Oct. 4, 1932. W. B. HADLEY 1,881,404

BOX BOARD MACHINE

Filed March 16, 1931 2 Sheets-Sheet 1

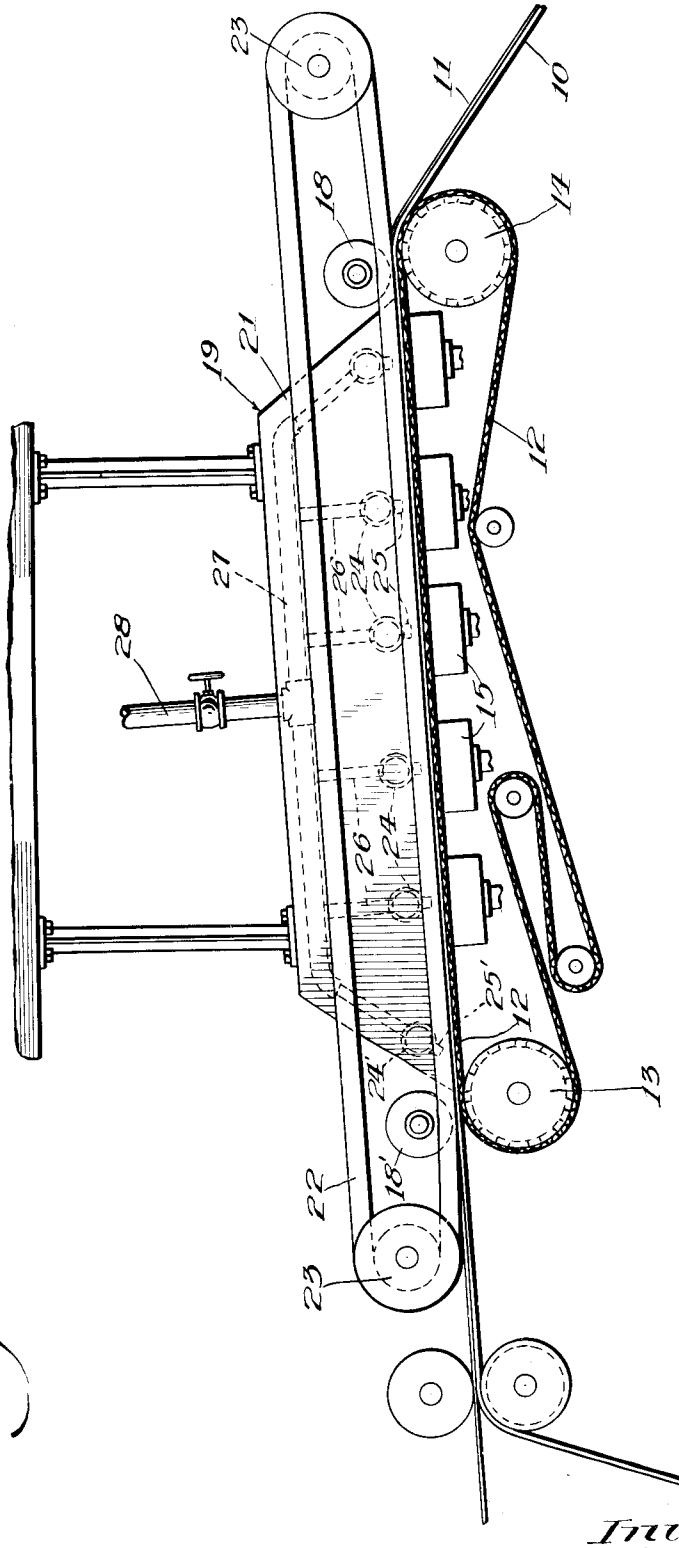


Fig. 1.

Inventor:
Walter B. Hadley
By Bertha L. MacGregor
Atty.

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Fig. 2.

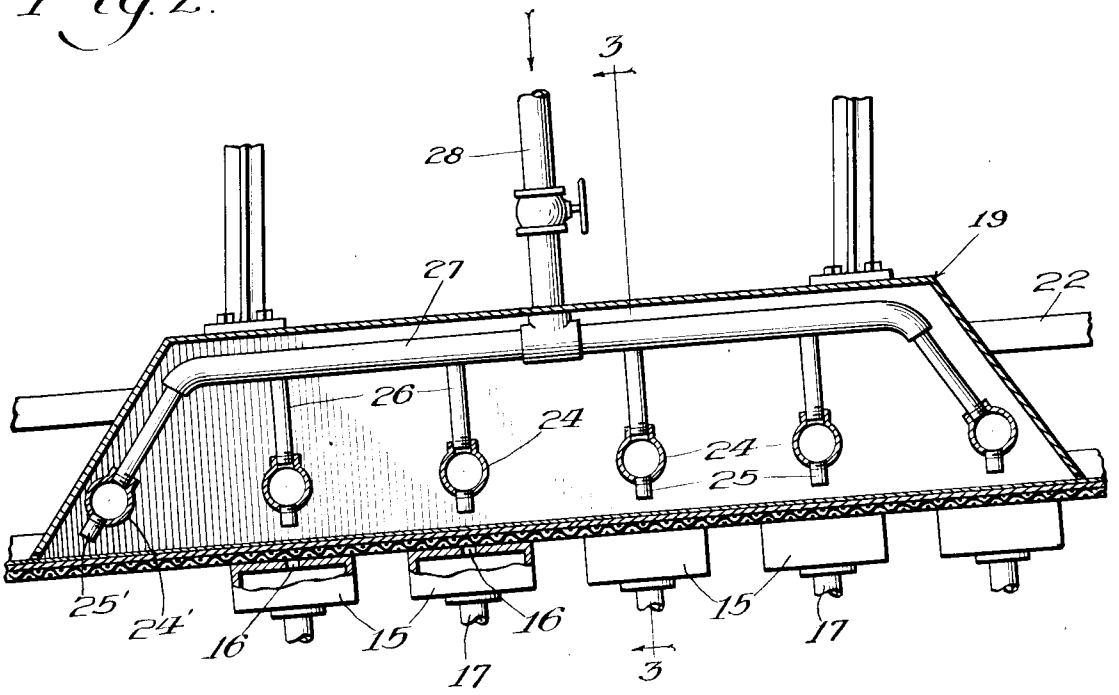
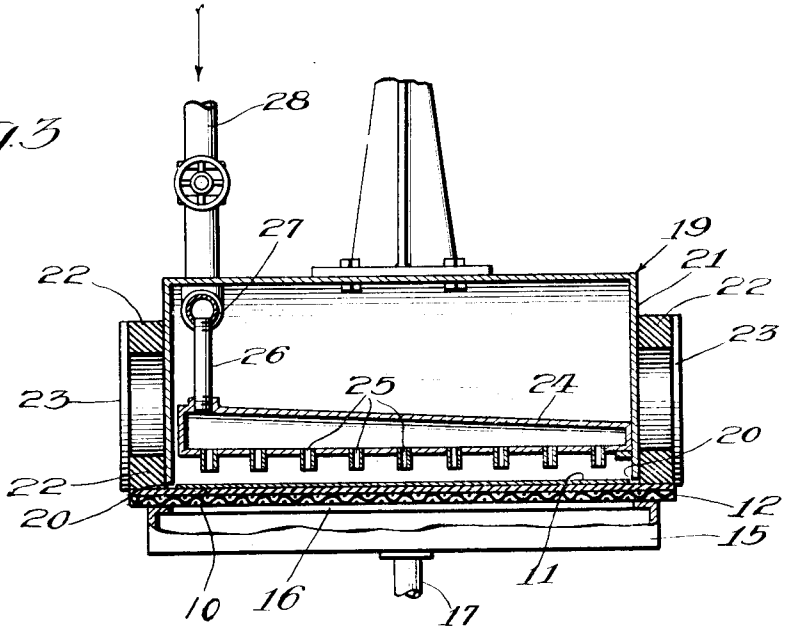


Fig 3



Inventor:
Walter B. Hadley,
By Bertha L. MacGregor
Atty.

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UNITED STATES PATENT OFFICE

WALTER B. HADLEY, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO KELLOGG-HADLEY CORPORATION, A CORPORATION OF DELAWARE

BOX BOARD MACHINE

Application filed March 16, 1931. Serial No. 522,859.

This invention relates to paper making and more particularly to improvements in machines for making box board. The invention may be embodied in paper making machines of the multiple cylinder type, adapted for producing combination box board, by which is meant paper board which is built up of a plurality of layers of fibre imposed one upon the other in the form of slush pulp, or may be embodied in machines of the Fourdrinier type, which are adapted to produce single ply paper board.

It is old in the art to deposit the slush pulp on what is known as a wet felt belt. A second felt belt is usually superimposed on the first mentioned belt and pulp, and the two belts and intermediate pulp are passed between pressure rolls for the purpose of extracting the water from the highly saturated pulp. This practice has proven unsatisfactory for the reason that the pulp fibres between the belts become disarranged while passing between the rolls, and the finished board is weakened. Another objection to this practice is that the fibres are compressed between the pressure rolls, and as increased pressure on the slush pulp results in diminished yield in area of paper board for a given quantity of raw material, it is desirable to extract the water from the slush pulp without compressing the fibres and without disturbing the relationship of the fibres to each other or disrupting their cohesive condition.

The main object of the present invention is to eliminate pressure rolls and upper felt belts and to provide means for efficiently drying the slush pulp without disturbing or compressing the fibrous mass.

Further objects and advantages will be apparent from the following description.

In the drawings:

Fig. 1 is a diagrammatic side elevation of a part of a box board machine embodying my invention.

Fig. 2 is a longitudinal sectional view of part of the mechanism shown in Fig. 1, on an enlarged scale.

Fig. 3 is a transverse vertical section taken on the line 3—3 of Fig. 2.

In that embodiment of the invention shown in the drawings, the wet felt belt is indicated at 10 and the slush pulp on the belt at 11. The mechanism for depositing the pulp 11 on the belt 10, either in a single layer or in a plurality of layers, has not been shown for the reason that the pulp may be applied to the belt by any of a number of types of machines for this purpose.

The felt belt 10 is supported and carried by an endless foraminous belt 12 which is passed around suction couches 13 and 14 or any driven rolls, and over the top surfaces of a plurality of suction boxes 15. The boxes 15 are provided in their upper surfaces with slots or any desired openings 16. 17 indicates outlets for the boxes 15. 18 is a rubber faced roll which bears lightly on the upper surface of the pulp and may be dispensed with if desired, and 18′ is a solid roll.

Preferably the felt belt 10 and foraminous belt 12 are of the same width but the pulp sheet is slightly narrower than its supporting belt, as best shown in Fig. 3.

A box-like housing 19, open at its bottom, is supported or suspended above the belts 10 and 12 carrying the pulp 11, in such position that the lower margins 20 of the side and end walls of the housing will be in substantially the same horizontal plane as the upper surface of the pulp 11. The longitudinal side walls 21 of the housing 19 are preferably perpendicular to the belt surface and are located in vertical planes slightly outwardly of the marginal edges of the pulp sheet 11. The lower margins 20 of said housing walls are intended to be close to the edge of the pulp 11 but not in contact with either the pulp or the moving belt 10.

Adjacent the outer surface of each side wall 21 is an endless deckle strap 22 of any suitable material, such as rubber, preferably square in cross section, mounted on sheaves 23. The sheaves 23 may be rotatably mounted in any desired manner in such position that the lower lap of the strap 22 will rest on the felt belt 10 near its side margin and travel with said belt as it moves over the vacuum boxes. The inner flat side of the strap 22 preferably contacts with the housing walls 21

and thus the strap functions as a seal between the stationary housing and the moving belt.

Within the housing 19 are transversely extending conduits 24 apertured in their lower walls and provided with nipples 25. The conduits 24 are located above the vacuum boxes 15 and the apertures and nipples 25 are directly above the slots 16 of the boxes 15. If desired, a conduit 24 may be positioned so as to cooperate with the suction couches; in the embodiment shown, one such conduit 24′ with nipples 25′ is placed in juxtaposition to the suction couch 13. The conduits 24 have one of their ends mounted in a side wall 21 of the housing 19, the opposite ends of the conduits being provided with upright connections 26 which are joined by a longitudinally extending conduit 27. A valved inlet pipe 28 communicates with the conduit 27 and extends upwardly through the top wall of the housing 19, to a source of heated air which is conveyed into the conduits 24 and through the apertures and nipples 25 to the pulp 11.

The suction boxes 15 and suction couches 13 and 14 extract the moisture out of the pulp and attract the heated air which is being directed to the pulp, with the result that the heated air passes downwardly through the pulp and felt belt, whereby drying of the pulp is accomplished in less time and more efficiently than has heretofore been the case, and without compressing or disturbing the pulp fibres. The substantially sealed housing, enclosing the conduits 24 and pulp sheet as it moves through the housing, conserves the heat and drying efficiency of the machine.

Changes may be made in details of construction without departing from the scope of my invention and I do not intend to be limited to the exact form shown and described except as set forth in the appended claims.

I claim:—

1. The method of making paper board which comprises depositing slush pulp on a carrier, moving the carrier through a substantially fully enclosed heat conserving zone, and subjecting the pulp successively a plurality of times to the combined action of suction and heated air directed thereagainst for drying the same as the carrier passes through the zone.

2. The method of making paper board which comprises depositing slush pulp on a carrier, moving the carrier through a substantially fully enclosed heat conserving zone, the pulp in passing through the zone being simultaneously dried by the successive combined action of suction means adjacent the carrier and heated air delivered thereagainst in a direction toward the suction means.

3. The method of making paper board which comprises depositing slush pulp on a carrier, moving the carrier through a substantially fully enclosed heat conserving zone, the pulp in passing through the zone being simultaneously dried by the successive combined action of suction boxes and heated air, the latter delivered against the pulp in a direction toward the suction boxes.

4. In a paper board machine, a carrier for carrying slush pulp, said carrier comprising a wet felt belt supported on a foraminous belt, vacuum means adjacent the foraminous belt, an open bottom housing mounted above the wet felt belt, and means for conducting heated air to the housing interior and into contact with the pulp on the belt.

5. In a paper board machine, a carrier for carrying slush pulp, said carrier comprising a wet felt belt supported on a foraminous belt, vacuum means adjacent the foraminous belt, an open bottom housing mounted above the wet felt belt, and apertured conduits in the housing for directing heated air to the pulp on the carrier, said conduit openings being located opposite the vacuum means.

6. In a paper board machine, a carrier for carrying slush pulp, vacuum means adjacent the carrier, an open bottom housing mounted adjacent the opposite side of the carrier, with the lower edges of its sides near the pulp but not in contact therewith, a deckle strap externally adjacent the housing and movable with the carrier, and means for conducting heated air into the housing into contact with the pulp on the carrier.

In testimony that I claim the foregoing as my invention, I affix my signature, this 12th day of March, 1931.

WALTER B. HADLEY.