by the formation of a ball-and-socket joint between the abutting faces of the thrust block and the stem of the ram; one of said faces, in the present instance that of the ram stem, is made convex, as indicated by the numeral 4⁵, while the other face, (that of the thrust block), is cupped or concaved to match, as indicated by the numeral 7³. Hence, when the above described angular lift of the roll takes place, the ram will have a slight lateral movement relative to cap A² in the passage 6 and to the said block, and its bolt will have a similar movement in the bore 7², the diameters of said bore and passage being sufficiently large to permit such movement without binding of the parts. Bore 7² also provides means for lubricating the ball-and-socket joint.

The lower face of the base portion of the cylinder element is designed to rest squarely upon the adjacent face of the upper brass throughout its entire extent or area, as has been stated, no bolts or other fastening devices being employed; this construction, as will be understood, enables the pressure exerted upon the cylinder and transmitted from it to the said brass, to be distributed evenly and entirely over the latter, and, also, does away with the necessity for employing the usual sole or bearing plate which is engaged by the end of the ram. Means is provided, however, for supporting and sustaining the aforesaid cylinder when the same reaches the limit of its inward or downward movement, so as to remove the pressure exerted thereon from the brasses. This is a matter of considerable importance, for, inasmuch as it frequently happens that there are appreciable intervals during the time that the mill is running when no cane is passing between the rolls, the entire pressure of the pressure device would, under ordinary circumstances, still be exerted at

such times upon the roll and would, in consequence, occasion needless wear of the brasses and strains on the driving system. In the present construction, the side walls of the journal recess are formed with opposed transverse shoulders 14 located substantially at the junction of the openings 8 and 9; these shoulders serve to engage and support the corresponding ends of the cylinder base under the circumstances mentioned.

The above-described vertical movement of the thrust block will enable the pressure device to be thoroughly inspected, and will also permit the cylinder to be withdrawn bodily from the housing; in addition, this adjustment enables the amount of wear upon the brasses to be ascertained, and compensation made therefor. The devices for taking up wear preferably consist of thin, flat steel or copper plates 15, shown in Fig. 2, which are interposed between the upper face of the top brass and the under face of the cylinder base. These plates, or "liners", as they are generally termed, are held against displacement in any preferred manner, as, for instance, by means of pins formed upon one of the two confronting surfaces specified, and projecting through openings in the liners into recesses or seats in the other of said surfaces; in the construction illustrated, the pins, indicated by the numeral 5⁴, are provided upon the cylinder base, and the seats 11⁴ in the brass. The nicety with which the said liners may be arranged, owing to their extreme thinness, enables the wear to be taken up periodically with the greatest accuracy.

Considering the invention as a whole, it is to be observed that the construction and arrangement of the various parts is such that the desired access to both members of the pressure device, as well as the removal of the pressure-receptive member, *i. e.*, the cylinder are provided for, and, further, that the manipulation of the opposing or resistance member incidental to the inspection of said members and to the removal of the aforesaid pressure-receptive member may be effected without necessitating any prior adjustment of the parts of the housing or the rolls. Furthermore, provision is made for neutralizing the angular lift of the roll with which the device is associated, and for taking up wear on the brasses for the journals of that roll; the latter operation may also be carried out without affecting the housing sections and the rolls, and during such operation and, also, those first specified, the resistance member is held and supported sufficiently far away from the pressure-receptive member and the roll journal to completely obviate all interference on its part.

I claim as my invention:

1. A cane mill housing having mounted

therein a pressure device comprising co-operatively engaged resistance and pressure-receptive members, one of which is movable relatively to the other; in combination with means associated with said other member for moving the same bodily out of such engagement.

2. A cane mill housing having mounted therein a pressure device comprising co-operatively engaged resistance and pressure-receptive members, in combination with means associated with one of said members for moving the same bodily out of such engagement.

3. A cane mill housing having mounted therein a pressure device comprising a substantially fixed resistance member, and a pressure-receptive member co-operatively engaged with the resistance member and movable relatively thereto; in combination with means associated with said resistance member for moving the same bodily out of such engagement.

4. A cane mill housing having mounted therein a pressure device comprising a substantially fixed resistance member, and a pressure-receptive member co-operatively engaged with the resistance member and movable relatively thereto, said pressure-receptive member being removable bodily from said housing; in combination with means associated with said resistance member for moving the same bodily out of such engagement, to permit the removal of said pressure-receptive member.

5. A cane mill having mounted therein a removable cylinder and a substantially fixed ram, the latter co-operating with and having an end disposed in the former, and means for supplying a motive fluid to the interior of the cylinder for forcing the same bodily away from said ram; in combination with means for moving said ram bodily away from said cylinder to withdraw its end therefrom and permit the removal of the cylinder.

6. A cane mill housing provided with a journal recess and with a passage opening thereinto; in combination with a pressure device comprising a pressure-receptive member located in said recess, and a co-operating resistance member extending into said passage; a movable member located in said passage; and means for connecting said resistance member to the last-named member to move the former bodily with the latter away from said pressure-receptive member.

7. A cane mill housing provided with a journal recess and with a passage opening thereinto; in combination with a pressure device comprising a pressure-receptive member located in said recess, and a normally fixed resistance member co-operatively associated with the pressure-receptive member and extending into said passage, said

pressure-receptive member being arranged for bodily movement relative to said resistance member; a movable member located in said passage; and means for connecting said resistance member to the last-named member to move the former bodily with the latter away from said pressure-receptive member.

8. A cane mill housing provided with a journal recess and with a passage opening thereinto; in combination with a pressure device comprising a pressure-receptive member located in said recess, and a co-operating resistance member extending into said passage; a rotatable member located in said passage; and means for connecting said resistance member to said rotatable member to move the latter during the rotation of the former bodily away from said pressure-receptive member.

9. A cane mill housing provided with a journal recess and with a passage opening thereinto; in combination with a pressure device comprising a pressure-receptive member located in said recess, and a resistance member co-operating with the pressure-receptive member and extending into said passage; a movable member fitted in said passage and formed with a bore; a projecting member attached to said resistance member and extending loosely into said bore; and means carried by said projecting member and arranged for engagement with said movable member, to connect the latter with said resistance member, for causing said resistance member to move bodily with said movable member, when the same is operated, away from said pressure-receptive member.

10. A cane mill housing provided with a journal recess and with a passage opening thereinto; in combination with a pressure device comprising a pressure-receptive member located in said recess, and a resistance member co-operatively engaged with the first-named member and having a portion extending into and arranged for angular movement in said passage.

11. A cane mill housing provided with a journal recess and with a passage opening thereinto; in combination with a pressure device comprising a pressure-receptive member located in said recess, and a resistance member co-operatively engaged with the first-named member and having a stem extending into said passage; and a member mounted in said passage and having a ball-and-socket connection with said stem, to permit an angular movement of the resistance member.

12. A cane mill housing provided with a journal recess and with a passage opening thereinto; in combination with a pressure device comprising a substantially-fixed resistance member having a portion extending into and arranged for angular movement in

said passage, and a pressure-receptive member with which the resistance member is co-operatively engaged disposed in said recess and movable bodily relatively to said resistance member.

13. A cane mill housing provided with a journal recess and with a passage opening thereinto; in combination with a pressure device comprising a pressure-receptive member located in said recess, and a resistance member coöperatively engaged with the first-named member and extending into said passage; and a member located in said passage in continuous engagement with said resistance member, said resistance member being arranged for angular movement in said passage relative to the third-named member.

14. A cane mill housing provided with a journal recess and a passage opening thereinto; in combination with a pressure device comprising a pressure-receptive member located in said recess, and a resistance member coöperatively engaged with the pressure-receptive member and extending into said passage; and a thrust block fitted in said passage and continuously engaged with the resistance member, the confronting ends of said block and resistance member forming a ball-and-socket joint, to permit an angular movement of the latter in said passage relative to the former.

15. A cane mill housing provided with a journal recess and a passage opening thereinto; in combination with a pressure device comprising a pressure-receptive member located in said recess, and a resistance member coöperatively engaged with the pressure-receptive member and extending into said passage; a movable thrust block fitted in said passage and continuously engaged with the

resistance member; and means for rigidly connecting said resistance member to said block, to permit the latter, during its movement, to withdraw the former bodily from engagement with the pressure-receptive member and hold the same in disengaged position.

16. A cane mill housing provided with a journal recess and a passage opening thereinto; in combination with a pressure device comprising a pressure-receptive member located in said recess, and a resistance member coöperatively engaged with the pressure-receptive member and extending into said passage; a movable thrust block fitted in said passage and loosely engaged with the resistance member, to permit angular movement of the latter with respect thereto; and means for rigidly connecting said resistance member to said block, to withdraw the resistance member bodily from engagement with the pressure-receptive member when the block is moved in one direction, and to hold said resistance member in disengaged position.

17. A cane mill housing having mounted therein a pressure device comprising a pressure-receptive member, and a resistance member coöperatively engaged with said pressure-receptive member and occupying a substantially fixed position with respect thereto, said resistance member being arranged for angular movement in said housing.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALPHONSE F. DELBERT.

Witnesses:

E. B. COUSIN,

A. F. LIVANDAIS.