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MACHINE FOR THE MANUFACTURE OF CELLULAR BOARDS.

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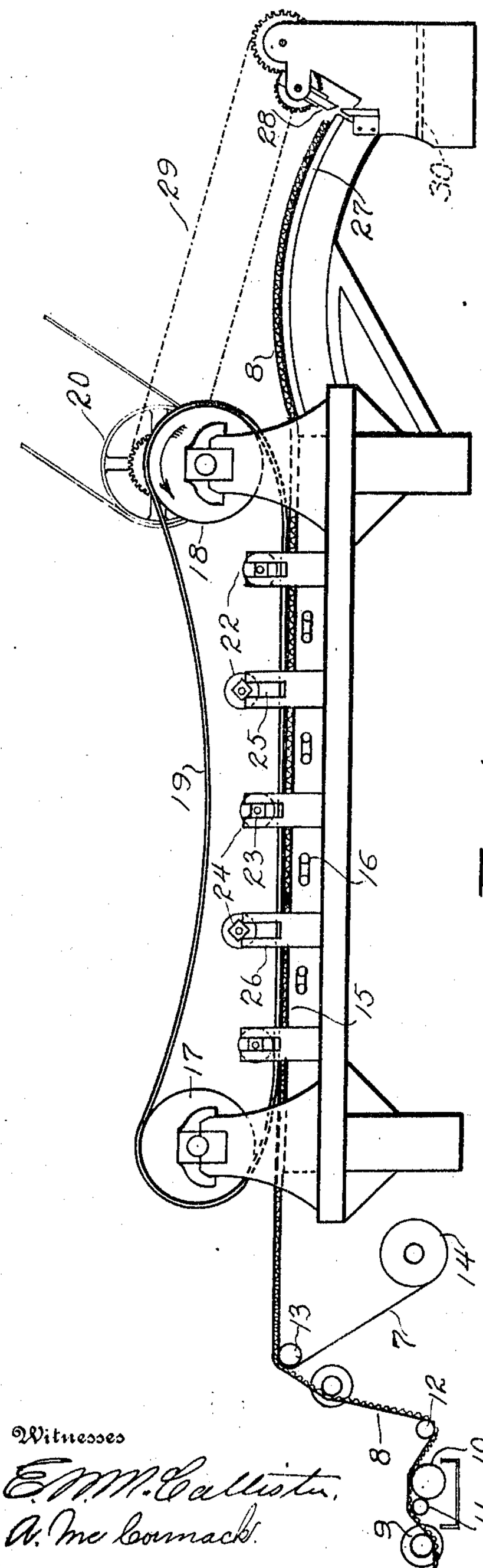

Fig. 1.

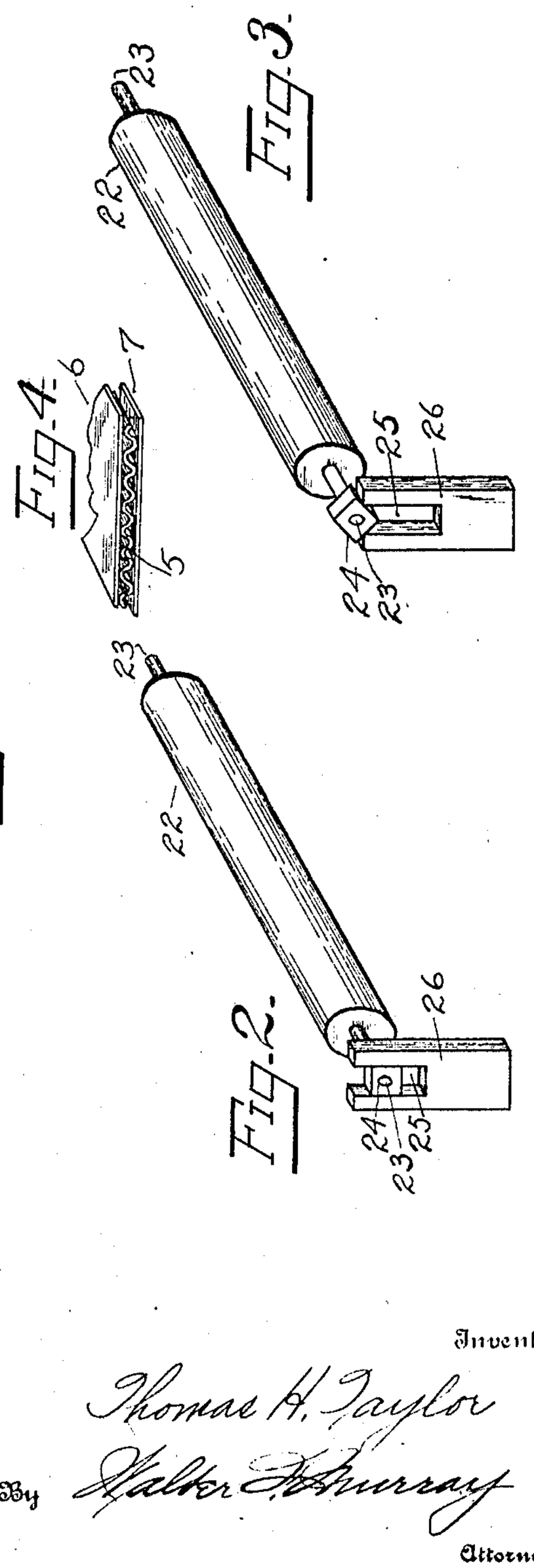

Fig. 4.

Fig. 3.

Fig. 2.

Witnesses

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UNITED STATES PATENT OFFICE.

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MACHINE FOR THE MANUFACTURE OF CELLULAR BOARDS.

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To all whom it may concern:

Be it known that I, THOMAS H. TAYLOR, a subject of the King of Great Britain, and resident of Cincinnati, county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Machines for the Manufacture of Cellular Boards, of which the following is a specification.

This invention relates to improvements in machines or apparatus employed in the manufacture of cellular boards or double faced corrugated paper. Two steps are ordinarily employed in the manufacture of such boards, or paper: First, a strip of paper is corrugated and is secured to one of the facing sheets which forms a part of the cellular board. These operations are carried forward by one machine. The paper is then conveyed in rolls to a backing machine, which secures the other facing sheet in place on the corrugated strip.

The object of my invention is the production of a simple and effective backing machine in which means are employed for gluing the backing sheet to the corrugated strip, feeding the strip through the machine where it is heated and pressed and the backing strip secured firmly in place, and, finally, cutting the cellular board so formed, into desired lengths.

In the drawings accompanying this application and forming a part thereof, Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a perspective view of a pressure roll shown in connection with a mounting bracket. The roll, relative to the bracket, is shown in the operative position. Fig. 3 is a perspective view similar to Fig. 2, in which the pressure roll is shown moved to an inoperative position relative to the bracket. Fig. 4 is a perspective view of a fragment of the cellular board formed by the backing machine.

Referring to the drawings: the corrugated board, after it is finished, consists of a corrugated sheet 5, a facing sheet 6 and a backing sheet 7. The facing and backing sheets are similar, the only difference being that the backing sheet is secured in place on the corrugated sheet 5, after the facing sheet has been secured in place.

The corrugated sheet, with the facing sheet 6 in place, is delivered to the backing machine in large rolls, or long strips, such as the strip 8, shown in Fig. 1. This strip is first passed under a guide roll 9, and then across a glue distributing roll 10, which is partially submerged in the vessel containing glue. A roll 11 contacts with the roll 10, and is technically known as a "cut-off" roll. The function of this roll is to wipe off the excessive glue adhering to the surface of the glue distributing roll. Both the rolls, 10 and 11, are positively driven by driving connections, not shown. After the strip 8 has passed over the glue distributing roll, it is passed under a guide roll, 12, which is located in a plane below the plane of the gluing surface of the roll 10 so as to insure that the corrugated sheet will contact with the glue distributing roll. The strip then passes over a second guide roll to a joining roll 13, where it meets the backing sheet 7. The backing sheet is stored in a roll 14, which is rotatably mounted, and the sheet passes around the roll 13 between the roll and the corrugated sheet 5 of the strip 8. The strip 8 with the backing sheet in place on the corrugated sheet is then fed to the backing machine, where it travels across a heater plate 15 and is subjected to just sufficient pressure to insure the securing of the backing sheet in place on the corrugated sheet, care being taken that the pressure is not great enough to crush the arches or the corrugations of the sheet 5.

The heater plate 15 consists of a flat plate, which is heated by means of steam coils 16, and which is provided with a smooth upper surface. This plate extends the whole length of the machine and is heated throughout its length. Pulleys 17 and 18 are mounted in suitable bearings located at either end of the plate 15. These pulleys support a heavy endless belt 19, which runs loosely around them and which is substantially the width of the plate 15. The belt is so adjusted over the pulleys that the lower leg runs on and contacts with the strip 8 in its passage across the face of the plate 15. The pulley 18 is driven by means of a belt and pulley 20 and intermediate gearing, in the direction of the arrow shown in Fig. 1 and it drives the belt so that the lower leg of the belt moves in the direction of the strip 8 as it passes through the machine. The pulley 17 is an idler and merely supports one end of the belt 19. This belt is so adjusted over the pulleys that it contacts with the strip 8 almost the entire

length of the heater plate and is effective in holding it in resilient engagement with the plate and also impelling it through the machine.

The friction between the belt 19 and the strip 8 is sufficient for some widths of the strip 8 to cause the belt to grip and impel the strip through the machine and to hold it with sufficient pressure against the heater plate 15. As the width of the strip increases, I find that it is preferable to supplement the pressure of the belt, and for this reason I employ pressure rolls 22, which extend transversely across the lower leg of the belt 19, and are provided at each end with short shafts 23, which are journaled in movable bearings 24. The bearings 24 are adapted to be located in vertically extending ways 25, provided in brackets 26, which are secured in place on the machine at each side of the heater plate 15. By permitting one of these rollers 22 to rest on the lower leg of the belt 19, the pressure of the belt against the strip 8 is increased, and, consequently, the friction between the belt and the strip is increased. As many rollers may be employed as is necessary to meet the existing conditions. The bearings 23 of each roll are free to move up and down in the ways 25, and, consequently, the rolls transmit an equal pressure to the belt for all thicknesses of the strip 8, which may be passed through the machine. In other words, the pressure rolls will adjust themselves relatively to the plate 15 to accommodate varying thicknesses of strip 8, without increasing or diminishing the pressure transmitted by them.

The rolls are moved to an inoperative position by raising their bearings 24 out of the ways 25, and by then supporting the bearings on the top of the bracket. This is accomplished by turning the bearings diagonally, after they are free of the ways and then setting them on the tops of the brackets so that only the corner projects downwardly between the bifurcated ends of the brackets. The alternate rolls in the machine, illustrated in Fig. 1, are shown in the inoperative position.

After the strip 8 has passed across the heater plate 15, the glue is, for all practical purposes, set, and the backing strip is firmly secured in place. The strip is then delivered from the machine across a delivery table 27, which is secured to the frame of the machine. This table delivers the strip to a rotating knife 28, which is mounted in suitable bearings, and is driven, by means of a chain and gear connection 29, by the operating gearing of the pulley 18. At the instant of severing a piece of the strip 8 from the main body of the strip, the forward motion of the end of the strip is interrupted. The portion of the strip moving through the machine and in contact with the belt 19 is of course, not interrupted by the cutting operation, and, consequently, means must be employed for preventing injury to the strip by suddenly checking the severed end. I accomplish this by arching the table 27, so that the strip in its passage over the table is initially arched, or bowed. With this arrangement, the only effect that the cutting operation has on the strip is to increase the amount of curvature of the portion of the strip on the table 27. The increasing curvature merely raises the strip from the table for a short interval of time, and has absolutely no effect on the portion of the strip gripped by the moving belt 19. If the table 26 were flat, it will be readily apparent that the momentary interruption of the forward motion of the sheet would crease strip 8. The force applied by the knife in stopping the sheet would act directly opposite to the force applied by the belt 19, in moving the strip forward, and, consequently, the strip would have to give, and in all probabilities it would crush out of shape, or be broken, as a result of bending on too short an arc.

The portion of the strip severed by the knife 28 drops to a table 30 between the bearings of the knife, and from there it may be removed. The knife 28 is provided with a number of sets of change speed gears, so that its speed may be varied relative to the speed of the belt 19 for the purpose of cutting the strip 18 into different lengths.

In accordance with the patent statutes, I have illustrated and described what I now consider to be a preferred embodiment of my invention, but I desire to be understood that I do not limit myself to the apparatus shown, and that various changes and modifications may be made without departing from the spirit and scope of my invention.

What I claim is:

1. A backing machine for cellular boards comprising a heater with a flat heating face, a belt, means for moving the belt across the face of the heater and rollers supported by the belt and adapted to hold it yieldingly in engagement with the face of the heater to feed the cellular board over the heater and to yield for varying thickness of the board.

2. In a backing machine for cellular boards, a heater plate extending the entire length of the machine, a pressure belt, a pair of pulleys supporting said pressure belt, one leg of which is adapted to transmit pressure to said plate, means for driving said pulleys, so as to move said belt across the face of said plate, a series of rolls for increasing the pressure of said belt, movable bearings for said rolls, brackets located on each side of said plate and provided with ways in which said bearings are located,

and means for supporting said rolls in an inoperative position by turning said bearings diagonally, and supporting them on the tops of said brackets.

3. A backing machine for cellular boards comprising means for backing the board in combination with means for constantly impelling the strip to be backed through the machine, a knife for severing the strip at the delivery end of the machine, and an arched delivery table between the means for backing the strip and the knife.

4. In a machine for making multiple ply paper fabrics, means for cementing together paper webs, means for constantly impelling the fabric through the machine, a knife for severing the fabric at the delivery end of the machine and an arched delivery table between the means for cementing the webs and the knife.

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