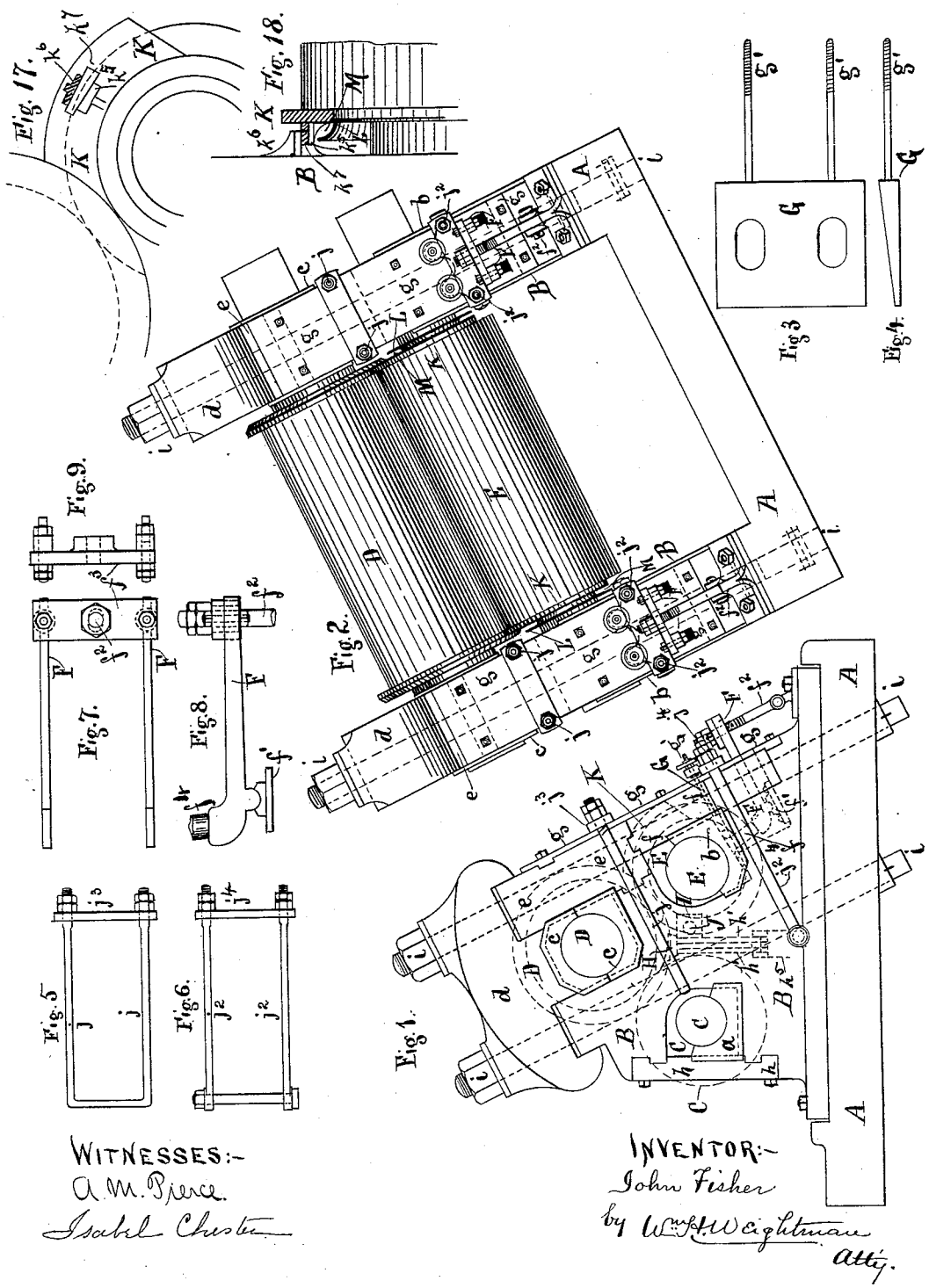
(No Model.) 2 Sheets—Sheet 1.

J. FISHER.

CANE MILL.

No. 482,084. Patented Sept. 6, 1892.



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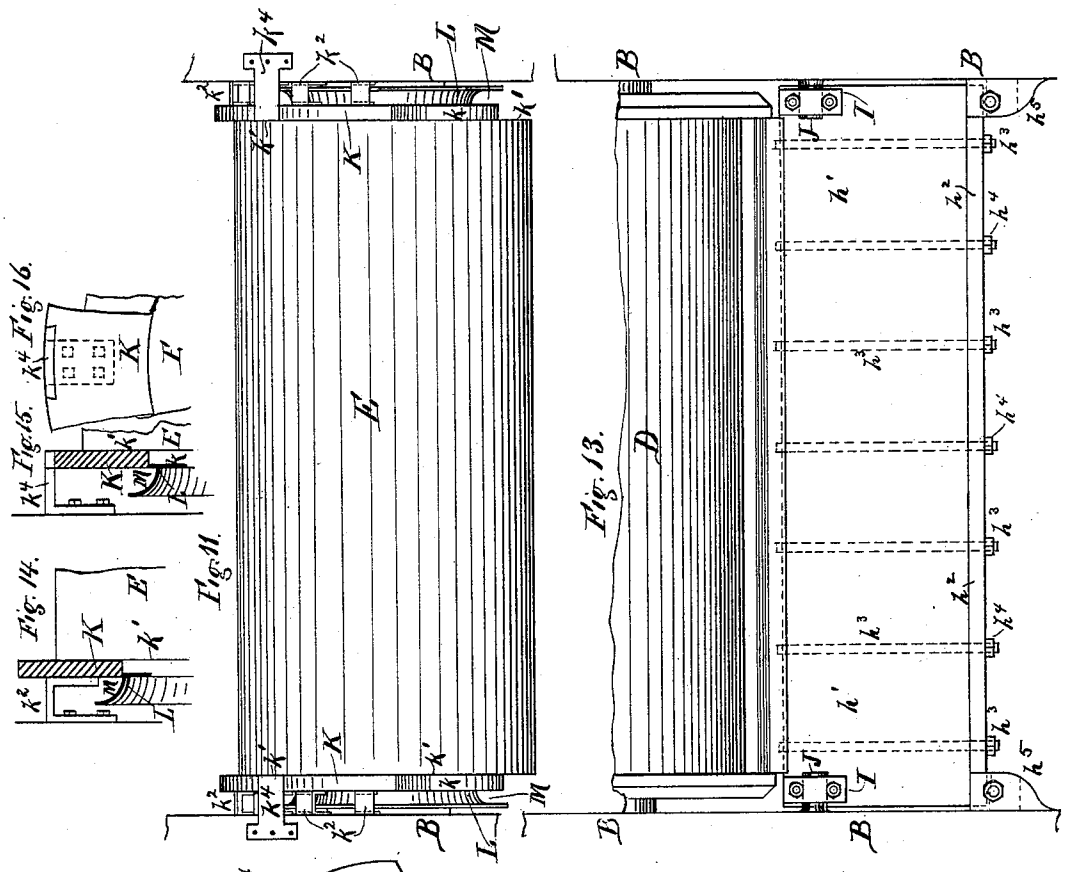

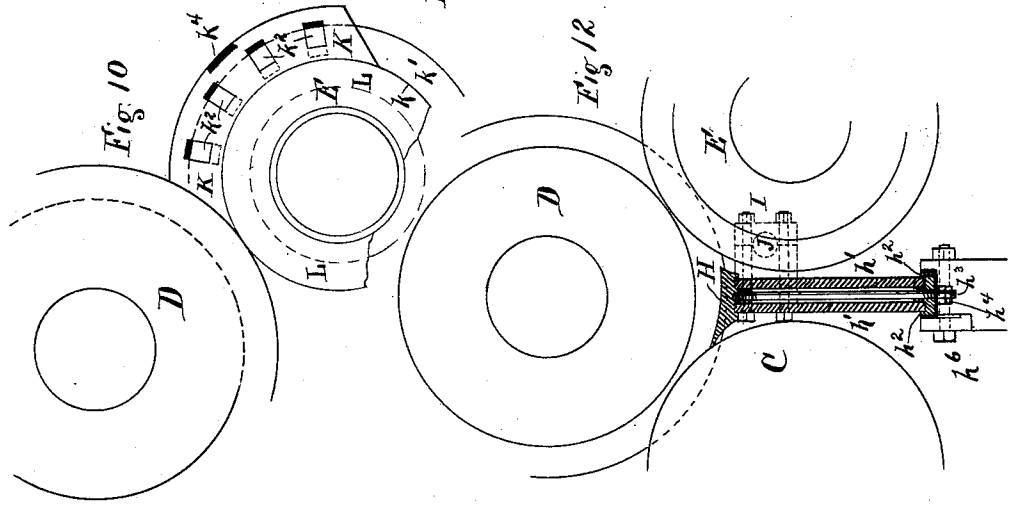

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UNITED STATES PATENT OFFICE.

JOHN FISHER, OF HAVANA, CUBA.

CANE-MILL.

SPECIFICATION forming part of Letters Patent No. 482,084, dated September 6, 1892.

Application filed December 8, 1891. Serial No. 414,372. (No model.)

To all whom it may concern:

Be it known that I, JOHN FISHER, of Havana, Cuba, have invented certain new and useful Improvements in Cane-Mills, of which the following is a specification, reference being had to the accompanying drawings.

The object of my improvements is to provide a mill reliable in its work, durable in construction, and one that will protect its bearings from the liquid, juice, cane, bagasse, and shredded or fibrous material while in operation.

A further object is to provide for the easy removal of the rolls when necesary and for their easy adjustment toward or from each other.

My improvements consist in the construction, arrangement, and combination of the several parts or portions comprising the mill, as may be hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents an end elevation of a machine embodying my improvements. Fig. 2 represents a side elevation of the same. Figs. 3, 4, 5, 6, 7, 8, and 9 represent enlarged detail views of various parts or portions of the machine. Figs. 3 and 4 represent side and plan views of supporting-wedge for the roll boxes or bearings. Figs. 5 and 6 represent straps and bolts for holding the removable sidings of cheek-pieces in place. Figs. 7, 8, and 9 represent details for lifting and lowering of boxes for roll-bearings. Figs. 10 and 11 show enlarged detail views of juice-channel and cane-guards to be applied to the lower rolls. Fig. 12 represents an end view of the rolls with a detail vertical cross-section of knife-plate and its supports. Fig. 13 represents a face view of knife-plate and its supports. Figs. 14, 15, 16, 17, and 18 are enlarged individual details of the juice-channel and cane-guards.

Similar letters of reference designate like parts or portions in all the figures.

The letter A designates the usual machine-bed, to which the cheek-pieces or housings for the rolls are attached and upon which they are supported.

B designates the main body of metal and additional parts forming the complete cheek-pieces or housings, to which are attached and contained within itself bottom bearing-boxes *a* and *b* and upper-bearing box *c*, upper cap *d*, removable sidings *e* and *f*—*e* the upper and *f* the lower siding—tie-plate *g* for sidings, side cap *h* for first or leading lower roll, king-bolts *i i*, holding the several portions of cheek-pieces or housings together, and tie-bolts or straps $j\,j^2$ for securing the removable sidings in place.

C designates the first or leading bottom roll, between which and the top roll D the cane passes for a first squeeze by the mill.

E designates a second or following bottom roll, between which and the upper roller D the cane passes for a second squeeze.

F designates a lever operated to raise and lower the bottom bearings to bring the rolls more or less close to the upper roll of the mill. These levers are shown applied only to the bearings of the second or following roll. They may be similarly attached to operate upon the first or leading roll. The levers F are operated upon a fulcrum f' (see Figs. 5 and 6) by means of an adjusting swing bolt and nut f^2, and they act at their shorter end upon projections f^4, extending downward from the bottom of bearing-boxes to raise and lower the same. To relieve these levers F, two of which are preferably used for each bearing-box of the heavy load while the rolls are in use, adjustable wedge-supports G (see Figs. 3 and 4 for large details) are made use of to act as a direct and more wide-spread support for the said bearing-boxes, said wedge-supports being brought up and held in place by means of fixed revolving nuts acting upon attached bolts g' or any of the well-known methods. When two or more of these levers F are placed to act upon a bearing-box, they are connected by a span-piece f^3, and the adjusting swing bolt and nut f^2 is located at its center. (See Figs. 7, 8, and 9.)

A turn-plate or knife H is located immediately beneath the upper roll D and between rolls C and E, with one edge set quite close to the face of roll C to receive the crushed material as it passes from between the rolls C and D and to keep up a continuous compression of the cane against the bottom of roll D while being passed for a second crushing between rolls D and E. The aim is to keep rolls C and E in as close connection and position as possible and to have the plate H narrow, so that the thrust supported by it shall be at a minimum. The narrower the knife-plate is the less will be the total thrust coming upon it.

As a means for supporting and adjusting the turn-plate or knife H in place, a cross-beam

composed of a pair of plates h', grooved into the bottom of turn-plate and into a bottom strip h^2, is made use of. Tie-bolts h^3 are passed through said bottom strip h^2 between the pair of plates h' and screwed into the bottom of turn-plate H. Nuts h^4 are screwed onto the bottom ends of bolts h^3 and the whole held securely together. Again, to the plate opposite to the contact edge of the turn-plate a pair of end swing or bearing boxes I are attached, and these swing or move upon a bearing pin or projection J, attached to the housings or cheek-pieces B. The bottom strip h^2 rests at its end upon lugs h^5. To adjust the contact or position of the knife-plate H with reference to the rolls, special fitting-strips or shim-pieces are inserted between the bottom strip h^2 and the lugs h^5, so that their insertion or removal raises or lowers the turn-plate H, swinging it on its bearing-boxes I and pins J, the contact edge of the turn-plate H having the greatest movement. To permit of an easy entrance of the fitting-strips, the side flange h^6 is made removable.

As a means for controlling the movement of the bagasse over the second bottom roll E after crushing takes place, a pair of segmental stop-pieces K are adjusted and shaped to mate the flanges of the top rolls. The ends of the bottom roll E are turned down to form a neck portion k and end wearing-face k', upon and against which the segmental stop-pieces K are held to wear, as shown in enlarged details in Fig. 10, 11, 14, 15, and 16. The segmental stop-pieces K are also shown in position in Figs. 1 and 2; also, in Figs. 17 and 18 a special method of holding them in place is shown. It being impossible for them to revolve with the protected roll, it is necessary to hold them in a secure position to slide upon the provided neck portion or space k. As specially shown in Figs. 10, 11, 14, 15, and 16, side elastic pressure-brackets k^2 are attached to the cheek-pieces or housings of the mill and act to keep by side pressure the stop-pieces K up against the end wearing-surface k'. To hold them against the neck portion k, one or more elastic radial-pressure brackets k^4 are fastened or attached to the housings or cheek-pieces, their projecting elastic ends being dovetailed or fitted into the upper edge of the stop-piece K. This latter keeps the stop-pieces to a neck-bearing, while the former pieces k^2 keep them up to an end surface bearing. A second method is shown in Figs. 17 and 18. The stop-piece K is kept in position against neck portion k by means of lugs or brackets k^5, attached to the stop-piece, and a similar mating lug or bracket k^6, attached to the housing, check-pieces, or any fixed portion of the mill. A soft and elastic wedge-piece k^7 is forced between the said brackets to hold the stop-piece K in working position against its roll.

To protect the bearings from the cane-juice as it is squeezed from the cane, a circular gutter-ring L is fitted to the ends of the rolls, as shown in Figs. 2, 10, 11, 14, 15, and 18, forming a circular channel or canal M about the roll, into which the juice passes to drop into the receptacle below.

The main work and strain of the mill comes upon the top roll D and on the second bottom roll E. To secure these and render their work as safe as possible, a pair of heavy king-bolts $i\,i$ is located in the housing at a slight angle to the resulting thrust developed in the operation of rolls D and E, but on about the line of mean thrust developed upon the upper roll D when the two bottom rolls are in use. To facilitate the removal of the several rolls, more especially D and E, removable sidings e and f are formed in each housing, the king-bolt on the higher side of cheek-pieces or to the right, as drawn, passing through both of them. To remove the rolls, the king-bolts $i\,i$ are released, the upper one or that to the right, as drawn, is removed and the caps taken off. The tie bolts or straps $j\,j^2$ are also released and the tie-plates g are removed. The loose side pieces e and f may then be taken out, exposing the rolls D and E and their bearing-boxes for easy removal. The cap d holds the upper end of siding e and the tie-strap $j\,j^2$, a detail of which is shown in Fig. 5, holds the lower portion of siding e. Lower siding f is held in position by the lower tie-strap j^2, a detail of which is shown in Fig. 6. The tie-plate g overlies both siding pieces e and f, being held in position by span-pieces j^3 and j^4 and being likewise held in place by small bolts.

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the turn-plate or knife of a cane-mill, a supporting cross-beam extending between the two cheek-pieces, composed of a pair of vertical side plates grooved at their upper edges into said turn-plate or knife and at their lower edges into a bottom strip extending the whole length of the vertical plates, a series of bolts screwing into the bottom of said turn-plate or knife and passing through the said bottom plate, a series of nuts or equivalent devices operating to hold the said bottom plate, the vertical side plates, and the turn-plate securely together, a pair of swing boxes or bearings attached to the upper end portions of said supporting cross-beam, a pair of bearing pins or projections securely attached to each of the cheek-pieces, and a pair of bottom bearing lugs or projections attached to each of the cheek-pieces, substantially as and for the purposes set forth.

2. In combination with the rolls of a cane-mill, a pair of segmental stop-pieces K, adapted to wear against the necked ends of said rolls, and side and radial pressure-brackets k^2 and k^4, as and for the purposes set forth.

JOHN FISHER.

Witnesses:
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JOSEPH A. SPRINGER.