

Nov. 20, 1928.

1,692,112

H. G. CRAM

METHOD AND APPARATUS FOR HANDLING BROKE

Filed Feb. 18, 1927

2 Sheets-Sheet 1

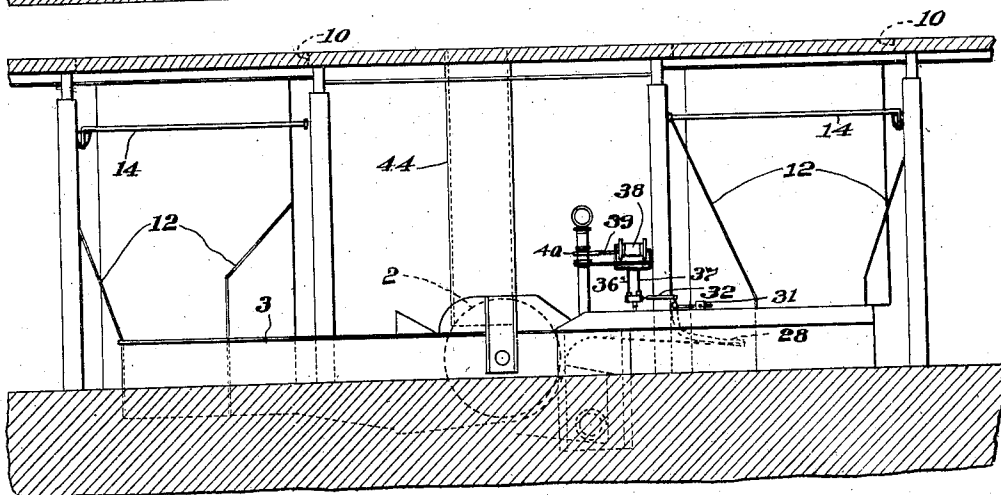
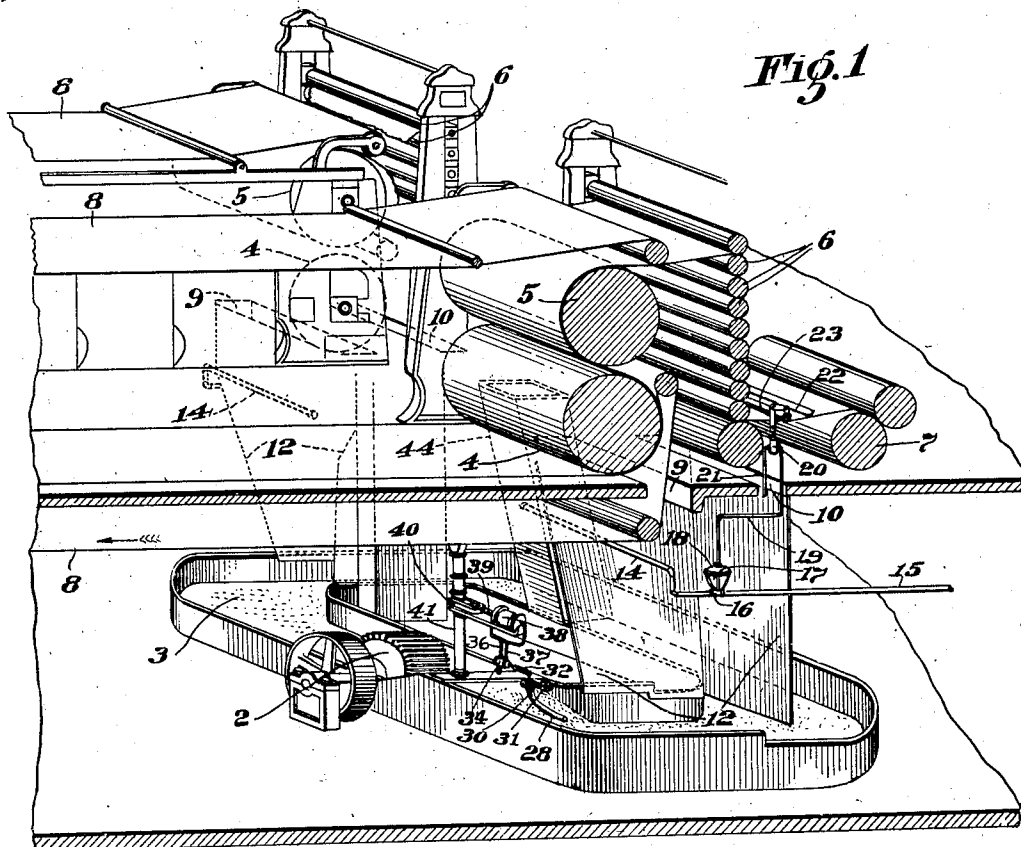


Fig. 2

INVENTOR:

Henry G. Cram,

BY *W. M. Cram*

ATTORNEY

Nov. 20, 1928.

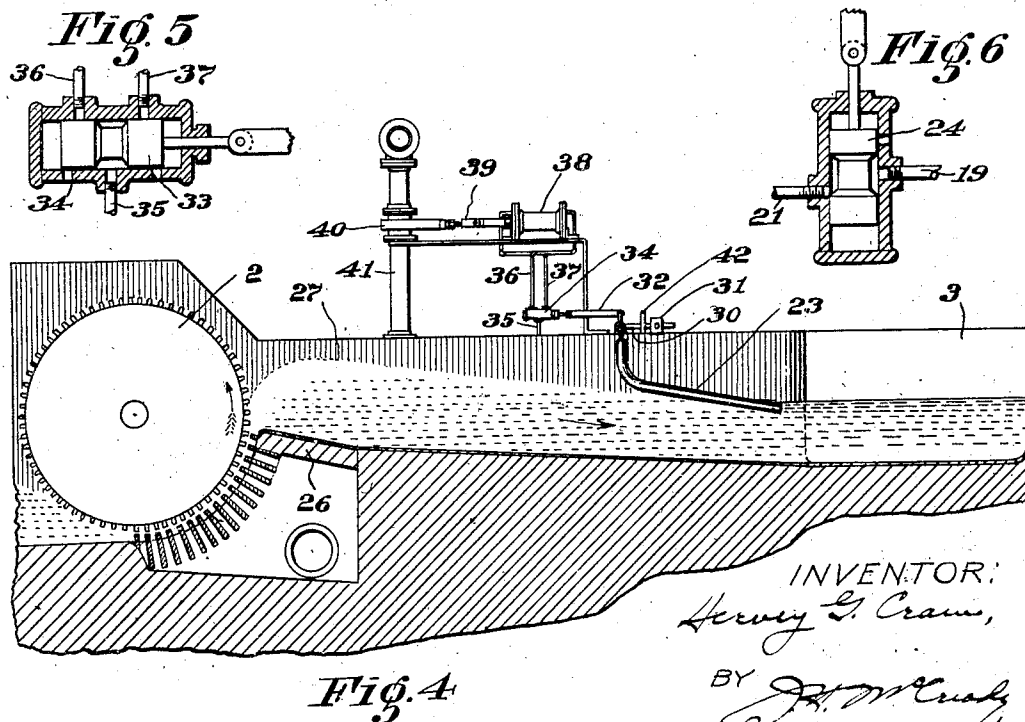
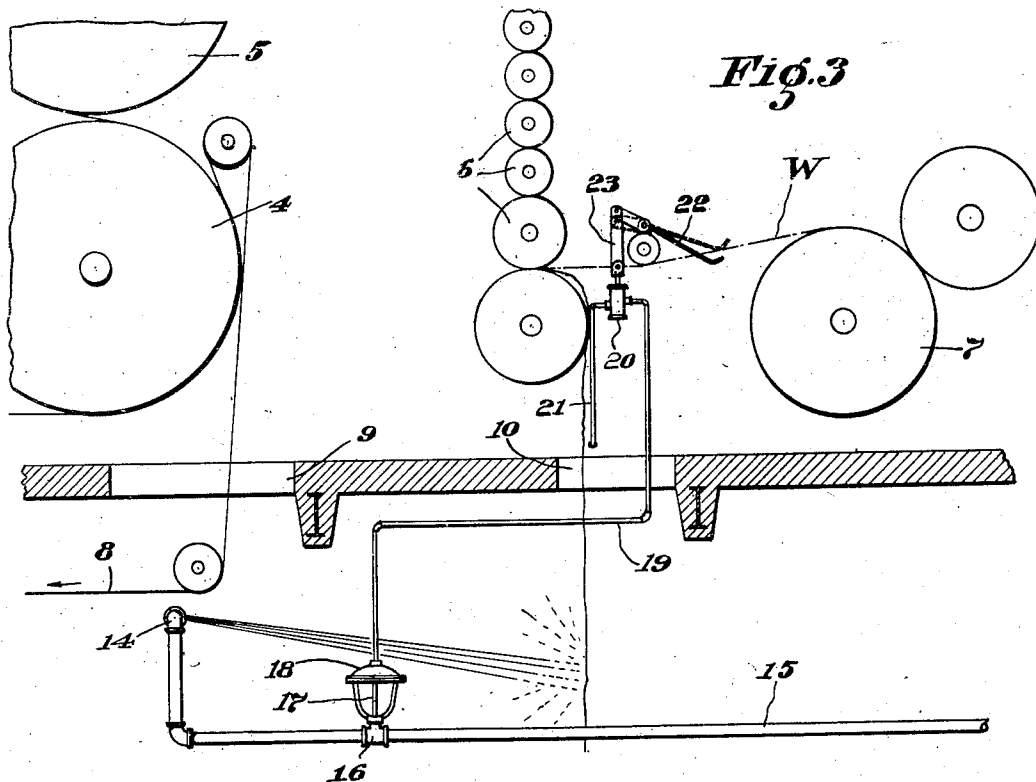
1,692,112

H. G. CRAM

METHOD AND APPARATUS FOR HANDLING BROKE

Filed Feb. 18, 1927

2 Sheets-Sheet 2



INVENTOR:

Hervey G. Cram,

BY *J. M. Crady*
his ATTORNEY

The ATTORNEY

UNITED STATES PATENT OFFICE.

HERVEY G. CRAM, OF MILLINOCKET, MAINE, ASSIGNOR TO GREAT NORTHERN PAPER COMPANY, OF MILLINOCKET, MAINE, A CORPORATION OF MAINE.

METHOD AND APPARATUS FOR HANDLING BROKE.

Application filed February 18, 1927. Serial No. 169,360.

The scrap or imperfect paper produced in a paper making machine is commonly referred to as "broke". The present invention relates to the handling of this material.

5 It has been a common custom heretofore to allow the broke to accumulate and then to feed it manually into one of the beaters where it is again reduced to a suitable consistency to be fed back to the wire of the paper machine. The present invention aims to handle 10 this material more expeditiously and more economically. It is a particular object of the invention to reduce the labor involved in handling broke, and to devise automatic 15 means for taking this material directly from a paper machine and converting it again into paper stock suitable for re-delivery to the paper making wire.

20 The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

25 In the drawings,

Figure 1 is a perspective view showing an organization of apparatus embodying this invention;

30 Fig. 2 is a vertical cross-sectional view showing certain features of the apparatus shown in Fig. 1;

Fig. 3 is a diagrammatic view illustrating the automatic control for the spraying or wetting mechanism shown in Fig. 1;

35 Fig. 4 is a cross-sectional view, somewhat diagrammatic, showing a consistency regulator embodying certain features of this invention; and

40 Figs. 5 and 6 are cross-sectional views of the pilot valve shown, respectively, in Figs. 4 and 3.

Referring first to Figs. 1 and 2, the apparatus there shown comprises a beater of a type commonly used in paper making, the beater roll being shown at 2, and the trough in which the roll is mounted and in which the stock circulates being indicated at 3. This beater is mounted on the floor below the paper machines, portions of two such machines being shown in the drawings. The drying drums for these machines are indicated at 4 and 5, the calender stacks at 6—6, one of the reels at 7, and the felts at 8—8.

An important feature of this invention re-

55 sides in means for conducting broke directly from the paper machines to the beater. For this purpose the beater and machines preferably, although not necessarily, are located substantially in the relationship shown with the calender stacks immediately above the curved 60 portions of the beater trough. Slots 9—9 are cut through the floor between the drying drums and the calender stacks, while additional slots 10—10 are formed through the floor between the calender stacks and the reels. 65 Chutes or guides 12—12 are arranged to conduct broke passing downwardly through either of the slots 9 or 10 directly into the beater trough.

When the broke is dry it tends to "balloon" 70 and is difficult to handle. According to the present invention, therefore, means is provided to wet the broke on its way to the beater. As shown, this means consists of spray pipes 14—14 extending across the 75 chutes 12—12 at one side thereof where they can direct a strong spray of water on the paper as it comes down through either chute 9 or 10.

80 In starting up the machines after they have been shut down, it is necessary to run several minutes before the machine will produce a perfect web of paper of full width. This imperfect web comes through the machine and is allowed to feed down through one of the 85 slots in the floor into the guides or chutes 12—12 and into the beater. As soon as a perfect web begins to come through, the reeling is begun. Thereafter if the paper should break either between the drying drums and the calender stack or between the calender 90 stack and the reel, the forward broken edge of the web will drop through one of the slots 9 or 10, depending upon the position of the break, and will be fed into the beater as above 95 described. It will be observed that the paper machines and the beater are so positioned with reference to each other that the web of paper feeds into the beater with the width of the web disposed lengthwise of the beater 100 trough.

105 In order to control the delivery of water to the wetting apparatus or spray pipes, the invention provides an automatic mechanism which is under the control of the web of paper travelling through the machine. This mechanism is best shown in Fig. 3. It will be observed that the flow of water through the sup-

ply pipe 15 to the spray pipe 14 is controlled by a valve 16. Preferably this valve is of the type in which the plunger or movable element is unbalanced so that it will be opened by the pressure of the water in the supply pipe 15. The valve stem 17, however, is connected with a diaphragm (not shown) mounted in the casing 18 and on which sufficient air pressure normally is maintained to keep the valve closed. Air is conducted to this casing through a pipe line 19 which leads to a pilot valve 20, an air supply line 21 also being connected to this valve. (See Figs. 3 and 6).

A feeler or rider plate 22 normally rests on the web of paper W and is connected by a link 23 to the stem of the valve plunger 24 so that the feeler normally holds the valve in approximately the position shown in Fig. 6 with the full pressure of the air line on the diaphragm in the casing 18, the valve 16 at this time being held closed. If, however, the web of paper should break, thus releasing the feeler 22, it would immediately drop, thereby moving the valve plunger 24 sufficiently to cut off the air pressure from the pipe 16 and connect this pipe line with the atmosphere. The air pressure on the diaphragm thus being released, the water pressure in the pipe 17 immediately opens the valve 16 and produces a spray from the pipe 14 which continues until the feeler is again re-set in its normal or running position. Even if the break occurs between the drying drums and the calender stack, the trailing end of the paper will shortly feed through the calender stack to the reel and release the feeler 22.

It will be noted that the delivery of broke to the beater will necessarily be intermittent and that it will result in increasing the consistency of the stock in the beater. It is necessary, therefore, to deliver additional water to the beater to compensate for this increase in consistency. The present invention provides a mechanism for automatically regulating the consistency. Referring to Fig. 4 it will be observed that the beater roll 2 discharges the stock over an overflow dam 26, and that the stock then flows down an incline in the direction indicated by the arrow. This is the usual arrangement in a continuous beater of this type. I have discovered that when the consistency of the stock increases, there is an appreciable change in the level of the stock in this inclined portion of the stream flowing through the trough 3. That is, the stock rises to a higher head at the point 27 on the discharge side of the beater when the consistency is increased, and the slope of the stream as it flows along the down stream side of the dam is modified.

Accordingly, the regulating apparatus provided by this invention comprises a stock contacting member which is responsive to this change in the stream and means under the control of this member for regulating the de-

livery of water to the beater. A convenient form of stock contacting member consists of a hose 28, as for example, an ordinary two inch hose with the end in contact with the stock closed or plugged. The opposite end of this hose is connected to one arm of a bell crank lever 30 carrying a counter weight 31 and connected by a link 32 to the plunger 33, Fig. 5, of a pilot valve 34. A water pressure line leads to this valve at 35, while right and left pipes 36 and 37 lead from this valve to the opposite ends of a cylinder 38. The piston in this cylinder is connected to the plunger 39 of a gate valve 40 of an ordinary type, this valve being mounted in a pipe line 41 leading from a suitable water supply to any desired point of discharge in the beater trough.

It will be evident that the position of the hose or float arm 28 will depend partly upon the level of the stock with which it is in contact, and partly on the drag of the stock against this member. As the consistency increases the float arm 28 will be raised somewhat, thus rocking the bell crank lever 30 in a counter-clockwise direction, Fig. 4, and thereby pushing the plunger 33 of the pilot valve 34 toward the left, Fig. 5. This will admit water under pressure to the left-hand end of the cylinder 38, thus pushing the piston therein toward the right and opening the gate valve 40, whereupon water will flow through the pipe 41 into the beater. This addition of water tends to correct the change in consistency which caused the opening of the valve.

As the consistency of the stock decreases, the float arm 28 will drop slightly, thus rocking the bell crank lever 30 in the opposite direction and hence moving the pilot valve plunger 33 toward the right where it admits water to the right-hand end of the cylinder 38 and allows the water from the opposite end of the cylinder to escape, thus closing the gate valve 40. This mechanism, therefore, automatically responds to changes in consistency of the stock and causes such changes to regulate the delivery of water to the beater in a manner that compensates for, or corrects, the variations in consistency.

In order to prevent any excessive movement of the bell crank lever 30, due, for example, to a wad of material coming in contact with the float arm 28, I prefer to use a stop 42 to limit the movement of this lever. This stop may consist simply of a U-bolt through which the lever passes. A chute 44 is provided between the machines into which miscellaneous broke, such as end trimmings and the like, may be placed, the chute guiding this material down into the beater.

It will now be appreciated that the invention provides a very economical method and a relatively simple apparatus for automatically handling broke. Due to the fact that the broke is wet down on its way to the beater,

it settles easily down into the beater and the difficulties which otherwise would be encountered in handling the material are avoided. At the same time the consistency of the stock in the beater is automatically maintained within allowable limits.

It will be understood that the present disclosure of the invention is made rather by way of illustration than limitation, and that the invention may be embodied in many other forms without departing from the spirit or scope thereof. For example, other forms of remote control may be substituted for the pilot valve and fluid pressure mechanisms shown, and other consistency regulators may be used. These, and various other changes, may be made within the spirit and scope of the invention.

The consistency regulator disclosed in this application is not claimed here but is claimed in a divisional application Serial No. 254,697, filed February 16, 1928.

Having thus described my invention, what I desire to claim as new is:

1. The combination of a paper machine, a beater, means for conducting broke from said machine to the beater, means for wetting the broke on its way to the beater, and mechanism for automatically controlling the operation of said wetting means in accordance with the delivery of broke to the beater.

2. The combination of a paper machine, guiding means for conducting broke away from said machine, means for directing water on to the broke to wet it, a valve controlling the flow of water to said wetting means, and operating means for said valve under the control of the web of paper travelling through said machine.

3. The combination of a paper machine, guiding means for conducting broke away from said machine, means for directing water on to the broke to wet it, a valve controlling the flow of water to said wetting means, and operating means for said valve including a feeler for engaging the web of paper travelling through said machine and normally held under restraint by said web but operative when released by the paper to cause the opening of the valve.

4. The combination of a paper machine, a beater located below said machine, means for guiding broke from said machine downwardly into the beater, means for wetting the broke on its way to the beater, a feeler for engaging the web of paper travelling through said machine, said feeler normally being held under restraint by said web, a pilot valve connected with said feeler to be operated thereby, a main valve for controlling the flow of water to said wetting means, and operating mecha-

nism for said main valve under the control of said pilot valve.

5. That improvement in methods of handling broke in paper machines which consists in conducting broke from the machine into a beater, wetting the broke on its way to the beater, and causing the broke to control the supply thereto of wetting liquid.

6. That improvement in methods of handling broke in paper machines which consists in conducting broke from the machine into a beater whereby the consistency of the stock in the beater is increased, and causing variations in consistency of said stock to control the introduction of water to the beater to correct such variations.

7. The combination of a paper machine, a beater located below said machine, guides for directing broke by gravity from said machine into the beater, and means located at one side of the path of travel of the broke toward the beater for directing a spray of liquid against the broke, the broke remaining in substantially the condition in which it issues from the machine except for the action of the spray.

8. The combination of a paper machine, a beater arranged directly beneath said machine, a passage through which the broke from the paper machine may descend by gravity substantially vertically into the beater, and means for spraying said broke with water during its travel downwardly to the beater.

9. The combination of a paper machine, a beater located below said machine, and parts providing a passageway for the travel of broke by gravity from said machine into said beater, said machine and beater being arranged to cause the web of broke to feed into the beater with the width of said web extending lengthwise of the beater trough.

10. The combination of a plurality of paper machines, a beater located below said machines, and parts providing passageways through which the broke discharged from said machines can move by gravity into the beater, said machines and beater being positioned to cause the webs of broke to enter the beater with the width of each web disposed lengthwise of the beater trough.

11. The combination of a paper machine, a beater located directly below said machine, an unobstructed passage through which the broke from said machine may descend by gravity into the beater, means for directing a spray of liquid against the broke as it moves toward the beater, and means for automatically cutting off the spray when the broke is not feeding toward the beater.

HERVEY G. CRAM.