Oct. 22, 1940. A. W. FROST 2,218,817

ROLL FOR HANDLING PAPER

Filed Oct. 14, 1938

Fig. 1.

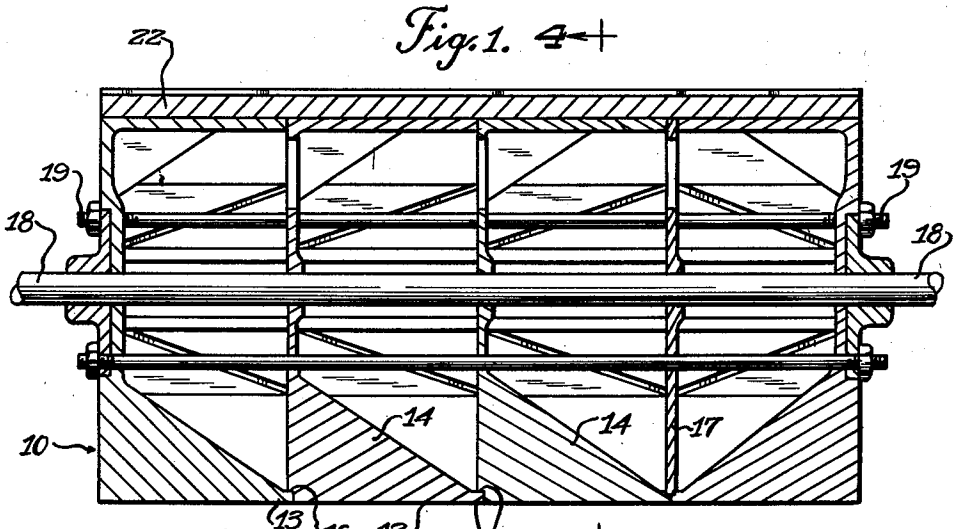


Fig. 2.

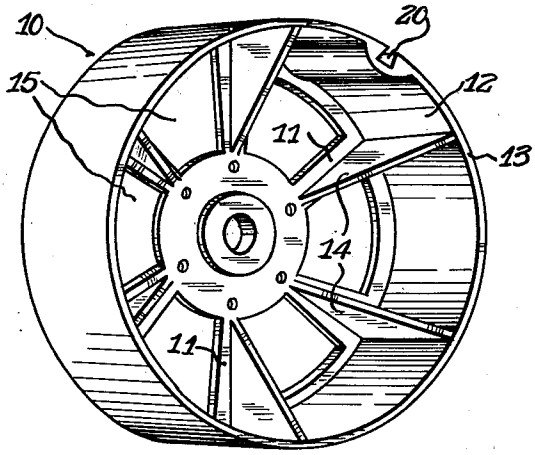


Fig. 3.

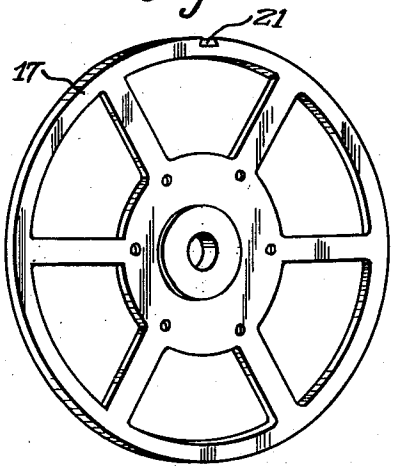


Fig. 4.

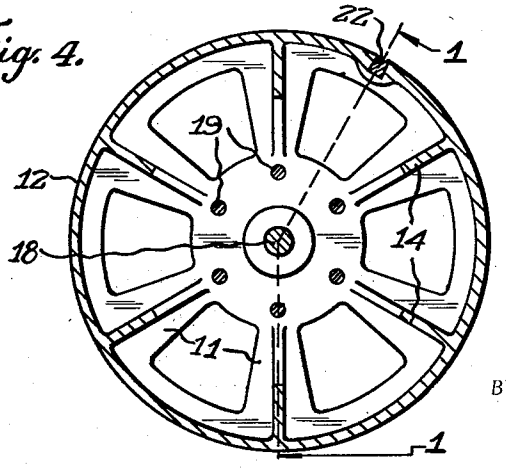
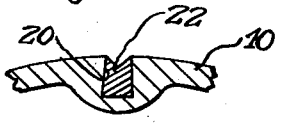


Fig. 5.



INVENTOR.
ALFRED W. FROST

BY Ramsey, Kent, Chisholm & Lutz

ATTORNEYS.

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ROLL FOR HANDLING PAPER

Alfred W. Frost, Detroit, Mich., assignor to Bohn Aluminum & Brass Corporation, Detroit, Mich., a corporation of Michigan

Application October 14, 1938, Serial No. 234,974

6 Claims. (Cl. 164—66)

This invention relates to a roll for handling paper formed of a light-weight metal such as an alloy of aluminum.

A main object of the invention is to provide a roll built up from sections cast separately, but assembled and reinforced in such a way that the completed roll is sufficiently strong and rigid for the intended use.

This and other objects and advantages of the invention will become apparent as the description proceeds.

While a preferred form is disclosed herein for purposes of illustration, it should be understood that various changes may be made in the structure and arrangement of parts without departing from the spirit of the invention as herein set forth and claimed.

In the drawing:

Fig. 1 is a longitudinal cross-section of a paper roll embodying the invention, taken on line 1—1 of Fig. 4.

Fig. 2 is a perspective of one of the cup-shaped members of the paper roll.

Fig. 3 is a perspective of the support disc.

Fig. 4 is a section on line 4—4 of Fig. 1.

Fig. 5 is an enlarged section showing the cutter member held in the dovetail groove.

This invention relates primarily to the roll used in the final operation of a paper board machine. These rolls take the board from the conveyor and are of relatively large size, one example being 104 inches long with a diameter of 45 inches.

Formerly the only satisfactory material for these rolls was wood, and each roll was a solid cylinder cut from a selected tree. These wooden rolls were expensive to produce, required great care in handling and storage, and had a relatively limited life. Ferrous materials cannot be used because they do not form a surface to which the paper will adhere. Light-weight alloys do form suitable surfaces, but to cast a one-piece roll of this size from them is very difficult and expensive.

The present invention provides a roll in which a plurality of separate sections are secured together to form a unitary roll, the separate sections being of such a size and shape that they can be cast conveniently.

In the drawing the separate sections are indicated by the reference numeral 10, and as is clearly seen in Fig. 2, each of these sections is of general cup-shape with a bottom 11, a cylindrical wall 12, and an open end surrounded by a rim 13. The member 10 is reinforced by a plurality of triangular webs 14 which are radially arranged and which are connected with the bottom 11 and the side wall 12. In order to lighten the structure, openings 15 are formed in the bottom 11.

The roll illustrated is formed by securing together four of the cup-shaped members 10, the three at the left-hand part of Fig. 1 being partially nested together while the one at the right-hand end of Fig. 1 is reversed so as to have its open end confronting the open end of the last cup-shaped member of the nested series. This arrangement is used in order to bring a bottom 11 of a cup-shaped member at each end of the roll for purposes of support.

Special arrangements are made to provide radial support for the rims 13 at the open ends of the cup-shaped members 10. For the partially nested series of members 10 this support is provided by fitting each rim 13 over a shoulder 16 on the adjacent member 10. At the right-hand of the roll where two of the cup-shaped members confront each other, thus bringing two of the rims 13 into contact, each of the rims 13 fits partway over a support disc 17 which may have the shape of an open spider as shown in Fig. 3.

Each of the cup-shaped members 10 and support disc 17 is formed with an aperture to accommodate shaft 18 which supports the roll. A plurality of through bolts 19 are used to draw the cup-shaped member tightly together to form a unitary roll. The surface of the roll can be suitably finished in the same manner as though it were a single homogeneous casting, and since a very strong compression is exerted on the members by the through bolts 19, it is practically impossible after the roll has been finished to detect that it is composed of a plurality of separate sections.

In the operation of paper rolls of this type it is desired to have a cutter groove extend axially of the roll. In the present invention each of the cup-shaped members 10 is formed with an undercut groove 20 and a suitable conforming groove 21 is formed in the support disc 17. The parts are assembled with these grooves in alignment, and a wooden grooved strip 22 is then driven longitudinally into the groove. When it is desired to sever the paper board coming from the roll a wooden knife is drawn across it following the groove in strip 22. The paper board coming from the conveyor passes under the roll and is carried up over the top of the roll, but does

not wind around the roll since the end is cut off as soon as the groove 22 presents itself.

The cup-shaped members 10 and support disc 17 are preferably formed of a suitably non-ferrous material, such as aluminum, magnesium, or alloys containing them. A preferred material is an aluminum alloy having the following percentage composition:

Copper	maximum	0.1
Silicon	4.5 to	6.0
Iron	maximum	0.8
Magnesium	do	0.03
Zinc	do	0.3
Manganese	do	0.03
Aluminum	do	Balance

The through bolts 19 are preferably made of a strong ferrous material.

The roll of the present invention can be economically produced, it is light and strong and since it is not subject to warping or cracking will last indefinitely. Other advantages of the invention will be apparent to those skilled in the art.

I claim:

1. A roll for handling paper comprising a series of cup-shaped members arranged in partially nested relation with the rim of each cup-shaped member interfitting with a shoulder formed on the bottom of the adjacent cup-shaped member, an end cup-shaped member arranged with its open end confronting the open end of the last cup-shaped member of the series, said end cup-shaped member and said last cup-shaped member having their rims interfitting with a support disc, a plurality of through-bolts binding the cup-shaped members and the support disc together to form a unitary roll, the peripheries of the cup-shaped members combining to form a uniform, cylindrical periphery for the paper roll.

2. A roll for handling paper comprising cup-shaped members formed of aluminum alloy, each cup-shaped member having a bottom, a continuous side wall, and an open end, a series of the cup-shaped members being arranged in partially nested relation with the rim of each cup-shaped member interfitting with a shoulder formed on the bottom of the adjacent cup-shaped member, an end cup-shaped member arranged with its open end confronting the open end of the last cup-shaped member of the series, said end cup-shaped member and said last cup-shaped member having their rims interfitted with a support disc, a plurality of through bolts binding the cup-shaped members and the support disc together to form a unitary roll, the peripheries of the cup-shaped members combining to form a uniform, cylindrical periphery of the paper roll.

3. A roll for handling paper as specified in claim 2 in which each cup-shaped member is reinforced by a plurality of triangular webs, each web extending along the bottom and side wall of a cup-shaped member.

4. A roll for handling paper as specified in claims 2 in which the roll is formed with an undercut groove extending axially across its periphery and is provided with a wooden strip secured in said groove.

5. A roll for handling paper comprising a plurality of cup-shaped members formed of lightweight metal, the rim of each cup-shaped member being supported by an interfitting engagement with an adjacent part, the two end cup-shaped members being disposed with their bottoms forming the ends of the roll, a plurality of fastening members binding the cup-shaped members together to form a unitary roll, the peripheries of the cup-shaped members combining to form the uniform cylindrical surface of the roll.

6. A roll for handling paper as specified in claim 2 in which each cup-shaped member is reinforced by a plurality of triangular webs, each web extending along the bottom and side wall of a cup-shaped member, and in which each of the cup-shaped members and the support disc is formed with an opening to accommodate a shaft.

ALFRED W. FROST.