July 1, 1930. C. F. RHODES 1,769,308

WHITE WATER SAMPLER FOR PAPER MAKING MACHINES

Filed Aug. 10, 1928 2 Sheets-Sheet 1

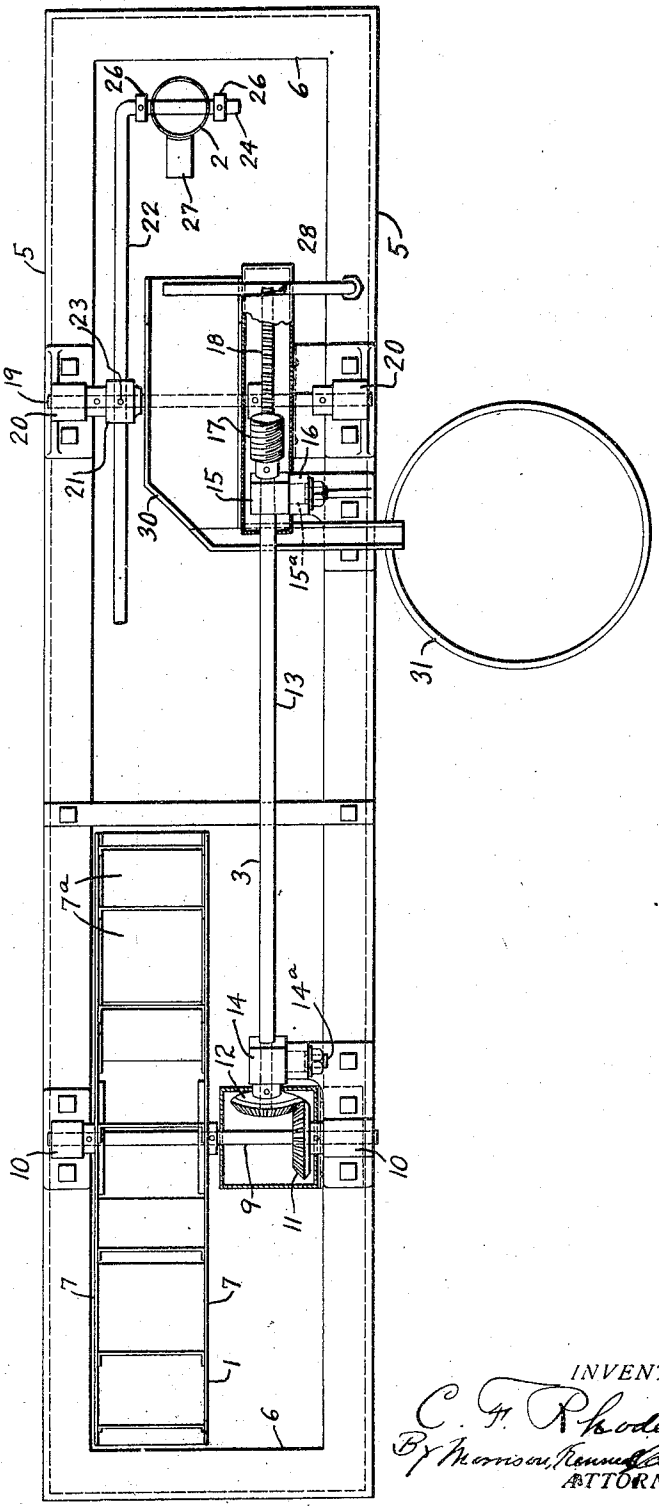


Fig. 1.

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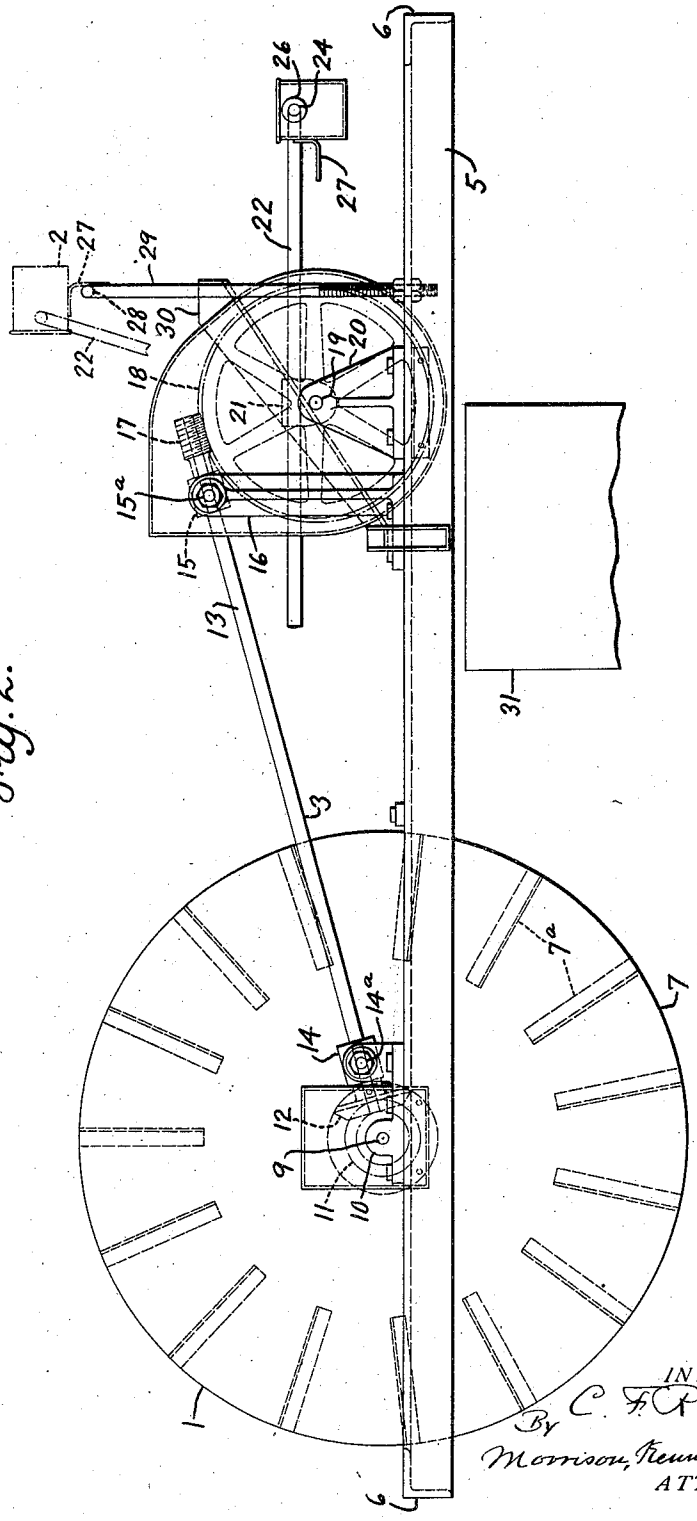


Fig. 2.

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UNITED STATES PATENT OFFICE

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WHITE-WATER SAMPLER FOR PAPER-MAKING MACHINES

Application filed August 10, 1928. Serial No. 298,823.

This invention relates to what are known as automatic samplers for taking at periodic intervals, uniform quantities or samples of a substance or material, which samples on being mixed together, will give an average of the quality and condition of the material for a given period of time.

The invention has reference more particularly to an automatic sampler designed for use in connection with paper making machines for taking samples of the so-called "white water" which usually flows from the paper making machine through a weir or conductor to waste, it being very desirable for the proper and economic operation of the paper machine that the attendant be informed as to the nature and amount of the constituents, such as clay, pulp, fiber, etc., etc., that is passing away from the machine in the white water, to the end that the proper steps may be taken in the preparation and handling of the stock and in the adjustment and operation of the machine to prevent undue waste.

In accordance with the present invention, a mechanism of simple form and efficient construction and operation is provided which is adapted to be placed in operative relation to the white water weir of a paper making machine, so that said mechanism may be operated, preferably by the flow of said water, to automatically take uniform quantities or samples of the same periodically, which samples on being mixed together, will give an average of the condition of the water coming from the machine for a given period; and in the specification to follow, the said mechanism will be described in detail, and the novel features thereof will be set forth in the appended claims.

In the accompanying drawings:

Figure 1 is a top plan view of the improved machine; and

Fig. 2 is a side elevation of the same.

Referring to the drawings:

The machine comprises as its main elements, a driving member 1, adapted in the present case to be operated by the flow of the white water, a sampling member or dipper 2 movable down into the flowing water to take a sample thereof, and then upwardly to elevate the sample so that the successive samples can be mixed together, and suitable power transmitting connections 3 between the driving member and dipper to impart to the latter its periodic dipping motions. These parts are mounted in and sustained by a suitable rectangular open frame comprising longitudinal side frame bars 5 and transverse end connecting frame bars 6.

The driving member 1 is, in the present instance, in the form of a water wheel consisting of two spaced circular side walls or discs 7 and a series of radial paddles 7ª fixed to and extending between said walls adjacent the peripheries of the same, which water wheel is fixed to a horizontal transverse driving shaft 9 rotatably mounted at its opposite ends in bearings 10 sustained by the side frame bars near one end thereof. The form and arrangement of these parts is such that when the frame is set in position over the weir through which the white water flows from the paper making machine, the water wheel will be immersed at its lower side a sufficient distance in the flowing water to be rotated thereby. Near one end the driving shaft has fixed to it a bevelled pinion 11 meshing with a bevelled gear 12 on the end of a longitudinally extending power transmitting shaft 13, which shaft is operatively connected at its opposite end to the dipper 2 in the manner presently to be described in detail, to operate the same.

The shaft 13 is mounted adjacent the bevelled pinion 12 in a bearing 14 movably sustained to rock on a horizontal transverse pivot bolt 14ª supported in a bracket plate fixed to the side of the longitudinal frame bar, from which point the shaft extends at an upward inclination, as shown in Fig. 2, and is journalled at its opposite end in a similar bearing 15 mounted to rock on a horizontal pivot bolt 15ª on the upper end of a standard 16 extending upwardly from said frame bar. The shaft 13 extends a short distance beyond the bearing 15 and has fixed to its end a worm 17 which engages a worm wheel 18 on a horizontal transverse driven shaft 19 mounted in suitable bearings 20 on the two longitudinal frame bars 5.

It will be understood that due to the con-

struction and arrangement of the parts described, the rotary motion imparted to the driving shaft by the water wheel, will be transmitted to the driven shaft at reduced speed, so that in the relative rapid motion of the water wheel, the driven shaft will be very slowly rotated, in order to cause the sampling member to dip into the water at the proper periodic intervals.

The driven shaft 19 has fixed to it a collar 21 having a hole through it in which extends a rod 22 held fixed in place in the collar by a pin 23, and extending at right angles to the shaft, which rod constitutes a carrier for the dipper 2 before referred to, and which carrier in the rotation of the driven shaft will be revolved in a vertical plane about the axis of the shaft. The dipper 2 is in the present instance in the form of a cup provided near its upper end at diametrically opposite points with alined bearing holes in which is loosely mounted a lateral journal arm 24 on the end of the rod 22, whereby the cup is supported by the carrier so that it may rock relatively thereto about an axis parallel with the driven shaft, collars 26 being fixed to the journal arm 24 on opposite sides of the cup to confine the same thereon.

In the revolution of the cup by the rotation of the driven shaft, it will by gravity assume an upright receiving position, as shown in Fig. 2, and when revolved in the direction of the arrow in said figure, the cup will be carried downwardly and will be immersed in the stream of white water flowing through the weir beneath, and becoming filled with the white water, it will be elevated by the continued movement of the carrier.

Means are provided for causing the automatic discharge of the contents of the cup when elevated, so that the successive samples of water taken from the stream in the successive cycles of operation of the cup, may be mixed together. To accomplish this object, the cup has fixed to it on one side, a finger 27 in position to engage a fixed stop arm 28 projecting laterally from a rod 29 extending upwardly from the side bar 5 of the frame, the said stop arm being arranged in the path of movement of the cup as it is carried upwardly and reaches the highest point of its travel. When the finger engages said stop arm, the continued movement of the cup by its carrier will cause the cup to rock on its journal on the carrier to discharging position, as shown by dotted lines in Fig. 1, whereby the contents of the cup will be discharged into a trough 30 on the frame leading to a suitable receptacle or pail 31 supported at the side of the frame. As the cup continues on its way, the finger will be disengaged from the stop arm, whereupon the cup will right itself by gravity, ready to receive another charge of water as it is again lowered to the flowing stream.

From the foregoing description, it will be observed that the dipper is coordinated in its movements relative to the water wheel in such manner that the dipper will be caused to take uniform and definite quantities or samples of the water at definite intervals relative to the rotation of the water wheel, and as the latter is driven by the flow of water in the weir, the speed of the wheel is proportional to the speed of the flowing water and will vary as said flow varies, consequently, the periods between the dipping actions will likewise vary. In this way, the samples collected for a given period, say 24 hours, will give a very accurate average of the quality and condition of white water covering that period, which will be analyzed as usual to give the necessary information to the attendant to enable him to control the condition of the stock, and the operation of the paper making machine under the most desirable and economical conditions.

While the invention has been described with particular reference to its employment in taking samples of the white water flowing from paper making machines, it is not intended that the invention be limited to such use, as it is applicable as well for taking samples of other materials used in the operation of the paper making machine, for instance the screen rejections, and the invention is applicable also for taking samples of other materials in other connections.

In the use of the device in connection with paper making machines, it is perhaps preferable to operate the driving member or water wheel by the flow of the liquid to be sampled, so that the samples will be taken in frequency, dependent upon the rate of said flow. But good results can be obtained by operating the driving member by means independent of the material to be sampled, since the water wheel can be supported free of said material and operated by a water jet impinging upon the wheel, or by other independent means.

In the foregoing description and accompanying drawings, the invention has been set forth in the particular detailed form and arrangement of the parts which in practice have been found to answer to a satisfactory degree the ends to be attained. It will be understood, however, that these details may be variously changed and modified by the skilled mechanic without departing from the limits of the invention; and further it will be understood that the invention is not limited to any particular form or construction of parts, except in so far as such limitations are specified in the claims.

Having thus described my invention, what I claim is:

1. In a sampler for use in connection with paper making machines, the combination of

a driving member adapted to be operated by the flow of liquid material to be sampled, and means operated by said driving member for taking uniform samples of said liquid at periodic intervals which vary directly as the rate of flow of the same varies.

2. In a sampler for use in connection with paper making machines, the combination of a driving member adapted to be operated by the flow of liquid material to be sampled, a dipper movable periodically to take samples of the flowing material, and connections between the driving member and dipper to impart the periodic movements to the latter.

3. In a white water sampler, the combination of a driving member adapted to be operated by the flow of white water, a dipper movable periodically to take samples of said water, and transmitting gearing between the driving member and dipper to impart the periodic movements to the latter.

4. In a sampler for materials, the combination of a driving member, a dipper to take samples of the material, an up and down movable carrier on which said dipper is mounted to shift relatively thereto from receiving to discharging position, means whereby the carrier is operated by the driving member to lower the dipper to the water to take a sample thereof and then elevate the same, and means controlled by the movement of the carrier to shift the dipper relatively thereto to discharge said sample.

5. In a sampler for materials, the combination of a driving member, a carrier rotated by said driving member, a dipper rockable on said carrier from receiving to discharging position, and adapted in the rotation of the carrier to be moved down to take a sample of the material and then elevate the same, and a fixed stop in the path of the dipper and serving, when engaged by the dipper, to rock the same on its carrier to discharge said sample.

6. In a sampler for materials, the combination of a driving member, a rotary carrier operated by said driving member, a dipper rockable on said carrier from receiving to discharging position, and adapted in the rotation of the carrier to be moved down to take a sample of the material and then up to elevate the same, and a fixed stop in position to be engaged by the dipper in its elevated position and serving to rock the dipper to discharging position.

7. In a sampler, the combination of a horizontal rotary driving shaft, a water wheel thereon, a horizontal rotary driven shaft parallel to the driving shaft, a worm wheel on the driven shaft, a longitudinally extending transmitting shaft geared at one end to said driving shaft and having a worm on its other end meshing with the worm wheel, and a dipper revolved by the driven shaft.

8. In a sampler, the combination of a horizontal rotary driving shaft, a water wheel thereon, a horizontal driven shaft parallel to the driving shaft, a worm wheel thereon, a bevelled pinion on the driving shaft, a longitudinally extending transmitting shaft, a bevelled gear on one end of said transmitting shaft meshing with the said bevelled pinion, a worm on the other end of the transmitting shaft engaging said worm wheel, a carrier rotated by the driven shaft, a dipper pivoted to the carrier to rock from receiving to discharging position, and a stop in position to be engaged by the dipper to move it to discharging position.

9. In a sampler, the combination of a supporting frame, a horizontal driving shaft mounted in bearings on said frame, a water wheel on said shaft, a bevelled pinion on said shaft, rockable bearings sustained by said frame, a longitudinally extending transmitting shaft rotatable in said roackable bearings and geared at one end to the driving shaft, a horizontal rotatable driven shaft mounted in bearings on the frame and geared to said transmitting shaft, and a dipper operated by said driven shaft to move down to the water to take a sample and then upwardly to elevate said sample.

10. In a sampler for materials, the combination of a supporting frame, a driving member rotatably mounted in said frame, a dipper revolubly mounted in the frame at a point distant from the driving member and movable downwardly to the material to be sampled and upwardly to elevate a sample thereof, a power transmitting shaft extending transversely of the axis of the driving member from the latter to the dipper, gearing operatively connecting the driving member to the shaft to rotate the latter, and gearing operatively connecting the shaft at its opposite end with the dipper to revolve the latter.

11. In a sampler, the combination of an elongated portable supporting frame formed with side bars spaced from each other to leave an opening in the frame, a water wheel rotatably mounted on said side bars and projecting down through said opening, a dipper supported by said side bars and movable down through said opening to take samples of the material, and movable upwardly to elevate said samples, and operative connections between the water wheel and dipper to operate the latter; whereby by placing the frame over a stream of the material to be sampled, the water wheel will be immersed in said stream, and the dipper will be enabled to enter the stream in its dipping actions.

In testimony whereof, I have affixed my signature hereto.

CHARLES F. RHODES.