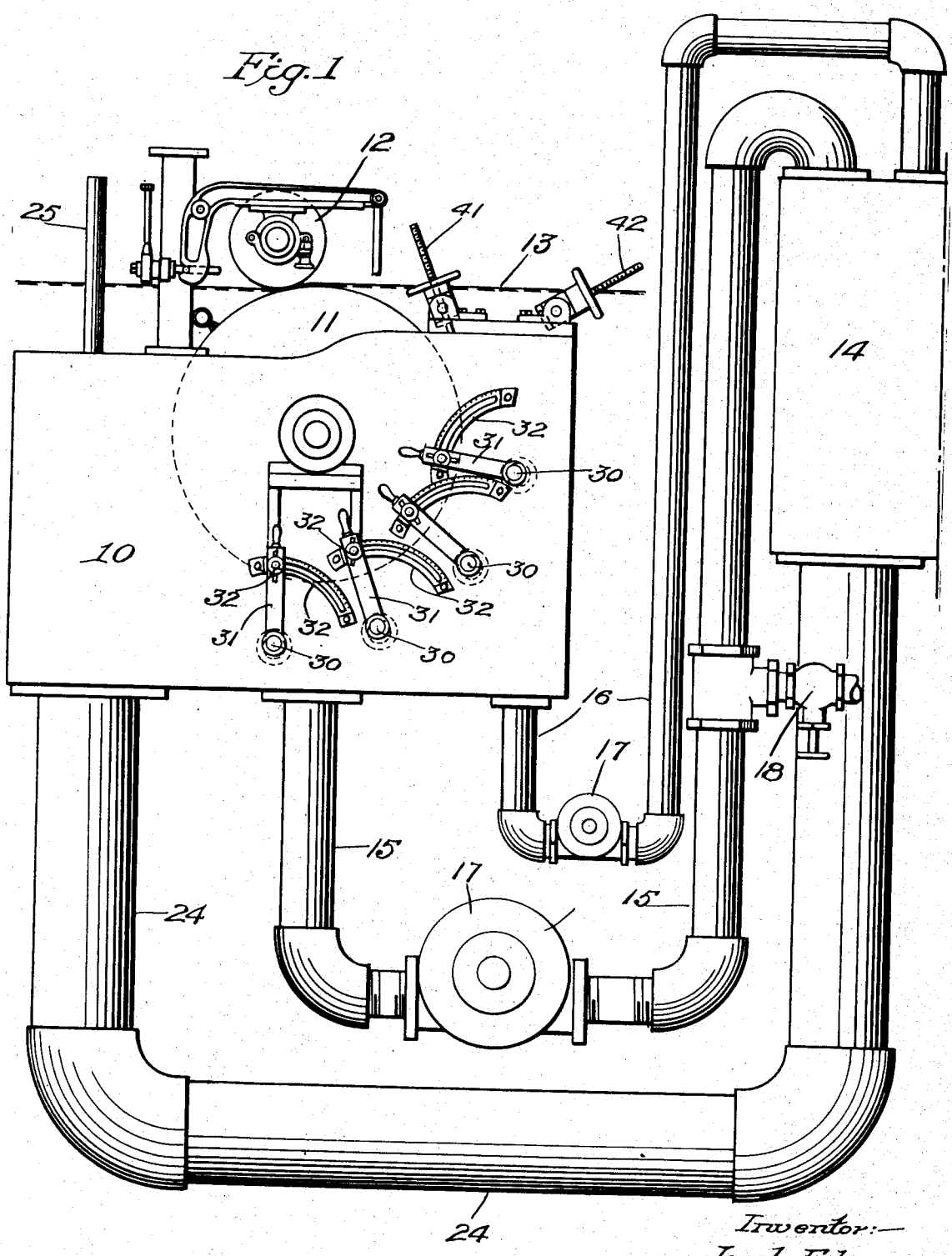
June 25, 1935. J. EDGE 2,005,839

CYLINDER MACHINE

Filed Jan. 26, 1933 4 Sheets-Sheet 1

Fig. 1



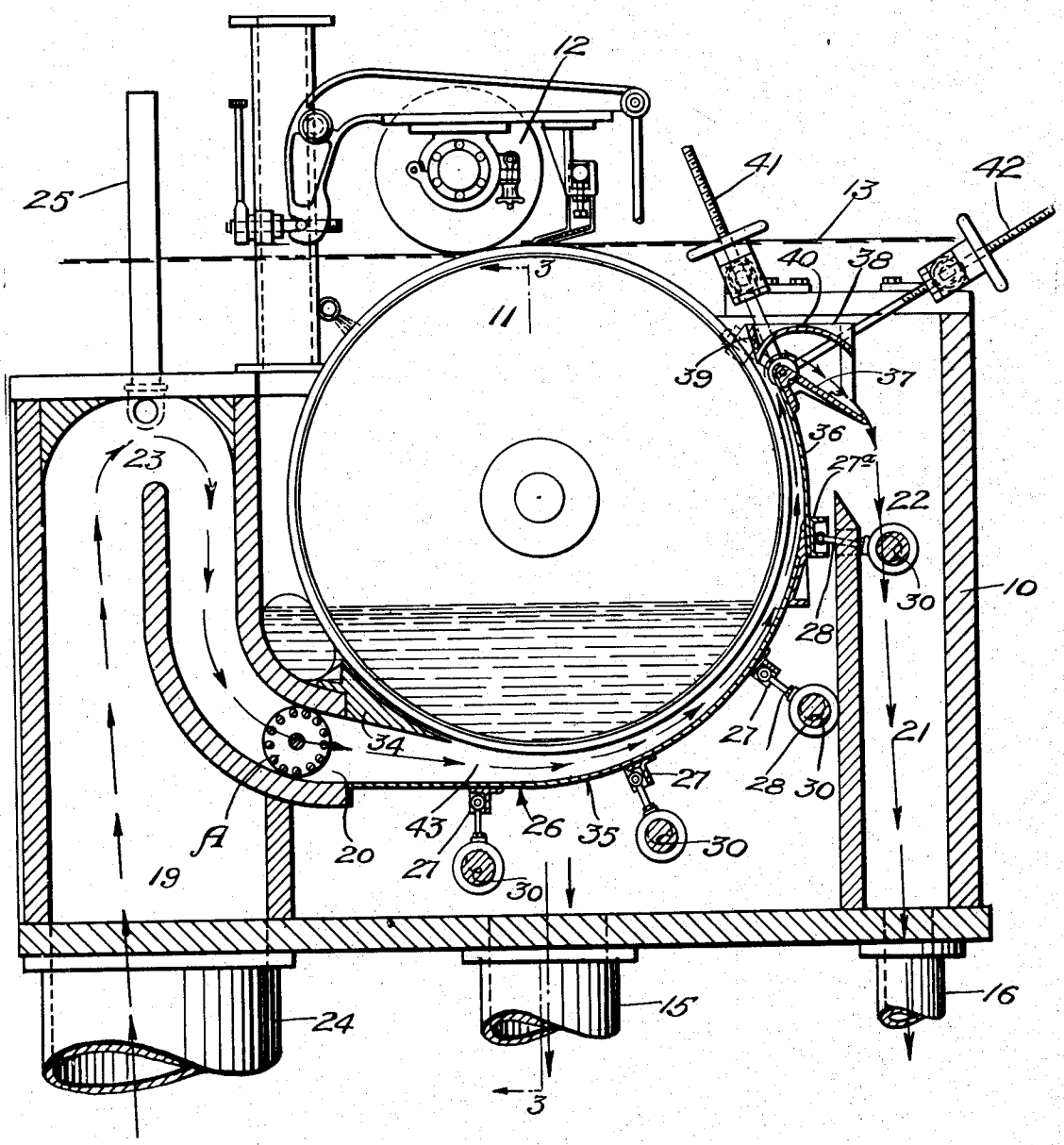
Inventor:—
Jacob Edge
by his Attorneys
Howson & Howson

June 25, 1935. J. EDGE 2,005,839

CYLINDER MACHINE

Filed Jan. 26, 1933 4 Sheets-Sheet 2

Fig. 2.



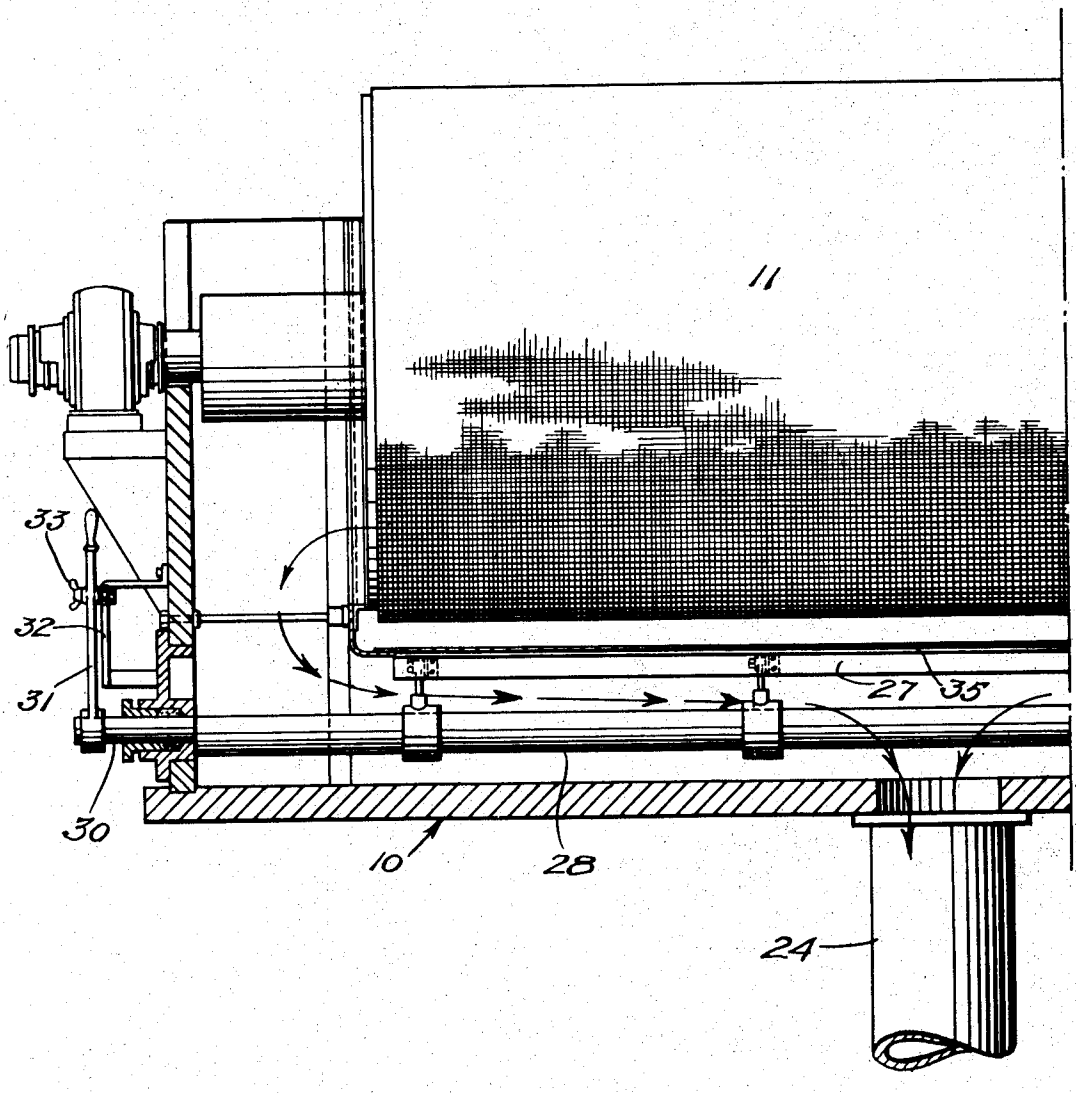
Inventor:—
Jacob Edge
by his Attorneys
Howson & Howson

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Fig. 3.



Inventor:—
Jacob Edge
by his Attorneys
Howson & Howson

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Fig. 4.

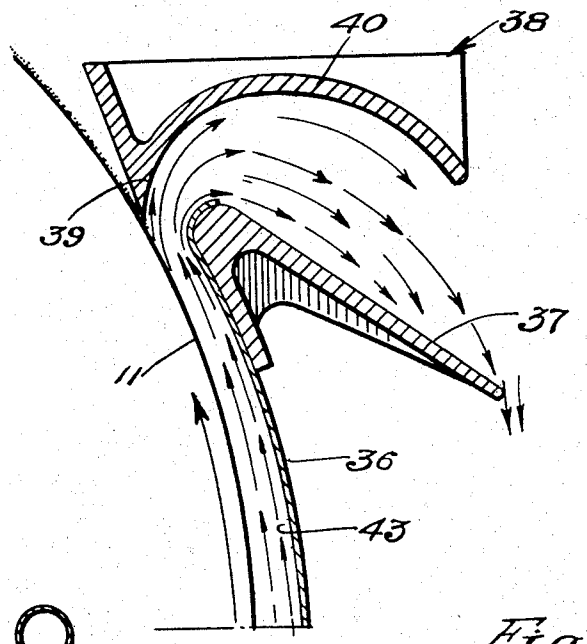


Fig. 5.

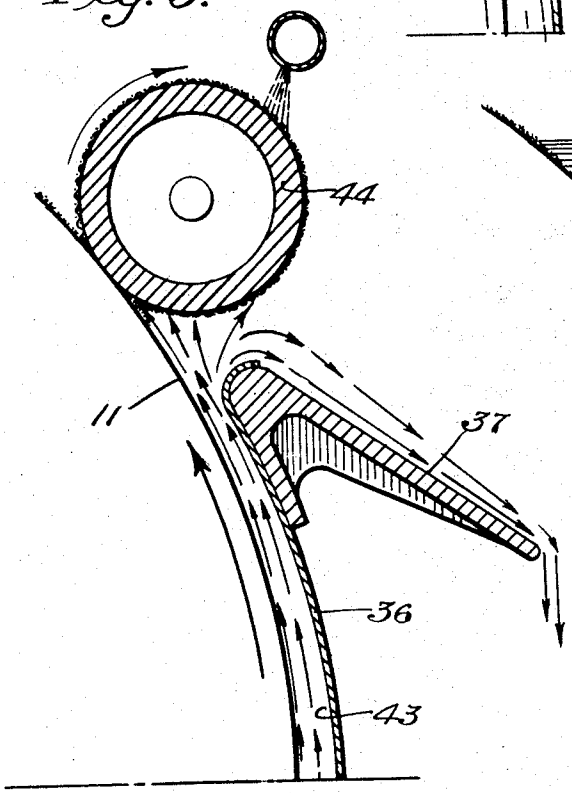
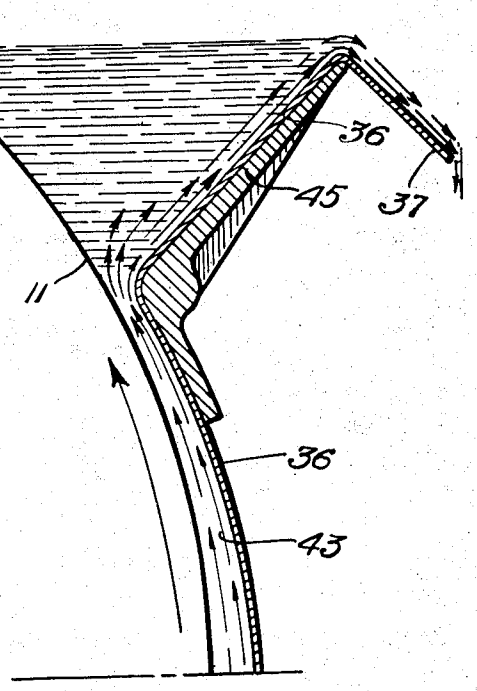


Fig. 6.



Inventor:—
Jacob Edge
by his Attorneys
Howson & Howson

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UNITED STATES PATENT OFFICE

2,005,839

CYLINDER MACHINE

Jacob Edge, Downingtown, Pa., assignor to Downingtown Manufacturing Company, Downingtown, Pa., a corporation of Pennsylvania

Application January 26, 1933, Serial No. 653,726

8 Claims. (Cl. 92—43)

This invention relates to a method of producing paper by cylinder paper machines, and to apparatus for use therein, and more specifically to a method of producing paper at high speeds by use of a cylinder paper machine having an especially constructed vat.

In order that cylinder paper machines may be economically operated in competition with those of the Fourdrinier type, it is essential that the operation be speeded up to the highest possible extent. With the present type of cylinder mold and vat, any high speed is impossible, due to the fact that the method of introducing stock to the vat and the method of taking care of the outflowing white water will not permit operation at any very great speed.

This invention contemplates the provision of a cylinder vat, wherein the mold operates at an extremely high speed, and in which the incoming stock is delivered under such head, and in such manner, that the stock travels about the periphery of the mold in the forming section at substantially the same speed as the periphery of the mold. It will be obvious with a construction of this character, in order that the similarity in speeds may be maintained throughout the forming section, that there must be sufficient stock delivered to provide an overflow of stock at the end of the forming section.

A secondary object of this invention is the provision of a novel means for taking care of such overflow in a manner preventing its interference with, or modification of the formed sheet.

A further object of the invention is the provision in a cylinder mold, having a defined stock passage throughout the forming area, of means whereby the contour of the stock passage may be varied at the will of the operator during operation of the machine. In this connection, it may be pointed out that while in the ordinary type of cylinder mold the stock passage is usually referred to as being adjustable, such passages are only adjustable through some means necessitating checking operation of the machine before they can be operated. With adjustment of the stock passage during operation, the effect of such adjustment upon the sheet can be immediately marked, so that it is known whether the desired result has been obtained or not; and if the desired result has not been made, suitable changes can be made without necessitating checking operation of the machine.

Other objects and advantages will become apparent from the following description.

Fig. 1 is a side elevation, partially diagrammatic in nature, showing apparatus constructed in accordance with my invention;

Fig. 2 is a vertical sectional view through the vat;

Fig. 3 is a fragmentary section on line 3—3 of Fig. 2; and

Figs. 4, 5 and 6 are detail sectional views illustrating different methods of controlling the overflow of excess stock.

Referring now more particularly to the drawings, the numeral 10 generally designates a vat; 11, a cylinder mold operating therein; and 12, a couch roll co-acting with the cylinder mold through the usual pick-up felt 13. Stock is supplied to the vat through a head box 14 giving a relatively high head to the stock, so that the stock may have a velocity equal to that of the desired peripheral speed of rotation of mold 11. White water will be returned from the stock to head box 14 through a suitable conduit 15, while overflow stock will be returned to the head box 14 by conduit 16, these conduits each having a pump 17 arranged therein and a white water return having the usual waste outlet indicated at 18.

The mold 11 may be of any usual or ordinary construction, and is arranged within the vat between a stock inlet 19, which has its outlet or delivery nozzle 20 substantially tangential to, but spaced from the periphery of mold 11, and a stock outlet 21 having its mouth 22 disposed adjacent the upper end of the vat. Stock inlet 19 is preferably constructed to provide an elevated elbow 23 between the point of its communication with stock supply conduit 24 and outlet nozzle 20, this elbow being in communication with a vat conduit 25, the upper end of which is disposed above the level of fluid in head box 14 in order that any entrained air in the stock may escape before the stock reaches nozzle 20. Nozzle 20 has an agitator A arranged therein to insure against uni-directional fibre movement of the stock. The outer or lower wall of nozzle 20 is extended by means of a flexible plate 26 which approaches the surface of the cylinder mold 11 as it recedes from the nozzle. This plate has upon its outer face a series of brackets 27, each providing a means for connecting to the plate an adjusting member 28, at present shown as comprising an eccentrically operated connecting rod. The eccentrics 30 operating these connecting rods are rotatably shiftable from the exterior of the vat through operating levers 31, each having a quadrant 32 associated therewith and each having means as at 33, whereby it may be secured in adjusted positions upon the quadrant. The upper wall of nozzle 20

is continued by means of a plate 34, the upper surface of which conforms to the shaping of and closely approximates the surface of the cylinder mold, and the lower wall of which is tangential to the cylinder wall; thus, a relatively elongated nozzle tangential to the cylinder wall is provided, with the result that the stock first coming into contact with the wall of the cylinder mold has tangential movement without turbulence.

The flexible wall 26 is formed in two sections 35 and 36, the section 35 or lowermost section of which is directly attached to the nozzle mouth, and the section 36 of which is slidably engaged at its lower end with the section 35, and is provided at its upper end with an overflow shelf 37. The slidable connection between the sections 35 and 36 may be readily provided by slotting the uppermost bracket 27a for the reception of the lower end of section 36.

In the form shown in Figs. 2 and 4, the shelf 37 is a portion of a structure 38 which in addition to the shelf includes a knife-edged deflector 39 comprising an arcuately curved wall 40 overlying the shelf 37. By means of angularly related adjusting screws 41 and 42, the structure 38 may be adjusted both vertically and toward and away from the periphery of the mold, and will in practice be positioned with the knife-edged deflector 39 as close to the wire of the mold as is possible without touching the newly formed sheet on the same.

In operation of the apparatus, the head of incoming stock is controlled through head box 14, so that the speed of the stock is substantially the same as the peripheral speed of the mold 11. Stock entering the passage 43 from the nozzle and coming into contact with the periphery of the mold is, therefore, stationarily related to the periphery of the mold, and the fibres thereof can maintain their normal position when coming into contact with the mold, that is to say, there is no such difference in the speed of movement of the stock and receiving surface as to cause any tendency toward uni-directional laying of the stock fibres. By adjustment of the flexible wall 26, the size of the passage can be kept at just such a point that the amount of stock properly fills the same to maintain the head pressure against the screen face of the mold 11. This will, of course, result in the stock arriving at the end of the forming channel 43 at a considerable speed which would tend to cause squirting of the stock from the mouth of this channel. This squirting would, obviously, seriously damage the sheet.

In the form shown in Figs. 2 and 4, the knife-edged deflector divides the upward flow of stock, deflecting almost all thereof over the shelf 37, and so into the upper end of stock return channel 21. What small amount of stock passes the deflector will easily drain through the web on the cylinder mold before reaching the felt 13. This deflection of stock can be obtained by other methods, all of which, however, should be of such character that any discharge of the stock is avoided in which the spurt falls back upon the formed sheet, or the amount of relatively dead stock is of such depth that there will be no tendency to wash the sheet from the mold because of the relatively high speed of movement of the mold.

In Fig. 5, the knife-edged deflector is substituted for by a dandy roll 44 which must be of greater diameter than the discharge mouth of channel 43. This dandy roll is slightly spaced from the channel mouth so that the force of the flow is broken. The newly formed sheet is held against dislodgment by the screen surface of the dandy roll, and the overflow stock will return over shelf 37 to the stock outlet channel.

In the form shown in Fig. 6, the mouth of the channel is flared, the upper end of the movable wall 36 being secured to a bracket 45 which inclines upwardly and outwardly from the surface of the cylinder mold. The upper, outer end of this bracket may be equipped with the shelf 37. The pocket formed by flaring the mouth of the channel 43 should be of such depth that the collected water will kill the spurt of stock passing from the mouth. In all forms of the invention described, white water extracted from the pulp and passing to the interior of the mold will drain either through the ends of the mold, or is passed through the wall thereof into the space beneath the flexible wall 26 and so passed through the white water outlet conduit 15.

Since the construction hereinbefore referred to is, obviously, capable of considerable modification without in any manner departing from the spirit of my invention, I do not wish to be understood as limiting myself thereto except as hereinafter claimed.

I claim:

1. In combination, a vat, a cylinder mold therein, a wall confronting the surface of the cylinder mold and co-acting therewith to define a forming section and means operable during the formation of a sheet on the mold for moving the wall throughout its length toward and away from the cylinder mold.

2. In combination, a vat, a cylinder mold therein, a wall confronting the surface of the cylinder mold and co-acting therewith to define a forming section and means operable during the formation of a sheet on the mold for moving the wall throughout its length toward and away from the cylinder mold, and for varying the effective length of the forming section.

3. In combination, a vat, a cylinder mold therein, a flexible wall confronting the surface of the cylinder mold and co-acting therewith to define a forming section, and means engaged with the wall at spaced intervals throughout its length for adjusting the wall toward and away from the cylinder mold.

4. In combination, a vat, a cylinder mold therein, a flexible wall confronting the surface of the cylinder mold and co-acting therewith to define a forming section, and means operable during formation of a sheet on the mold and engaging the wall at spaced intervals throughout its length for adjusting the wall toward and away from the cylinder mold.

5. In combination, a vat, a cylinder mold therein, a flexible wall confronting the surface of the cylinder mold and co-acting therewith to define a forming section and a plurality of independently operable members engaging the wall at spaced intervals throughout its length for adjusting the wall toward and away from the cylinder mold.

6. In combination, a vat, a cylinder mold therein, a wall confronting the surface of the cylinder mold and formed in two overlapping sections, one of said sections being circumferentially movable, means for relatively adjusting said sections to thereby provide a forming section of adjustable length, and means for adjusting said

section toward and away from the surface of the mold.

7. In combination, a vat, a cylinder mold therein, a wall confronting the surface of the cylinder mold and formed in two overlapping sections, means for relatively adjusting said sections to thereby provide a forming section of adjustable length, said means being operable during formation of a sheet upon the mold, and means for adjusting said wall toward and away from the surface of the mold.

8. In combination, a vat, a cylinder mold therein, a wall confronting the surface of the cylinder mold and formed in two overlapping sections, means for relatively adjusting said sections to thereby provide a forming section of adjustable length, and means for adjusting said wall throughout its length toward and away from the surface of the mold, both of said means being operable during formation of a sheet on the mold.

JACOB EDGE.