

[54] **CONCRETE PIPE MAKING APPARATUS**

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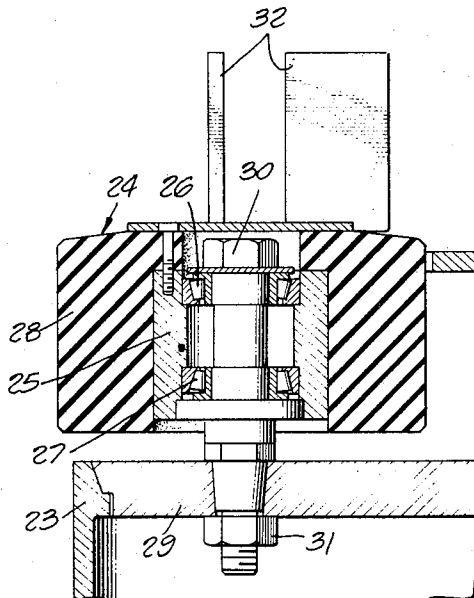
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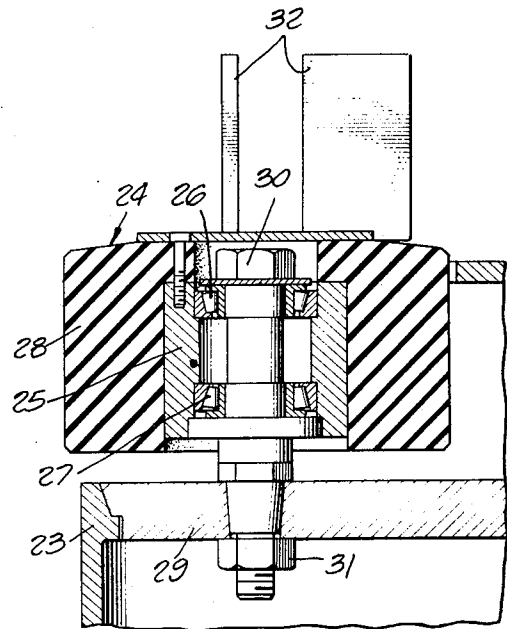
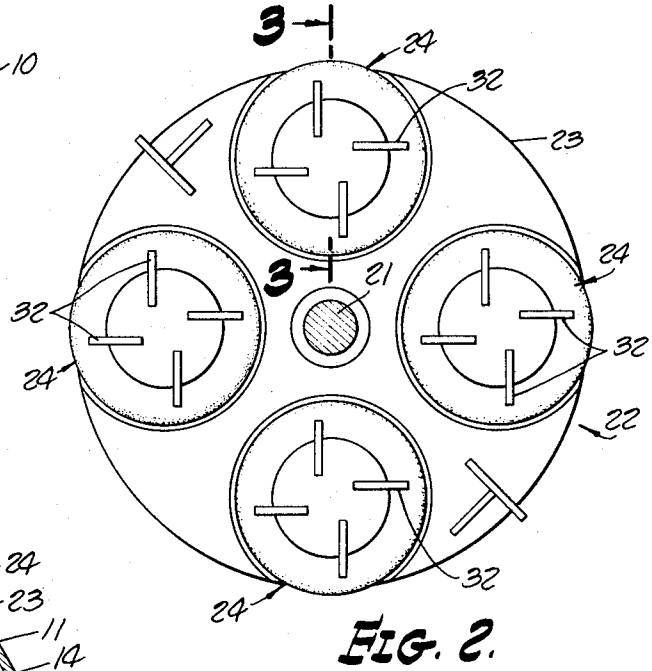
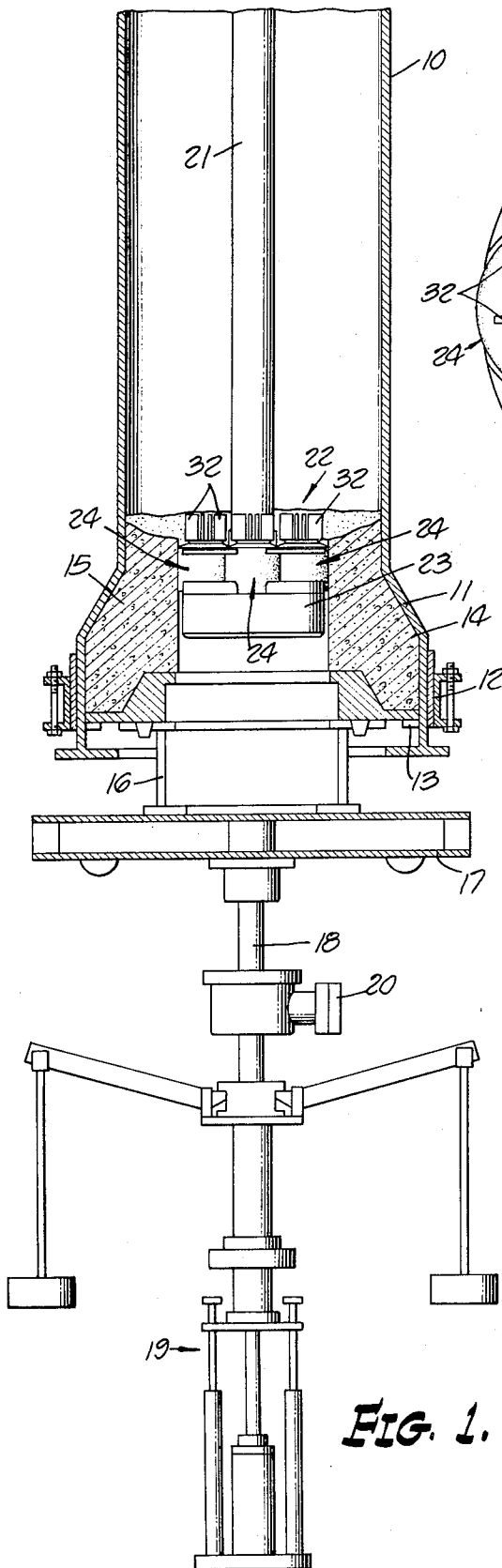
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[57] **ABSTRACT**

Each of the rollers in the packer head of concrete pipe making apparatus has rubber tires or rubber facings on their peripheral surfaces, which are brought into bearing contact with the concrete of a forming pipe. The tires or facings have a sufficient amount of resiliency so that stones, or the like, do not jam between the roller and adjacent packer head parts, but are merely rolled on through. Also, on eventual wear, the tires or roller facing parts may be quickly, easily, and relatively inexpensively replaced.

**1 Claim, 3 Drawing Figures**





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## CONCRETE PIPE MAKING APPARATUS

The present invention relates generally to apparatus for making concrete or cement pipe, and, more particularly, to an improved roller head apparatus for use in the forming of pipe made of such materials.

### BACKGROUND OF THE INVENTION

It is standard technique at the present time in the making of concrete pipe to produce relative vertical movement between a roller assembly, frequently referred to as a packer head, within a cylindrical mold, which head forces freshly poured concrete or other aggregate outwardly toward the mold surface, such that on passing therethrough a pipe is formed in contacting relation to the cylindrical mold. The packer head must exert sufficient force against the aggregate material to pack tightly against the mold surface and retain its shape after the packer head moves on for that length of time necessary for the material to set up. Such packer heads in the past have included rollers in the outer surface of the head which contact the cement or concrete and are themselves rotated during formation of the pipe.

These so-called packer head rollers, in the past, have been constructed of steel to withstand the very high pressures required for working of cement, concrete and the like, as well as to provide a useful operating life in the face of considerable frictional wear. Despite being made of very hard and tough steel, the rollers are still found to exhibit a considerable amount of wear, as well as the fact that stones occurring in the concrete frequently get caught between the rollers and adjacent working parts of the packer head, preventing the rollers from rotating, thereby disrupting the pipe making process.

### OBJECTS AND SUMMARY OF THE INVENTION

It is therefore a primary object and aim of this invention to provide head roller apparatus for use in making concrete pipe in which relatively resilient surfaces are pressed into contact with the forming pipe materials.

A further object is the provision of concrete pipe making apparatus in which rollers having resilient peripheral surfaces aid in packing the pipe making materials against a mold wall.

Yet another object is the provision of apparatus as described in the above objects in which the rollers include rubber peripheral surfaces.

In the practice of the present invention, there is provided in a concrete pipe making apparatus, resilient rollers for inclusion in the packer head. In particular each of the rollers included in the packer head have rubber tires or have rubber facings on their peripheral surface, which are brought into bearing contact with the concrete of a forming pipe. The tires or facings have a sufficient amount of resiliency so that stones, or the like, do not jam between the roller and adjacent packer head parts, but are merely rolled on through. Also, on eventual wear, the tires or roller facing parts may be quickly, easily, and relatively inexpensively replaced.

## DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional, elevational view of concrete pipe making apparatus in accordance with the present invention.

FIG. 2 is an enlarged, plan view of a roller head assembly, illustrating the head rollers of the present invention.

FIG. 3 is an enlarged, sectional, elevational view of a packer head roller of this invention taken along the line 3—3 of FIG. 2.

### DESCRIPTION OF A PREFERRED EMBODIMENT

Turning now to the drawings, particularly FIG. 1, there is illustrated a typical concrete pipe making apparatus, with which the special roller apparatus of this invention derives its primary utility, although it can be satisfactorily and advantageously used with any other type of concrete pipe making apparatus employing a packer head. The apparatus is depicted in the initial stages of making a concrete pipe.

An upstanding, hollow, generally cylindrical mold or mold jacket 10 includes at its lower end an enlarged portion 11. A retaining bracket 12 includes parts 13 extending within the mold cavity for supporting a pallet 14 upon which the concrete 15 rests during formation of the pipe. A standard 16 is adapted to be removably received within the lower portions of the pallet 14 and in force bearing contact with the pallet. A rotatable platform 17 carried on the upper end of a shaft 18 supports the standard 16. Hydraulic drive means 19 serve to move the shaft 18, supporting table 17, standard 16 and the remainder vertically for placing the standard into position against the pallet. Via a gear box 20, an electric motor (not shown) provides rotative motion to the shaft 18 and thence to the standard carried thereby, for a purpose to be shown.

A shaft 21, frequently referred to as a packer shaft, carries at its lower end a head or packer head assembly 22, and which comprises in its major elements a generally cylindrical body 23 with a plurality of individually mounted rotatable rollers 24, the peripheral edges of which rollers extend slightly beyond the outer edges of the body 23 for engagement with the concrete to press the same against the jacket wall as will be more particularly pointed out.

In operation, the empty mold jacket 10 is moved upwardly about the packer head 22 and shaft 21 by the hydraulic drive means 19 until the head is at the lowermost position, i.e., approximately the level of the base or pallet 14. Concrete, cement or other aggregate is applied from the top of the mold jacket 10 and is allowed to fall downwardly into the mold and onto the upper portions of the roller head 22. At the same time, in accordance with a known technique, the shaft 21 rotates the head 22 in the direction shown, while the shaft 18 rotates the standard and pallet 14 in the opposite direction.

The concrete begins to fill up the lower regions of the jacket 10 as shown in FIG. 1 and above the upper surface of the pallet 14, the peripheral surface of the head 22 and the rollers 24 engage the concrete or cement 15 and shape the inner surface of the forming pipe. This rotative motion is transferred through the axles for the rollers 24 to the upstanding impeller fins 32, which

serve to throw the concrete dropping onto the upper surface of the head 22 into the pipe forming regions. In addition to the rotative motion and the wiping action of the rollers 24, vibration is sometimes applied to the platform 17, which also serves to pack the concrete or cement against the inside of the mold wall. As the pipe is formed, the head 22 is slowly withdrawn to form higher sections of the pipe, which is continued until the pipe is finished.

With reference now to FIG. 3, each of the rollers 24 of this invention is seen to include a tubular metal hub 25 journaled to a pair of axially aligned bearings 26 and 27. The entire circumferential periphery of the hub 25 is covered with a relatively hard, high tensile strength rubber facing 28 which is securely anchored to the hub. The roller is mounted onto the upper surface of a horizontal plate 29 forming a part of 23 by bolt means 30, extending through the bearings 26 and 27 and an opening in the plate 29. A nut 31 secures the bolt and roller to the plate 29.

In accordance with the practice of the present invention, there is provided in concrete pipe making apparatus, head rollers having a relatively resilient surface for engaging the concrete and pressing the same against a mold surface. Whereas in the past such head rollers have been constructed of steel, the subject rollers are made of a hard or high tensile strength rubber, which is relatively resilient as compared to steel and it is in this comparative context that the word resilient is used herein. Such rollers possess sufficient strength to accomplish the pressing function in the formation of a concrete pipe and also, due to their relative resilience, do not entrap stones between the roller moving parts and adjacent surfaces of the packer head, which in the past has been a frequent source of failure or malfunction.

Further in this connection, the rubber rollers of the subject invention, when brought into bearing contact with the cement, give sufficiently so that the surface frictional abrasion forces are less than in the case of conventional steel rollers. Also, it is believed that coefficient of sliding friction for the rubber rollers is greater

than for ordinary steel rollers so that there will be less slippage of the rubber rollers against the cement than would be the case for steel rollers, and thus frictional wear is substantially reduced.

In the foregoing description, the rubber facings for the rollers are defined as constructed of a hard and high tensile strength rubber. Although it is contemplated that improved results can be obtained with rubber packer rollers of hardness extending over a relatively broad range, best results have been obtained in an actual construction in which the rubber facing on the rollers had a 50-Shore durometer hardness as measured on the "A" scale. Also, the same rubber had tensile strength of approximately 3,000 pounds per square inch.

Moreover, although in the foregoing description, the rollers of this invention are provided with solid rubber facings, it is believed that air-filled rubber tires may be used and still come within the spirit of this invention.

The resilient roller facings of this invention have been referred herein as constructed of rubber; however, it is considered that a number of plastic materials may be found having sufficient resiliency characteristics for use as a roller facing or for an air-filled tire to practice the present invention.

What is claimed is:

1. A packer head roller for forming pipes from soft concrete or cement, comprising:

a tubular metal hub;

bolt means having one end rotatably journaled within said hub and its other end affixed to a generally horizontal supporting surface; and

a rubber facing of a hardness less than approximately 70-durometer secured to the outer surface of said hub extending completely circumferentially therearound, and axially beyond the outer end of said hub in contacting covering relation to said hub edge;

the outwardly directed circumferential and end surfaces of said rubber facing engaging the soft concrete or cement and forming it into a compact pipe wall.

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