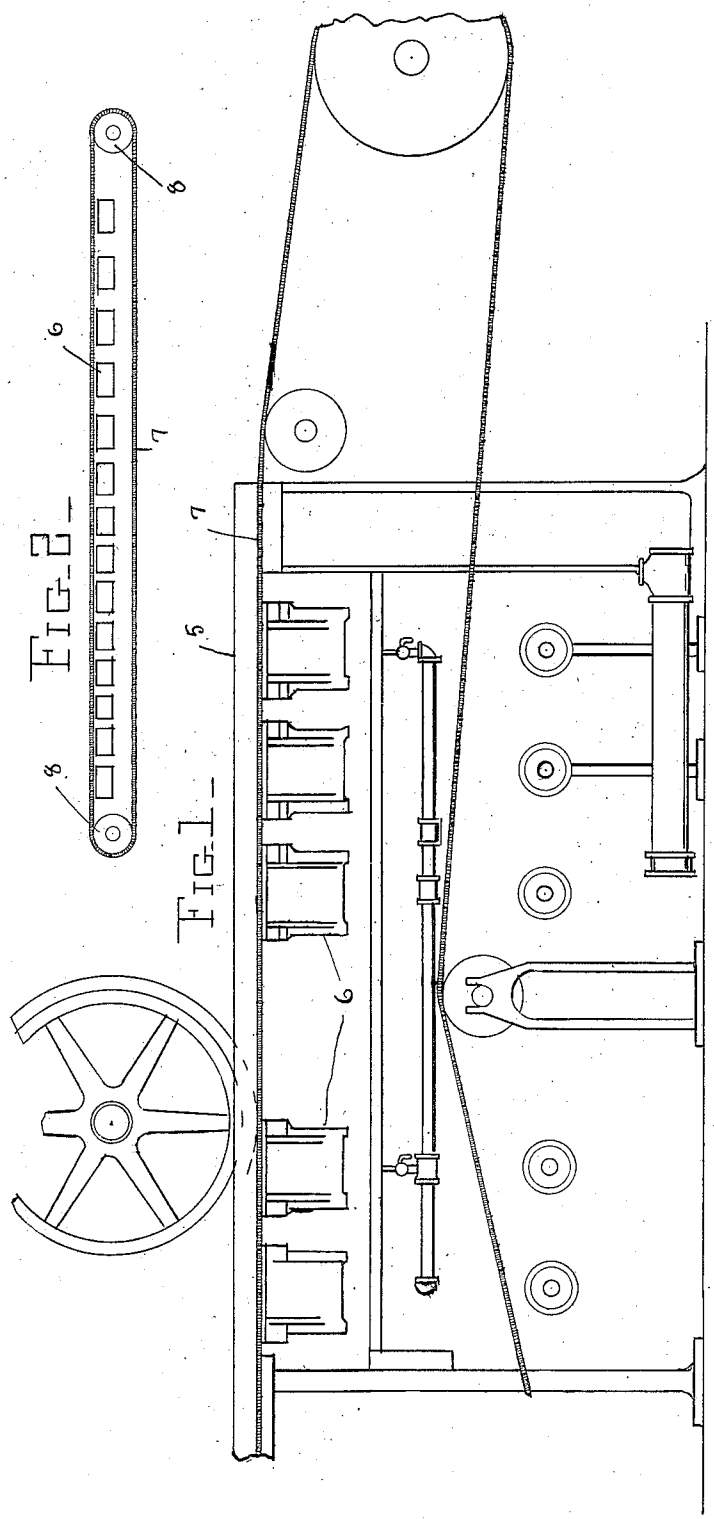
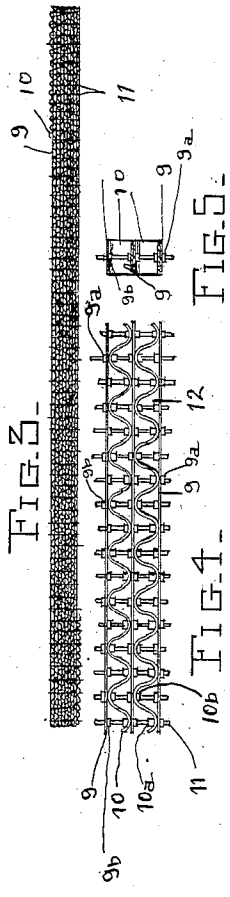
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J. J. O'BRIEN

PAPER MAKING BELT OR FOURDRINIER WIRE

Original Filed March 25, 1920





INVENTOR

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PAPER-MAKING BELT OR FOURDRINIER WIRE.

Application filed March 25, 1920, Serial No. 368,662. Renewed November 7, 1923.

To all whom it may concern:

Be it known that JOSEPH J. O'BRIEN, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, has invented certain new and useful Improvements in Paper-Making Belts or Fourdrinier Wires, of which the following is a specification.

This invention relates to improvements in paper making belts or Fourdrinier wires and its leading object is to provide a belt or wire having a pulp supporting surface of uniform height throughout and including transverse strips and longitudinal connecting wires all arranged so that the transverse strips provide water spaces through which the surplus water may be sucked by the suction boxes of the paper making machine. The transverse strips are spaced from each other by serpentine strips and the space between the curves of the serpentine strips determines the size of the water openings in the belt of wire construction and the serpentine strips are of the same width as the transverse strips.

One of the objects of the invention is to provide a pulp working foraminous belt or Fourdrinier wire wherein shearing action between intersecting longitudinal and transverse members of the belt or wire are reduced to a minimum and the working surfaces of the belt or wire maintained at a uniform height throughout so as to avoid forming minute indentations in the paper pulp as it is worked by the belt or wire from the suction boxes.

With the above and other objects in view this invention relates to certain new and useful constructions, combinations and arrangements of parts, clearly described in the following specification and fully illustrated in the accompanying drawings, in which:

Figure 1 is a fragmental side elevation of the wet end of the paper making machine showing my improved pulp working belt or Fourdrinier wire in operative relation to the suction boxes thereof.

Figure 2 is a detail view on a similar scale illustrating the endless construction of the belt or wire.

Figure 3 is a detail fragmentary plan view of the belt or wire taken on an enlarged scale.

Figure 4 is a similar view greatly magnified.

Figure 5 is a detail edge view of Figure 4.

Referring to the accompanying drawings 5 designates the frame of the paper making machine which includes the usual suction boxes 6. My improved Fourdrinier wire or paper making belt 7 is mounted to move in the usual manner over the suction boxes 6. The action of this belt in the making of paper is substantially the same as that of the standard Fourdrinier wire, with the exception that the belt is slightly thicker and adjustments of the steering roller or the like over which the belt or wire will travel will be necessary. Figure 2 shows the endless construction of the belt, operating on the supporting end rolls 8 over the suction boxes 6.

In the manufacture of paper minute irregularities are left in the surface of the paper due to the vertical bending of the warp and woof strands of the wire fabric, and these irregularities result in imperfect printing when the paper is worked in the ordinary process of publication. The constant bending of the wire fabric develops a shearing action between the warp and woof strands and in time the wire breaks and the tendency to break is intensified by the pressure exerted by the suction boxes and the paper pulp and the wire itself against the paper making machine.

In my improved paper working belt or Fourdrinier wire flat wire and serpentine wire strips are used in place of the ordinary round wire strands and the warp threads or wires are extended through openings formed in the transverse flat or serpentine strips, the warp threads or wires being located midway between the upper and lower edges of the transverse strips so that they will remain out of contact at all times with the paper pulp. The flat and serpentine strips are all of equal diameter and the warp threads or wires extend therethrough so that the upper edge portions and the transverse strips will be spaced equally above the warp wires or threads and these will be maintained at a uniform working height.

In Figure 3 I show a slightly magnified view showing the fabric as it would look in ordinary use and in Figures 4 and 5 I show a fabric greatly magnified. Referring to the last named figures 9 designates the flat

transverse strips, 10 the serpentine transverse strips and 11 the warp threads or wires. The serpentine strips 10 are located between the flat strips 9 and the right and left curves of said serpentine strips which are of equal area so as to provide water passages or openings of equal area between the sides of the flat strips and the curves of the serpentine strips. The size of the curves of the serpentine strips determines the area of the water passages 12 provided between said serpentine strips and the flat strips.

As shown in Figures 4 and 5 the outer faces of the serpentine strips are in contact with the adjacent faces of the flat strips and the warp threads or wires 11 are extended through the engaging serpentine and flat strips which are spaced an equal distance from each other. The flat strips 9 are formed with extruded openings 9^a on one side thereof and 9^b on the opposite side thereof, while the serpentine strips are formed with extruded openings 10^a on one side thereof and 10^b on the opposite side thereof through which the warp wires or threads 11 extend, thus providing contacting surfaces between the transverse strips of the warp wires or threads of greater width than the thickness of the strips themselves, and thus minimizing the abrasive action of the engaged parts. The ends of the warp wires or threads are connected to each other as in the customary Fourdrinier wire construction so as to make the entire fabric an endless construction as indicated in Figure 2. The material extruded in forming the openings is in the nature of burrs, which provide minute spacing tubes for holding the confronting strips spaced apart, and for providing relatively long contact between the strips and the connecting wires.

In using the improved paper working belt or fabric the transverse strips have contacting engagement with the pulp and as the upper edge portions of the transverse strips are of equal height and a level surface is presented to the belt which prevents the formation of minute irregularities or indentations such as tend to prevent the proper printing of the paper. Owing to the flexibility of the serpentine strips the fabric will bend easily around the roller. By making the curves long or short the number of warp threads or wires used may be varied at will.

Having described my invention, I claim:

1. A paper working fabric belt consisting of a plurality of transverse strips arranged to provide water passages therebetween and means connecting the strips to each other to provide an endless belt construction.

2. A paper working fabric consisting of a series of flat transverse strips, a series of serpentine transverse strips disposed alternately therebetween and means connecting the strips to each other to provide an endless belt construction.

3. A paper working fabric or the like consisting of a series of flat transverse strips, a series of serpentine transverse strips disposed alternately therebetween and spacing the first strips from each other to provide water passages and means connecting the strips to each other to provide an endless belt construction.

4. A paper working fabric or the like consisting of a series of flat strips, a series of serpentine strips located alternately between the flat strips and providing water passages therebetween, and warp threads or wires extending through the strips to provide an endless belt construction.

5. A paper working fabric consisting of members connected to each other to provide an endless belt construction and presenting pulp engaging surfaces of uniform height.

6. A paper working fabric or the like consisting of a series of transverse flat strips, a series of serpentine strips located therebetween, said strips having extruded openings and warp thread or wires extending through said openings to provide an endless belt construction.

7. A paper working fabric consisting of a series of transverse flat strips, a series of strips disposed alternately therebetween and provided with offset portions spacing the first strips therefrom to provide a series of passages between the strips, and means connecting the strips to each other.

8. A paper working fabric consisting of a series of transverse flat strips, a second series of strips alternately disposed between the strips of the first series, the strips of one of said series having offset portions spacing the strips of the other series therefrom, and flexible connecting means passing through all of the strips.

9. A paper working fabric consisting of a series of strips, a second series of strips disposed alternately between the first series, and means carried by one of the strip series for spacing the member strips of the other series therefrom to provide a series of restricted water passages between the strips.

10. A paper working fabric consisting of a series of strips, and flexible connecting means therefor, certain of the strips being spaced from the other strips to provide a series of water passages between the strips, the connecting means being spaced inwardly of the working edge surfaces of the strips.

Signed by me at Springfield, Massachusetts.

JOSEPH J. O'BRIEN.