No. 643,022. Patented Feb. 6, 1900.

J. WILSON.

FILTER PRESS.

(Application filed July 3, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig 1

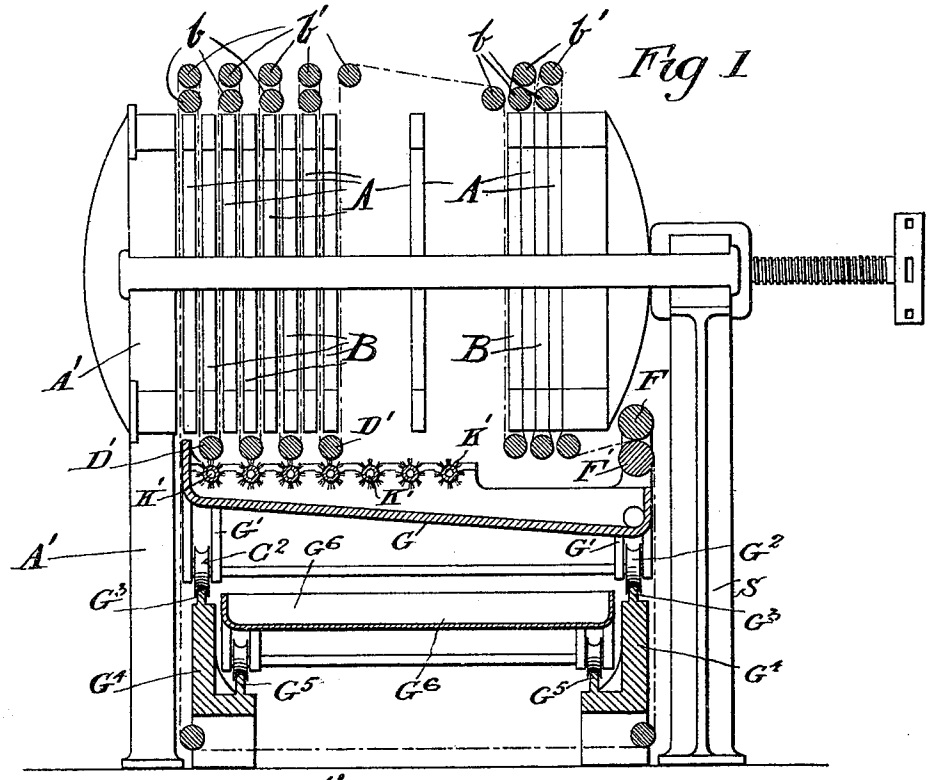


Fig. 2.

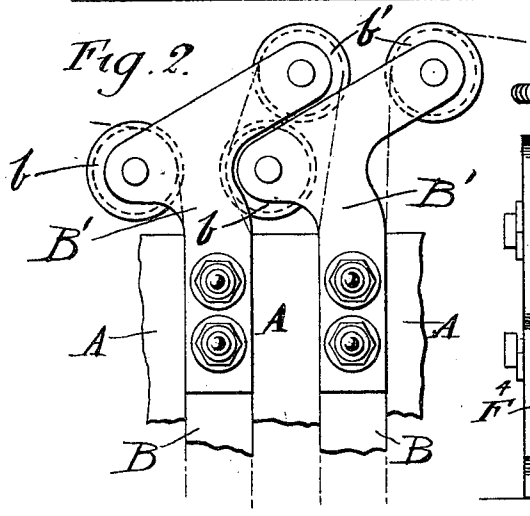


Fig. 3.

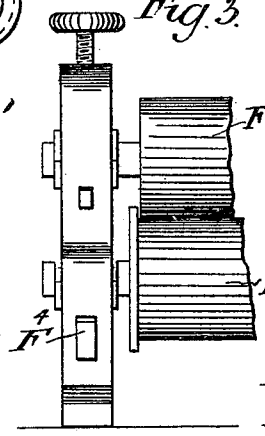
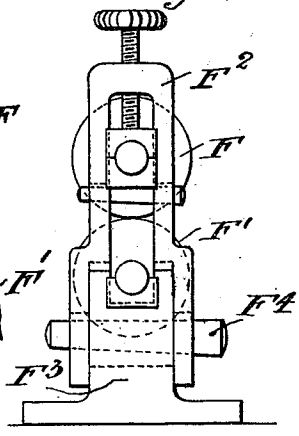


Fig. 4.



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No. 643,022. Patented Feb. 6, 1900.

J. WILSON.

FILTER PRESS.

(Application filed July 3, 1899.)

(No Model.) 2 Sheets—Sheet 2.

Fig 5

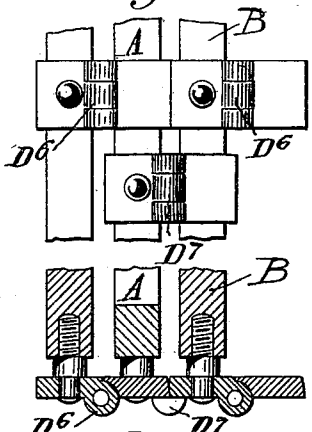


Fig. 6

Fig. 7.

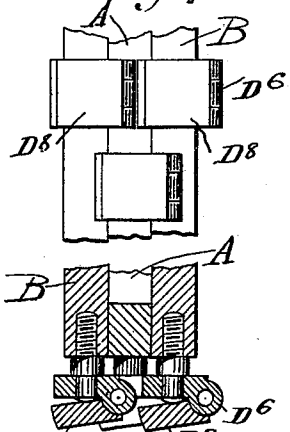
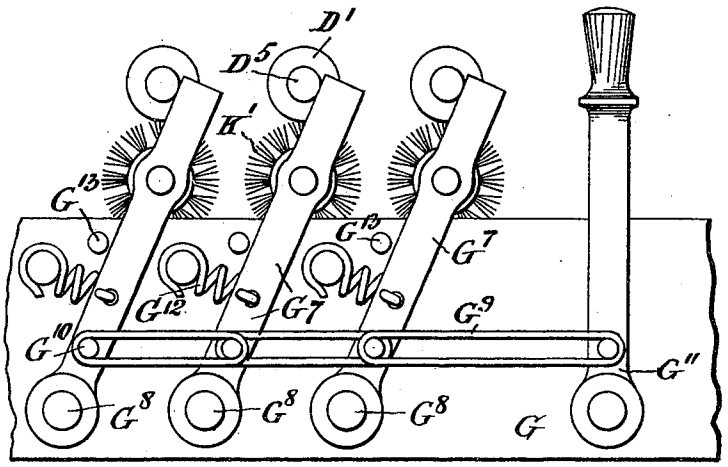


Fig 8

Fig. 9



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UNITED STATES PATENT OFFICE.

JOHN WILSON, OF GLASGOW, SCOTLAND.

FILTER-PRESS.

SPECIFICATION forming part of Letters Patent No. 643,022, dated February 6, 1900.

Application filed July 3, 1899. Serial No. 722,732. (No model.)

To all whom it may concern:

Be it known that I, JOHN WILSON, analytical chemist, of 1 Hill street, Garnethill, in the city of Glasgow, Scotland, have invented certain new and useful Improvements in and Relating to Filter-Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention, which relates to filter-presses and similar filtering apparatus, belongs to that type wherein the filtering medium is composed of cloth and wherein the revolving brushes are used for the periodic cleaning of the filtering-cloth, and, further, where frames are used for the cake in conjunction with plates, and has for its object the provision of means for removing the cake and thereafter cleaning the filtering-cloth aforesaid.

In the accompanying drawings, which illustrate the invention, Figure 1 is a longitudinal elevation, partly in section, of my improved filter-press, showing the arrangement of the rollers upon the plates and the position of the same at a particular stage of the cleaning operations. Fig. 2 is an enlarged detail view representing in side elevation the positions of the rollers carried upon the top of the plates when the filter-press is closed up. Fig. 3 represents a fragmentary view in elevation of the nipping-rollers and their bearings. Fig. 4 represents a view in elevation of the parts shown in Fig. 3, as seen from the left in said figure. Fig. 5 represents a fragmentary view, in side elevation, of portions of the plates and frames, showing the hinged distance-pieces thereon, said hinged pieces being shown as open. Fig. 6 is a horizontal sectional view of the parts shown in Fig. 5. Fig. 7 is a view similar to Fig. 5, showing the distance-pieces as closed. Fig. 8 is a horizontal sectional view of the parts in their positions shown in Fig. 7; and Fig. 9 is a fragmentary side elevation of the bed-plate of the machine, showing the manner of mounting and operating the brushes.

In the arrangement shown in Fig. 1 the frames A have all been emptied of their contents and the plates B and frames A are in course of being brought into position for the brushing of the cloths. One frame A is shown midway between two plates B B as illustrating the method of isolating the frames when knocking out the cake. The rollers upon the plates, the revolving brushes, with the bed-plate upon which they rest, the receptacle for the cake, and the two cross-rails are shown in section in order that the invention may be better understood from the description.

The general course of the filter-cloth, which is formed of an endless band, is vertically up and down zigzagwise between the plates B and frames A of the filter-press; but for the purpose of guiding the same instead of affixing one roller to the top of each frame I attach a pair of brackets B′, each carrying two rollers *b b′*, to the top of each plate B, as shown to an enlarged scale in Fig. 2, which view represents the positions of the rollers *b b′* when the filter-press is closed up.

As will be seen in Fig. 2, the brackets B′ are formed so as to carry the rollers *b b′* in different horizontal as well as different vertical planes, the axis of the roller *b* of each plate being in a vertical plane parallel to and a short distance from the one face of the said plate, and the axis of the roller *b′* of the same plate being in a vertical plane parallel to and a short distance from the other face of the said plate, and the roller *b* on the one plate B being so set as to pass beneath the roller *b′* of the adjacent plate. By this arrangement the filtering-cloth passes over the upper set of rollers *b′* above the frames A when the press is closed up, the lower set of rollers *b* interlocking beneath, but not contacting with the said rollers *b′*, and being inclosed within the bights or loops formed in the filtering-cloth by the said rollers *b′*. When the plates B are drawn apart, as when the cake is to be removed from the press, the upper roller *b′* on one plate and the lower roller *b* on the adjacent plate, both inclosed within the same loop of the filter-cloth, will stretch the loop to a width equal to the distance of the separation of the plates B B, thus leaving the intermediate frame A perfectly free, as will be

seen in Fig. 1, where two of the plates B have been drawn apart and the loop in the filtering-cloth so stretched.

The bed-plate G is formed independently of the front head A′ and the back gauntrees S and is provided with suitable depending projections or brackets G′, which rest upon the pulleys G^2. The said pulleys run upon rails G^3, forming part of the inner frames G^4. The said inner frames G^4 are fixed in such a position that the brushes K′ come into proper contact with the bottom rollers D′. The inner frames G^4 also embody two inner rails G^5, upon which runs a bogie or receptacle G^6. The purpose of this bogie is to hold all the solid matter contained within the frames of the press and which must first be removed before the brushing operations commence.

When it is desired to remove the cake, the bed-plate G, with the brushes K′, is moved from below and the bogie G^6 is exposed and, as shown, is in its position to receive the cake.

The inner frames G^4 may project to any necessary distance on either side of the press and beneath any number of presses when the use of such is found expedient, by which device one set of brushes and one cake-receptacle only may be found necessary.

In cases where it is permissible to erect the press at a sufficient height the bogie or receptacle G^6 would not be required.

As it would be undesirable to cut or disconnect the filtering-cloth at any time, the nipping-rollers F F′ are so fixed within their bearings that the upper one can be readily removed and replaced. Figs. 3 and 4 show one method of doing this. The block-frames F^2, holding the upper roller F, are made in the form of straps to embrace the lower block-frames F^3. Provision is made for the accommodation of the keys F^4, which is such that the upper block-frame is firmly attached to the lower block-frame. As these keys are readily removed, the two rollers are thereby easily separated. I do not confine myself, however, to this or to any other particular method of attaining the same object.

In order to insure the brushes coming into full contact with the cloth while passing over the rollers D′, I have the shafts upon which the brushes are mounted attached to short arms hinged at the bottom of the bed-plate. Fig. 9 illustrates this method of mounting the brushes, G being the bed-plate. Instead of fixing the brushes K′ solidly thereto I have them swinging in the arms G^7, pivoted at G^8. These arms are connected by the links G^9, working outside the pins or studs G^{10}, which are attached to the arms G^7. By these means the handle G^{11} can simultaneously throw all the brushes K′ out of gear and so enable them to travel freely below one or a series of presses.

The springs G^{12} are provided for drawing the brushes into contact with the filtering medium or cloth traveling over the rollers D′; but the brushes are prevented from pressing harder than is necessary. The spindle D^5 of the rollers D′ projects a sufficient distance to prevent the arm G^7 from being drawn by the spring G^{12} too near to the said rollers. Pins G^{13} are provided to counteract the effect of the spring when the bed-plate G is withdrawn from beneath the press. To make allowance for the variations of the position of the brushes, the driving-belts between the pulleys K^2 would preferably be made of india-rubber.

As it is desirable that the plates or plates and frames be equidistant from each other while the cloth is being wound through them and the brushes are revolving, I attach to each plate or each plate and frame two or more distance-pieces formed with a knuckle-joint to make allowance for the condition of the press whether it be opened or closed.

Figs. 5 and 6 represent the plates and frames when opened out, and Figs. 7 and 8 represent the same closed.

At convenient parts of the edges of the plates or frames are fixed hinged members D^6, jointed at D^7. The movable part or flap D^8 is made of such a length that when it meets the butt-end of its adjacent member it keeps the plates or plates and frames apart the required distance while the filtering-cloth is drawn through the filter-press by the nipping-rollers F F′. The movable part of these members D^8 can readily be withdrawn when necessary to close up the filter-press. I do not, however, confine myself to this or to any other particular form of attaining this end.

I claim—

1. In a filter-press wherein the deposit formed consists of a cake the combination of two rollers to the top and one at the bottom of each plate for carrying the filtering-cloth, the detachable nipping-rollers whereby the filtering-cloth can be taken out of the press, means for keeping the plates or plates and frames the requisite distance apart while the filtering-cloth is drawn through the press and the means of throwing the cleansing-brushes in and out of contact with the filtering-cloth substantially as described and shown on the accompanying drawings.

2. In a filter press or presses wherein the deposit formed consists of a cake the combination of a movable bed-plate provided with pulleys which run upon rails, means employed for carrying the cleansing-brushes which are arranged to be brought into operation in either a single or multiple press, and a bogie mounted on wheels which run upon rails placed beneath the said bed-plate for receiving the cake as it is discharged from the press or presses substantially as described and shown on the accompanying drawings.

3. In a filter-press wherein the deposit formed consists of a cake, the combination with the frames; of plates each carrying a

pair of rollers at its top and a single roller at its bottom, over which rollers passes the filter-cloth, said rollers being in different vertical planes, substantially as described.

4. In a filter-press wherein the deposit formed consists of a cake, the combination with the frames; of plates each carrying at its upper end a pair of rollers in different vertical and horizontal planes and carrying at its bottom a single roller, over which rollers passes the filtering-cloth, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN WILSON.

Witnesses:

JOSEPH HENRY PEARSON,

ROBERT JOHNSTON.