May 9, 1933. J. W. YOUNGCHILD ET AL 1,908,275

APPARATUS AND METHOD FOR TREATING PAPER

Filed April 11, 1932

Fig. 1

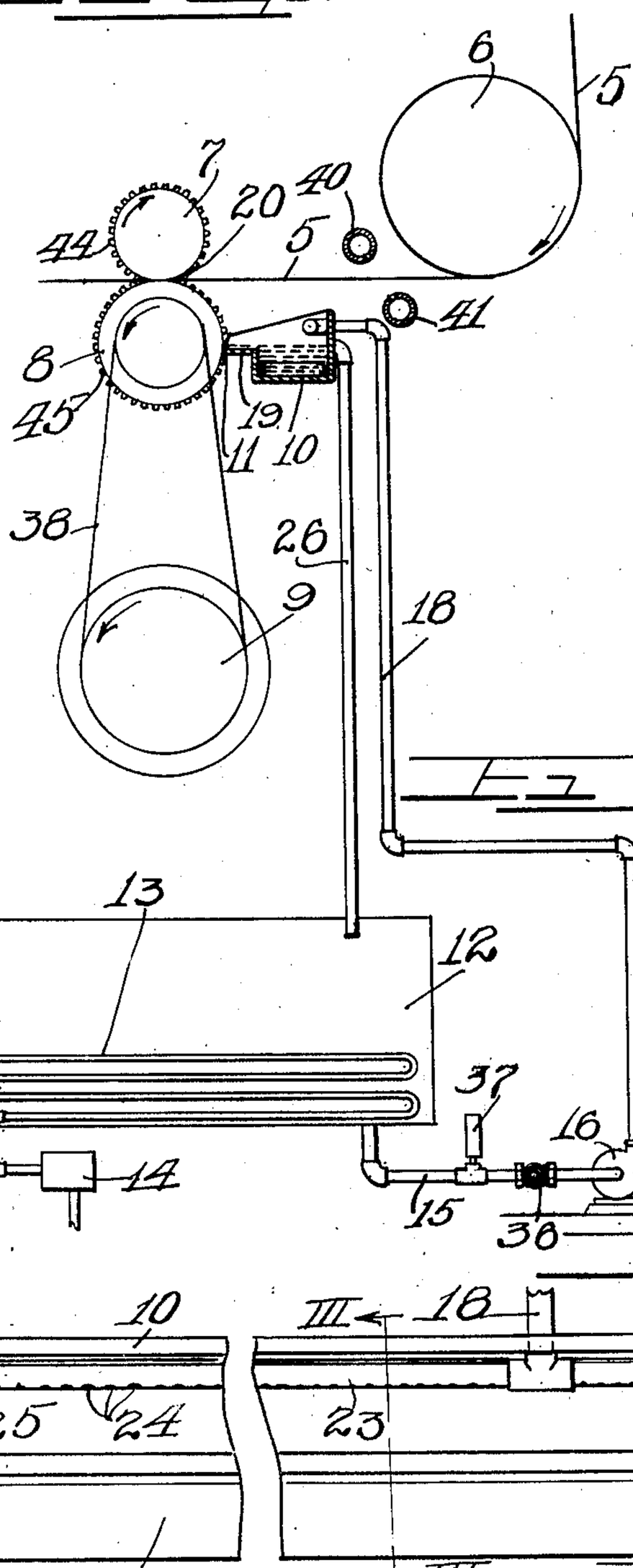


Fig. 2

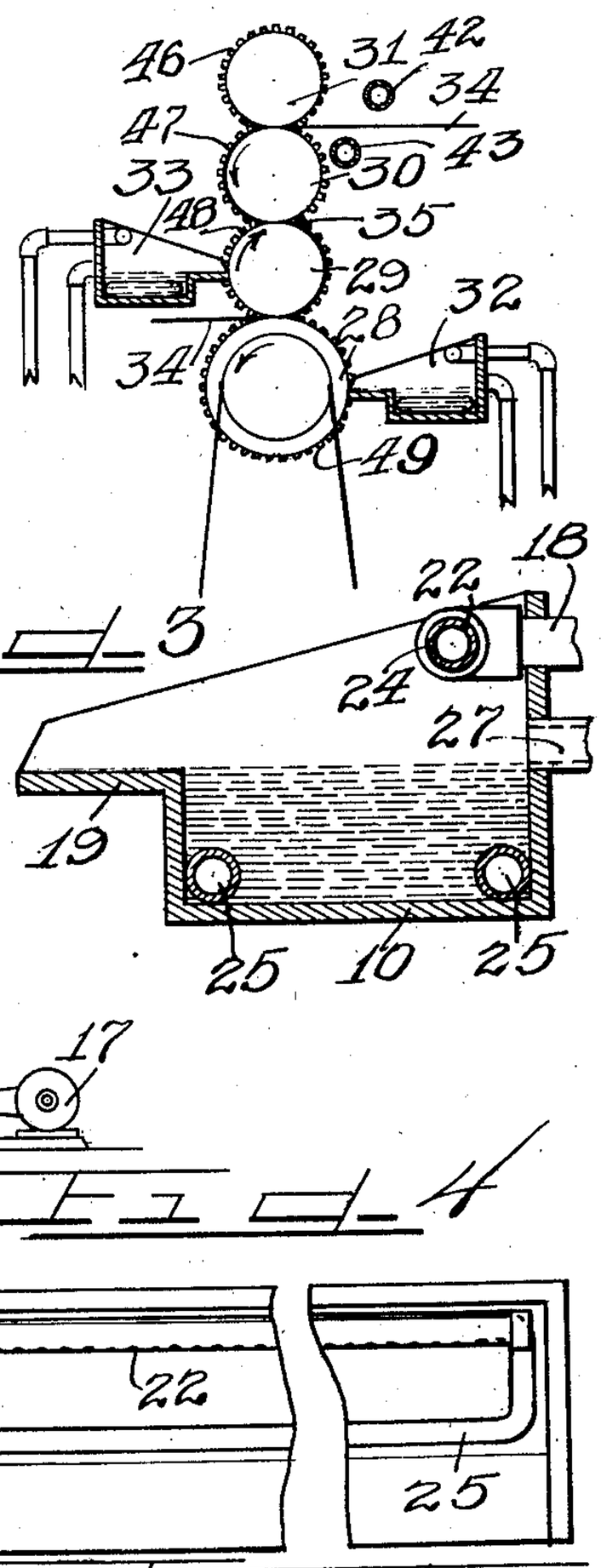


Fig. 3

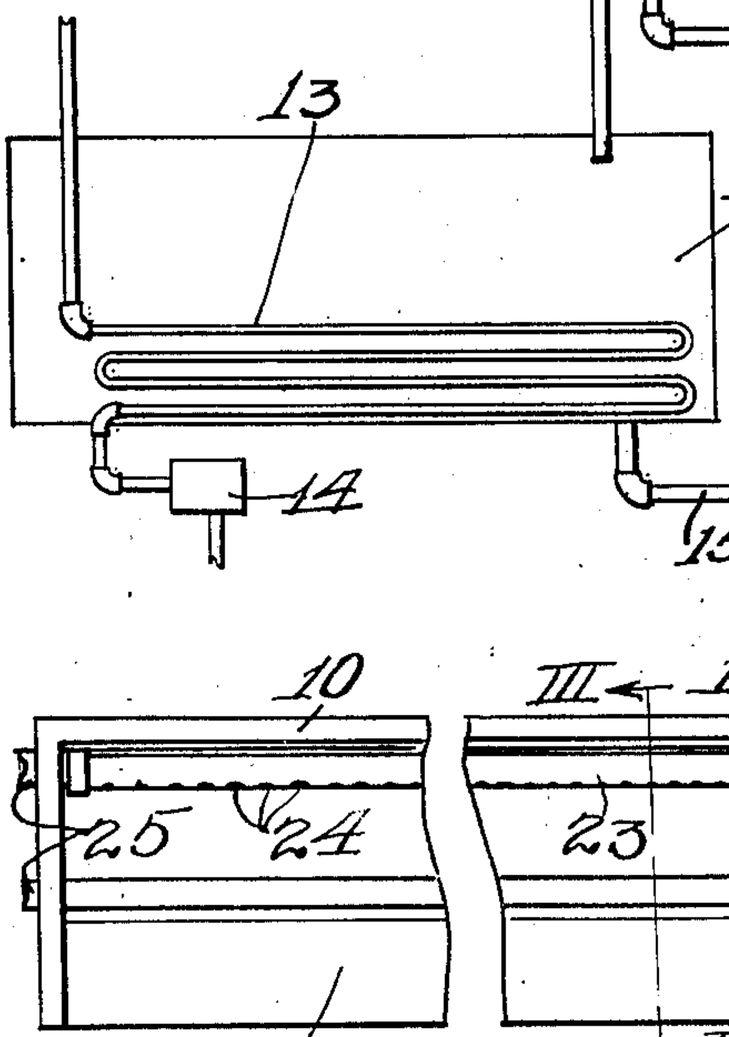
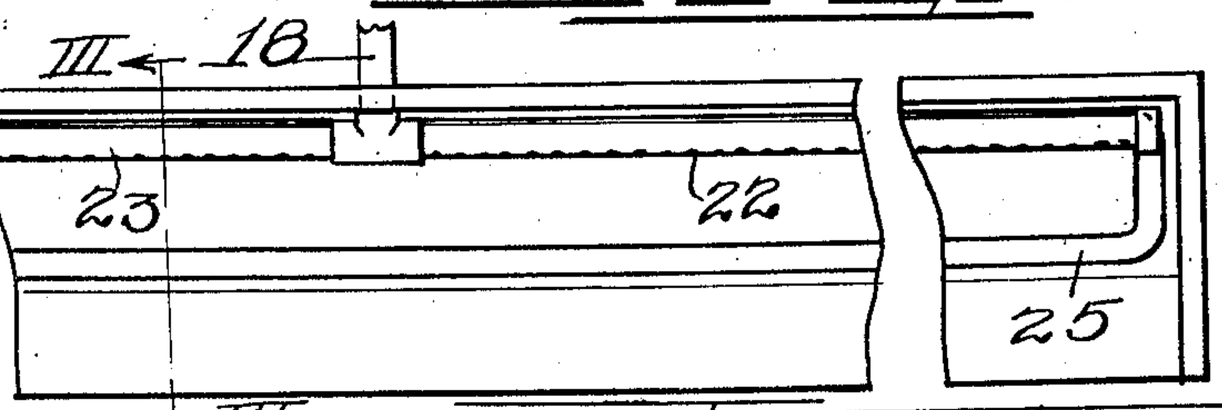


Fig. 4



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UNITED STATES PATENT OFFICE

JOHN WESLEY YOUNGCHILD AND JOSEPH WIPFLI, OF NEKOOSA, WISCONSIN, ASSIGNORS TO NEKOOSA-EDWARDS PAPER COMPANY, OF NEKOOSA, WISCONSIN, A CORPORATION OF WISCONSIN

APPARATUS AND METHOD FOR TREATING PAPER

Application filed April 11, 1932. Serial No. 604,428.

This invention relates to a process and an apparatus for treating paper.

In former methods of oiling or otherwise treating paper, it has been difficult to control the supply of oil or other treating material to make a uniform product.

We have now invented means whereby such an oiling or treating operation may be performed simultaneously with the manufacture of the paper on a paper machine and a uniform product produced.

It is, therefore, an object of our invention to provide a method and means for treating paper while on the paper making machine so that the costs of manufacture will be reduced.

A further object of this invention is to provide an apparatus for treating paper successfully and practically with oil or other materials.

Other and further objects of this invention will be evident from the following specification and accompanying drawing.

On the drawing:

Figure 1 represents a side elevation of our device shown diagrammatically with parts in section.

Figure 2 represents a side elevation of another modification of our device shown diagrammatically with parts in section.

Figure 3 represents a cross section of the oil box used in our device, taken along the line III—III of Figure 4.

Figure 4 represents a plan view of the oil box shown in section in Figure 3.

As shown on the drawing:

A heated and dried web of paper 5 as it comes from a drier, not shown, passes under a roll 6 and between calender rolls 7 and 8. Calender roll 8 may be connected to any suitable source of power but as illustrated is driven from the bottom calender roll 9 by means of a belt or chain 38.

The periphery of the roll 8 is supplied with oil or other treating liquid from an oil box 10 which is provided with an apron 19 for contact with said roll surface as at 11.

A tank 12 contains the treating liquid which is kept at the desired elevated temperature, as when heavier grades of greases and waxes are used by steam coils 13 which are connected to a steam trap 14. The temperature of the liquid may be determined by a thermometer positioned as at 37. The treating liquid from tank 12 passes through a pipe 15 to a pump 16, operated by a motor 17, which pumps it through a pipe 18 into the oil box 10. The oil or other treating liquid on reaching the oil box 10 flows out over the apron 19 into contact, as at 11, with the surface of the roll 8. The thin film of oil thus formed is subsequently taken up by the paper as it passes into the nip between the rolls 7 and 8.

The pipe 18 is provided at its upper end with two branch pipes 22 and 23 positioned lengthwise of the oil box 10. These branch pipes have numerous perforations 24. This insures a uniform distribution of the treating liquid along the entire length of the oil box 10. A steam coil 25 is provided in the oil box 10 to maintain the oil at the proper temperature.

The excess liquid pumped into oil box 10 drains off through an overflow pipe 26 which returns it to the tank 12. Opening 27 where pipe 26 leaves the oil box 10 is placed at the right height so that the treating liquid will just flow over the apron 19.

The roller 8 to whom the oil is applied is driven by a positive drive from the drive roller 9. A chain as at 38 or other suitable arrangement may be used for this purpose. The roll 7 is also driven by a positive drive from roll 8. This positive drive may consist of gears as at 44 and 45 or other suitable means, but we prefer gears since they are most suitable for this purpose.

It will be understood that there may be several unused rolls of the calender stack between the drive roll 9 and the roll 8 to

which the oil is applied. Ordinarily, the friction between the various rolls of the calender stack is sufficient to permit all rolls to be driven by merely applying power to drive roll 9, but when oil is being applied to one of the rolls, the friction is greatly reduced and some form of positive drive for the oiled rolls is necessary. This positive drive for the oiled roll or rolls of the calender stack is one of the important features of our invention.

A product of more uniform quality may be produced by exposing the paper to live steam just before the oiling step and after it has been dried. Steam for this purpose may be supplied through perforated pipes 40 and 41 of Fig. 1, and 42 and 43 of Fig. 2. Of course, it will be understood that the steam may be applied to either or both sides as desired.

This application of live steam is one of the new and novel features of our invention since it is entirely unobvious and unexpected that the use of live steam upon a paper should render a coating of oil more uniform.

Figure 2 illustrates a modification of our apparatus for applying liquid to each side of the paper as it passed through a calender stack of a paper machine.

Rolls 28, 29, 30 and 31 are rolls of the calender stack, positively driven by some suitable means such as gears 46, 47, 48 and 49. A greater or lesser number of rolls may be used as desired. Oil boxes 32 and 33 are similar in construction to oil box 10 described above and are supplied with oil or other liquid by a tank and pump arrangement like that shown in Fig. 1 and described above. Box 33 supplies oil to cylinder 29 which is taken up by the paper at a point 35, and box 32 supplies oil to cylinder 28 which is taken up by the opposite side of paper 34 so that both sides are treated.

The amount of liquid applied to the paper may be regulated by adjustment of a valve 36 in pipe 15 and also by the pressure applied to the calender rolls.

We also contemplate the use of heated calender rolls when desired. It is particularly advantageous to heat the rolls 7, 29 and 30. These rolls may be heated by any of the usual methods but we prefer to use steam.

We are aware that numerous details of our invention may be varied through a wide range without departing from the principles thereof, and we, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

We claim as our invention:

1. In combination, a calender roll and a liquid feed box having an edge contacting with said roll, an inlet pipe for said box extending substantially the entire length thereof and perforated to distribute inflowing liquid uniformly through the length of said box, and an outlet for said box so placed that the liquid will be maintained at a level slightly above said edge contacting with said roll.

2. In combination with a roll in the calender stack of a paper making machine, a box contacting with and adapted to supply oil to the surface of said roll, means for maintaining oil in said box at a constant level, means for positively driving said roll and means for maintaining the oil at an elevated temperature.

3. In combination, a calender roll equipped with a positive drive, and a liquid feed box having an edge contacting with said roll, an inlet pipe for said box extending substantially the entire length thereof and perforated to distribute inflowing liquid uniformly through the length of said box, and an outlet for said box so placed that the liquid will be maintained at a level slightly above said edge contacting with said roll.

4. In combination with a positively driven calender roll in a calender stack of a paper making machine, means for applying oil to the outer surface of said roll, and means for applying live steam to the paper before it passes around said roll.

5. The method of oiling paper during the course of its manufacture which comprises applying live steam to the paper just previous to the calendering step, and applying oil to said paper during the calendering step.

6. The method of oiling paper during its manufacture, which comprises applying steam to said paper prior to the calendering step, and applying oil to the outside surface of the rolls of the calender stack.

7. The method of oiling paper during its manufacture, which comprises treating said paper with live steam before the calendering step and applying oil to one surface of said paper during the calendering step.

8. In combination with a calender stack of a paper making machine, means for positively driving normally frictionally driven rolls of said calender stack, and means for applying oil to the outer surface of said rolls for transfer to a web of paper brought into contact therewith.

9. In combination, a calender stack having a plurality of positively driven calender rolls, a plurality of liquid feed boxes each having an edge contacting with one of said calender rolls, each of said boxes having a perforated inlet pipe extending substantially its entire length, whereby a uniform distribution of liquid is secured, and an outlet so placed that the liquid will be maintained at a level slightly above said edge.

10. In combination, a calender stack of a paper making machine having a plurality of positively driven calender rolls, means for applying oil to the outer surface of a plurality of said rolls, and means for applying

live steam to the paper before it passes around said rolls.

11. In combination with a calender stack of a paper making machine, means for positively driving normally frictionally driven rolls of said calender stack, and means for applying oil to the outer surface of one of said rolls for transfer to a web of paper brought into contact therewith.

12. In combination, a calender stack of a paper making machine having a plurality of positively driven calender rolls, and means for applying a liquid to the outer surface of a plurality of said rolls.

In testimony whereof, we have hereunto subscribed our names at Nekoosa, Wood County, Wisconsin.

JOHN WESLEY YOUNGCHILD.
JOSEPH WIPFLI.