April 2, 1929. M. P. CHAPLIN 1,707,430

PULP MOLDING MACHINE AND METHOD OF FORMING MOLDED PULP ARTICLES

Filed Feb. 7, 1927 2 Sheets-Sheet 1

Fig. 1.

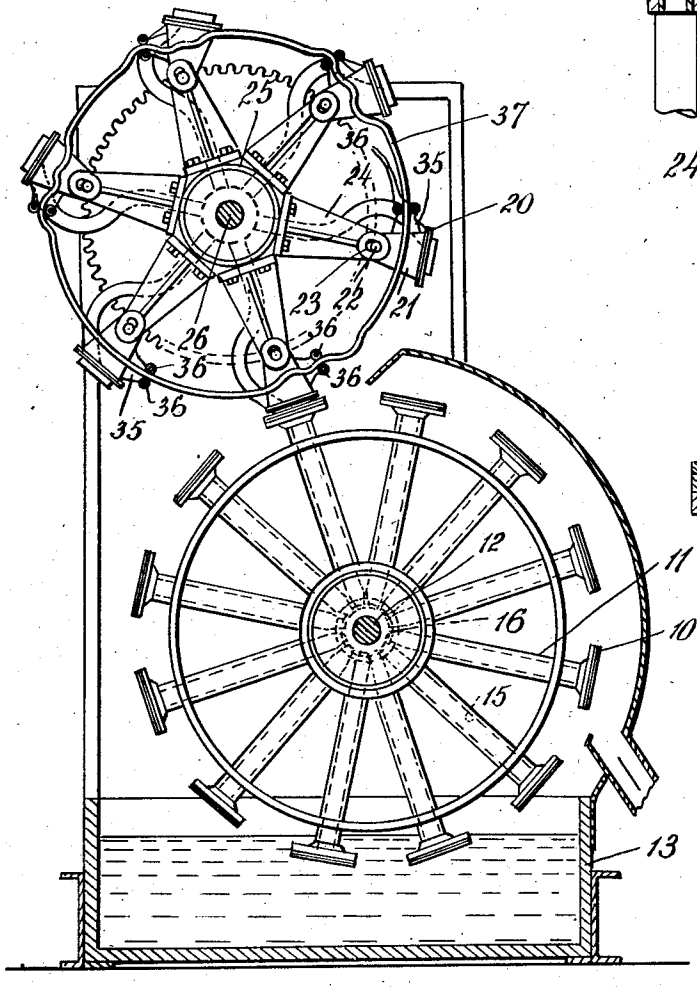
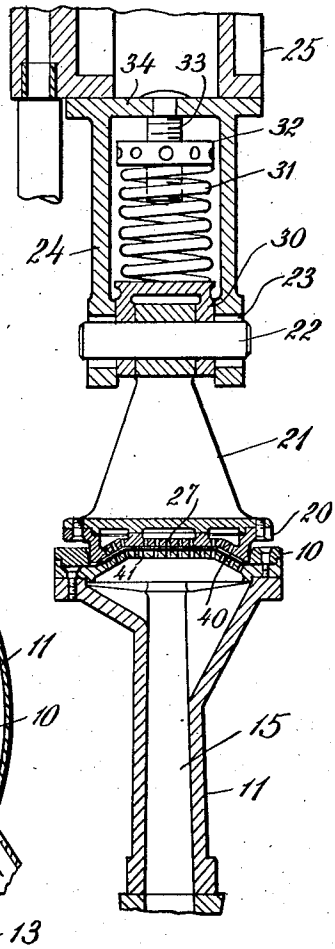


Fig. 2.



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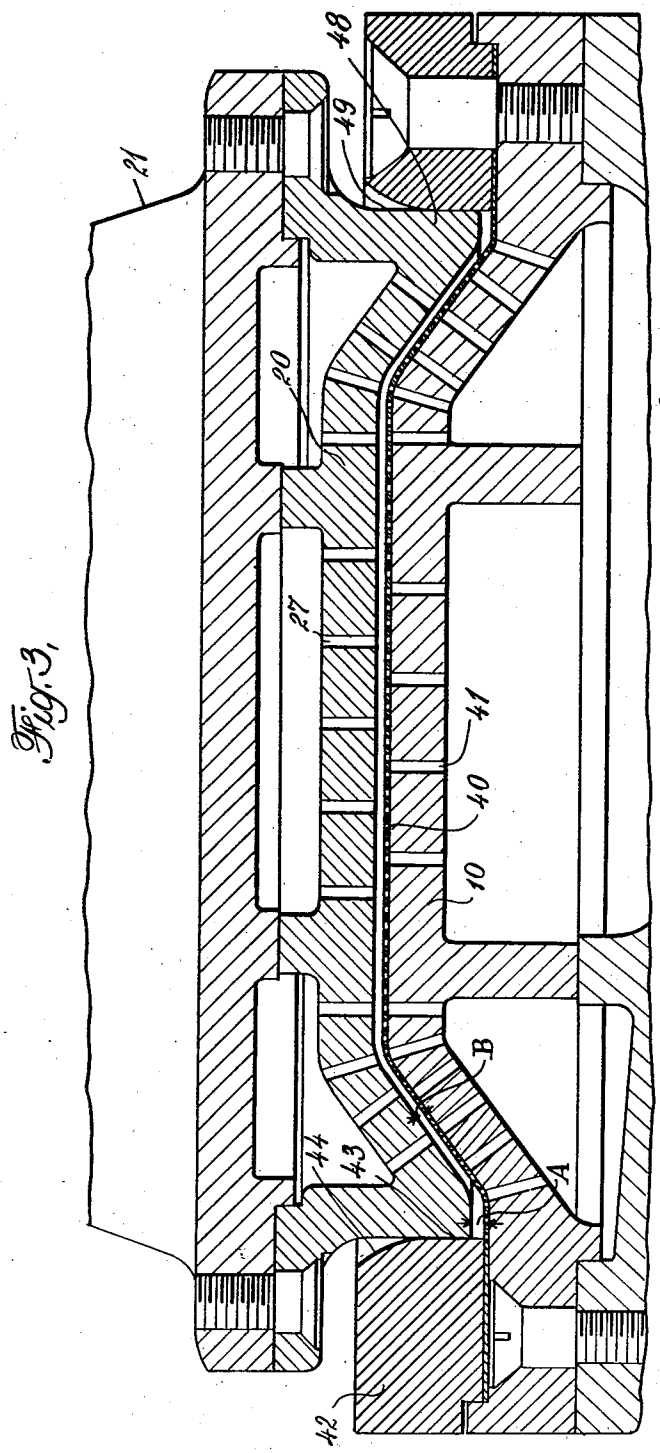


Fig. 3.

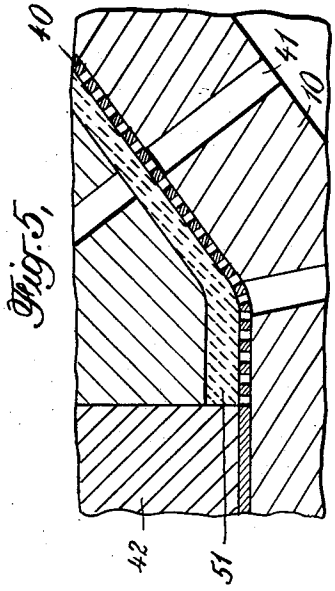


Fig. 5.

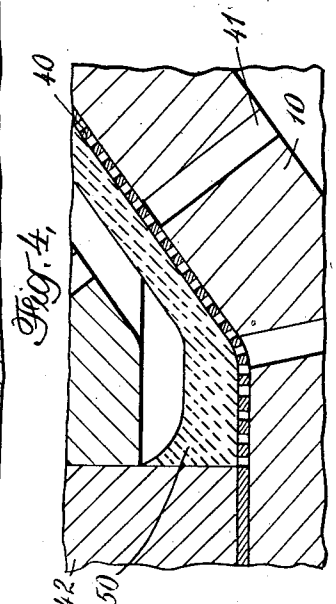


Fig. 4.

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UNITED STATES PATENT OFFICE.

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PULP-MOLDING MACHINE AND METHOD OF FORMING MOLDED PULP ARTICLES.

Application filed February 7, 1927. Serial No. 166,364.

This invention relates to pulp molding machines and methods of forming molded pulp articles, and more particularly to the construction of the forming and compression dies.

In molding articles from pulp, before the articles are pressed, there is a fillet or deposit of pulp at the outer edge portion of the forming die. In some machines, this fillet or deposit is squeezed out and extends outwardly from the pressed article in the form of a feather edge.

This invention has for its salient object to provide a structure whereby all the pulp deposited on the forming dies will be pressed by the compression dies into the article and whereby the articles molded by the compression dies on the forming dies will have a clean and well-defined outer edge.

Another object of the invention is to produce a molded article having its outer edge reinforced or thicker than the remaining portion of the article.

Further objects of the invention will appear from the following specification taken in connection with the drawings, which form a part of this application, and in which

Fig. 1 is an elevational view illustrating one form of forming dies and compression dies;

Fig. 2 is an enlarged sectional elevation taken through one of the forming dies and the compression die coacting therewith;

Fig. 3 is an enlarged sectional elevation showing the details of construction of the coacting portions of the forming and compression dies;

Fig. 4 is an enlarged sectional elevation showing portions of the outer edge of the forming die and compression die prior to the compression of the pulp therebetween; and

Fig. 5 is a view similar to Fig. 4 but showing the pulp compressed between the two dies.

The invention briefly described consists of so constructing and operating the forming and compression dies that these elements are brought into spaced parallel relation prior to the movement of the compression die into coacting relation with the forming die. Furthermore, the forming die is provided at its outer periphery with an annular, relatively deep ring and the compression die is provided with an annular, relatively deep projecting portion adapted to fit closely within the ring on the forming die. Since the forming dies and compression dies are brought together in parallelism instead of by a swinging motion, the rings on the forming dies and the projections on the compression dies can be made of such dimensions as to force into the mold formed between the dies, the material deposited at the outer edge of the mold, thus compressing all of this material into the mold. Further details of the invention will appear from the following description.

Any desired construction of forming die carrier and compression die carrier may be utilized, but in the form of the invention illustrated, the construction shown is that illustrated and described in my co-pending application Serial No. 129,130 filed August 14, 1926. In this embodiment of the invention, the forming dies 10 are carried by arms 11 mounted on a shaft 12 and are adapted to rotate through a pulp solution contained in a vat 13.

Each of the arms 11 has a conduit 15 therethrough having its inner end 16 adapted to coact with a suction and air control casing in such a manner that the forming dies will be under suction during their rotation through the vat and until they are in a position to coact with the compression dies and deliver the article thereto. When they have reached this position, the suction is cut off and air is admitted to facilitate the transfer of the article from the forming dies to the compression dies.

The compression dies 20 having the usual perforations 27 therein are carried by toggle arms or yokes 21 pivoted on pintles 22 mounted in pivot slots 23 formed at the outer ends of arms 24 carried by a hub 25 mounted on the shaft 26. A yoke 30 is mounted on each of the pins 22 and is engaged by a compression spring 31 interposed between the yoke and a collar 32 adjustably threaded on a bolt 33 carried by a transverse member 34 formed on the arm 24.

Each of the yokes 21 has secured thereto and projecting therefrom a bracket 35 which carries a pair of rollers 36 disposed on opposite sides of a cam track 37. The track 37 is so designed that the approaching forming and compression dies will be disposed in axial

alinement and with their faces in parallel relation. In other words, the forming and compression dies are brought into spaced parallel relation prior to their movement toward each other into coacting relation. This construction and operation is more fully described in the application above referred to.

It will be noted that the openings 27 through the face of the compression dies are substantially all the same length and are sufficiently short to prevent their retaining any considerable amount of moisture or water.

The particular construction of the forming and compression dies is illustrated in Figs. 3, 4 and 5. In these figures it will be seen that the forming die 10 has a screen 40 secured to its outer surface over the perforations 41 formed in the face of the die. The screen is secured in position by a ring 42 which is relatively deep and has a cylindrical surface 43 and a curved surface 44.

The compression die 20 is formed with an annular relatively long projection 48 having a cylindrical surface 49 adapted to fit closely within the cylindrical surface 43 of the ring 42.

From the showing in Figs. 3 and 5 it will be noted that the space A between the outer edge portion of the projection 48 and the coacting portion of the compression die is wider than the space B between the remaining coacting portions of the two dies.

In Fig. 4 the pulp formed on the forming die is shown with a fillet or deposit 50 at the outer periphery thereof which adheres to that portion of the surface 43 which is nearest the screen 40. Since the forming die and compression die come into coacting relation in axial alinement or with their surfaces parallel, the fillet or deposit will be pressed between the two dies and will be prevented from spreading laterally to form a feather edge on the article.

It will be understood that the cylindrical surface 43 of the ring 42 is made sufficiently deep to surround and to extend beyond the fillet or deposit 50 and to confine this material when the projection 48 of the compression die is forced within the ring 42.

In Fig. 5 it will be seen that the outer edge portion 51 of the pulp article is thicker than the remaining portion thereof and that the fillet or deposit 50 has been pressed into the article. Furthermore, the edge portion 50 may by properly proportioning the parts be made denser than the remaining portions.

Although one specific embodiment of the invention has been particularly shown and described, it will be understood that the invention is capable of modification and that changes in the construction and in the arrangement of the various cooperating parts may be made without departing from the spirit or scope of the invention, as expressed in the following claims.

What I claim is:

1. In a pulp molding machine, a forming die, a compression die, means for bringing said dies into spaced parallel relation and for subsequently moving said dies into coacting pressing relation, said forming die having a peripheral ring having a substantially cylindrical inner surface and said compression die having a peripheral projection having a substantially cylindrical outer surface adapted to fit within the cylindrical surface of the ring and to confine and compress within the ring the fillet or deposit of pulp disposed around the periphery of the die.

2. In a pulp molding machine, forming dies, means for moving said dies through a pulp solution, compression dies adapted to coact with said forming dies, means for bringing said forming dies and compression dies into spaced parallel relation and for subsequently moving said compression dies in a substantially straight line into coactive pressing relation, rings on the forming dies surrounding said dies and annular projections on the compression dies adapted to fit within said rings and to confine and compress within the rings the fillet or deposit of pulp disposed around the peripheries of the dies.

3. In a pulp molding machine, a forming die, and a compression die adapted to coact therewith to form a molded article, the coacting surfaces of said dies being spaced apart a greater distance at their outer edge portions than at the remaining portions thereof when the dies are disposed in coacting molding relation, whereby the article molded thereby will have its edge portion thicker than the remaining portion thereof.

4. In a pulp molding machine, a forming die, a ring carried by and disposed at the outer periphery of the forming die and extending beyond the face of the die, said ring having a cylindrical inner surface at least as deep as the depth of pulp on the forming die prior to the compression thereof.

5. In a pulp molding machine, a forming die, a ring carried by and disposed at the outer periphery of the forming die and extending beyond the face of the die, and a compression die adapted to coact therewith to form a molded article, and said compression die having an annular projection provided with a cylindrical outer surface adapted to fit within the cylindrical surface of the ring and force all of the pulp at the outer edge of the forming die into the molded article.

6. A method of forming the edge of a molded article which consists of depositing on a forming die a layer of pulp having an excess of material at the outer edge thereof and confining and compressing said edge to form a reinforced edge.

7. A method of forming molded pulp articles which consists of forming a pulp blank with an excess of pulp at the margin thereof

and in consolidating and compressing the marginal excess to form a reinforced edge without increasing the thickness of the main body portion of the article.

8. A method of forming molded pulp articles which consists of forming a pulp blank with an upstanding excess of pulp at the margin thereof and in consolidating and compressing the marginal excess to form a reinforced edge without increasing the thickness of the main body portion of the article.

9. A molded pulp article having a main body portion and a reinforced homogeneous edge.

In witness whereof, I have hereunto set my hand this 3rd day of February, 1927.

MERLE P. CHAPLIN.