May 24, 1960 L. TONIOLO ET AL 2,937,701

PIPE MAKING MACHINES

Filed May 14, 1956 4 Sheets-Sheet 1

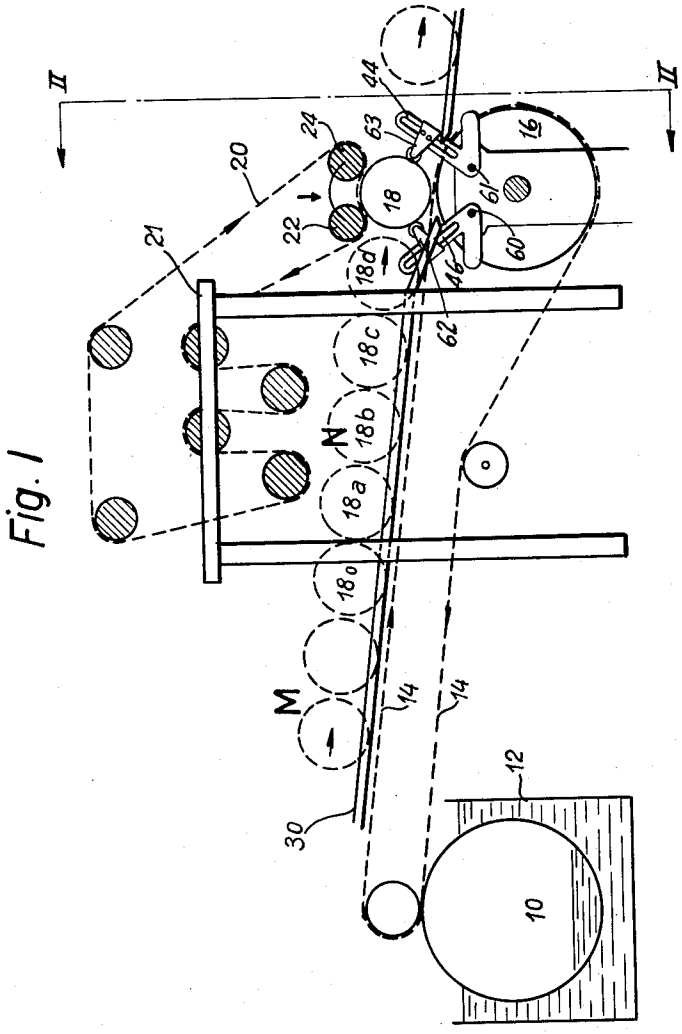


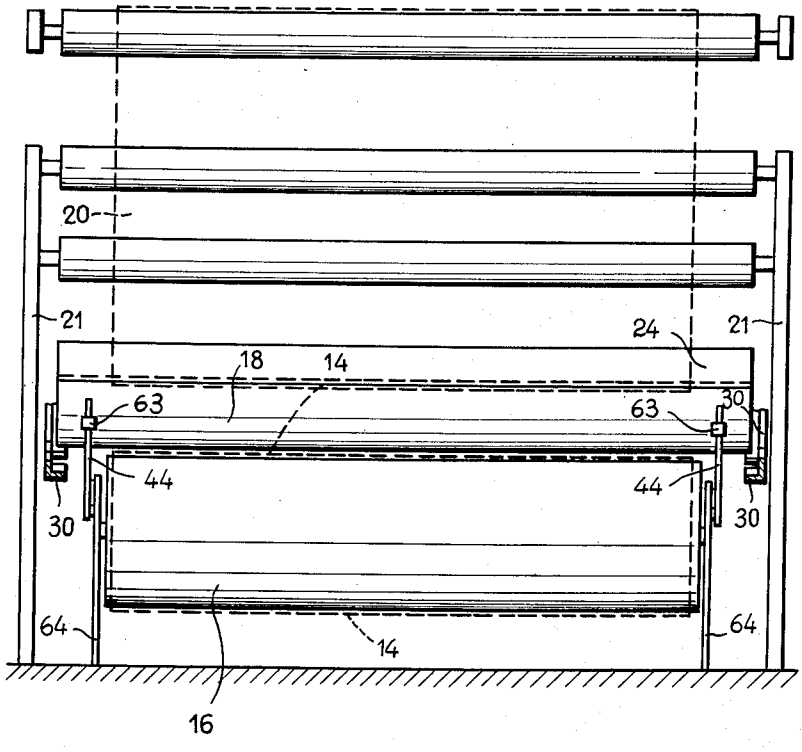
Fig. 1

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Fig. 2



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FIG. 3a

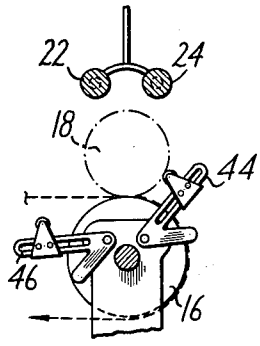


FIG. 3b

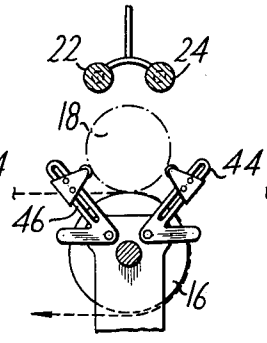


FIG. 3c

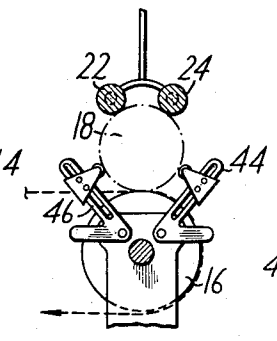


FIG. 3d

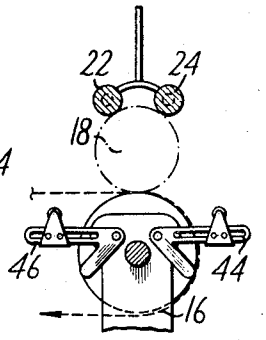


FIG. 4a

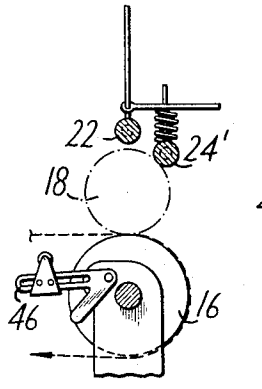


FIG. 4b

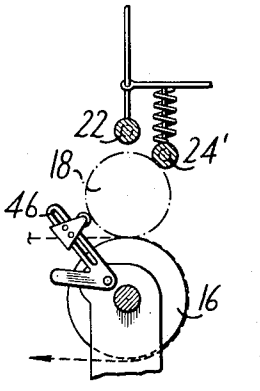


FIG. 4c

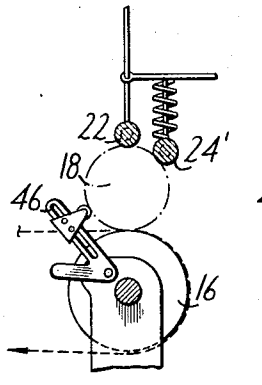


FIG. 4d

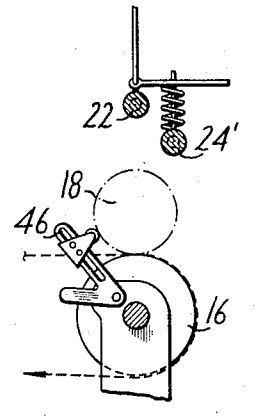


FIG. 5a

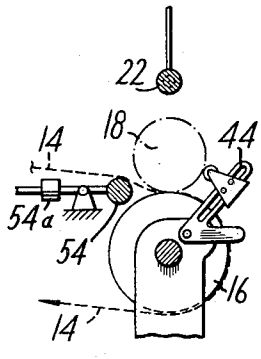


FIG. 5b

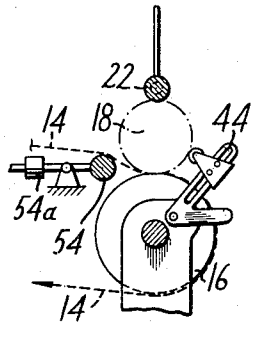
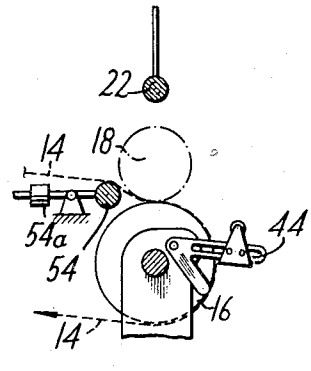


FIG. 5c

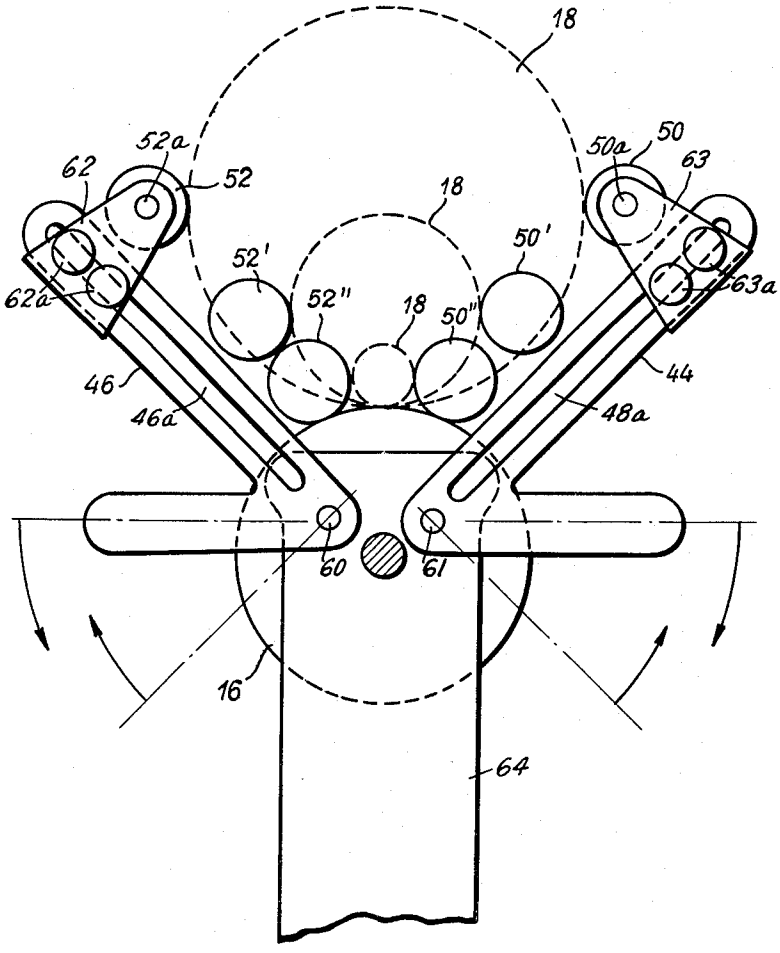


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Fig. 6



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PIPE MAKING MACHINES

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Filed May 14, 1956, Ser. No. 584,767

Claims priority, application Great Britain May 13, 1955

2 Claims. (Cl. 162—284)

This invention relates to improvements in machines for manufacturing pipes by winding on a mandrel a continuous layer of fibrous material mixed with a binder, e.g., of asbestos fibres mixed with a cement slurry or other fibrous material such as cellulose, cotton, blast furnace slag fibres or synthetic fibres mixed with hydraulic binders other than cement such as lime, silicates and fluosilicates, with or without fillers such as quartz silicate and marble powder.

The known machines of the kind referred to above are objectionable because they must be stopped every time the pipe forming operation on the mandrel is accomplished in order to remove the mandrel and to replace it with a fresh bare mandrel. This causes a waste of time so that the output of the machine is limited.

Moreover, in the known machines, the means used for introducing bare mandrels in the machine and for placing them in their operative position in the latter and for effecting the withdrawal of the mandrels with the pipes wound thereon are rather intricate in structure. Another disadvantage of known machines is that, commonly, they are not adapted for use with mandrels having different diameters, especially when said diameters vary within a wide range.

The primary object of the invention is to provide a machine of the kind referred to equipped with means which permit introducing fresh bare mandrels therein and withdrawing therefrom mandrels with pipes wound thereon, all the operations being carried out without stopping the machine so that the operation of the machine is continuous.

Another object of the invention is to provide in a machine of the kind referred to, means for permitting continuous operation as specified above and which means are of simple structure, low cost, and involve simple operation, and which may be used in machines of various structures. A special object of the invention is to provide means for continuous operation of machines provided with an endless belt adapted to be run over the mandrel so as to compress pipe forming material disposed on the mandrel.

Another object of the invention is to provide in a machine of the kind referred to, means for permitting continuous operation as specified above and which render the machine adapted to operate with mandrels the diameters of which vary within a wide range.

With this and other objects in view, the invention will now be described with reference to the accompanying drawings, in which:

Fig. 1 is a side elevation of a pipe making machine according to the invention;

Fig. 2 is an end elevation of the machine shown in Fig. 1, taken along line II—II, a portion of the machine being broken away;

Figs. 3*a*–3*d*, 4*a*–4*d* and 5*a*–5*c* show, in side elevations, three embodiments of a device for stopping mandrels in their pipe making positions in the machine according to

Fig. 1, there being shown in each set of figures successive positions for various of the operating elements;

Fig. 6 is a side elevation of a structural detail of the device shown in Figs. 3*a*–3*d*.

As shown in Fig. 1 a filter cylinder **10** is partly immersed in a tank **12** containing an aqueous suspension of cement and asbestos fibres which it takes up as a thin film and passes to a first or lower felt **14**, which is driven through a motor driven cylinder or roller **16**, acting like a pulley.

A pipe of predetermined thickness is formed on a forming cylinder or mandrel **18** lying between the lower felt **14** and an upper felt **20**. A pressure device comprising a pair of rollers **22** and **24** steadfastly holds the mandrel **18** and prevents it from being pushed out of the machine by the lower felt **14** moved by the under-cylinder **16**.

Devices for guiding, tensioning, washing, rinsing and squeezing the felts and for eliminating water from them will not be described because they are not pertinent to the invention.

The mandrel **18** with the pipe wound on it is removed from the machine, carried to a calendar and then to an extracting machine, which removes the mandrel from the finished pipe, the bare mandrel being returned to the pipe machine.

In accordance with the invention, mandrels are brought on the machine on its rear end in the space M before and outside the frame **21**, viz: in the free space M where neither frame nor upper felt **20** can hinder this operation.

From the space M, mandrels can then travel through space N, traveling towards the pipe-making position along a path parallel to the lower felt; so that their motion direction is the same as felt direction, and not contrary or perpendicular thereto.

The mandrels are brought by any suitable means to the space M at the rear end of the machine and for guiding the mandrels through the space M and space N and to the pipe making position, there is provided a pair of guide rails **30** which are arranged one on each side of the machine and along the lower felt **14** and parallel to it. The mandrels proceed from said rear end smoothly to the position **18***d*, without any interruption.

Fig. 2 shows that the mandrels **18** are a little wider than the cylinder **16** and all the other rollers and cylinders so as to be able to rest on the rails **30**.

The rails may extend beyond the pipe-making section of the machine, to a calendar (not shown) and then to an extracting machine (not shown) where the pipes are removed from the mandrels, and these transfers can be performed without hoists, cranes and the like. But we do not claim the operations outside the pipe making machine; we wish only to point out that the pipe making operation of the invention is well suited for combination with other pipe making operations.

The arrangement whereby the pipes advance to the working position and are removed from the machine by traveling in the same direction as the upper run of lower felt **14** makes it possible to work continuously, viz. without interruption for mandrel replacement at the working position. This is an advantage of the machine of the invention over the machines used heretofore.

The rails keep the mandrels **18***a*—**18***b*—**18***c*—**18***d* above the lower felt **14** until they are close to the lower cylinder **16**, where the rails tilt and the mandrels go down onto the felt **14** and immediately afterwards, onto the under-cylinder **16**.

The rails **30**, are shown as sloping so that the mandrels roll forwards naturally. If the rails are horizontal suitable mechanical means must be provided to move the mandrels.

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Fig. 1 shows another advantage which is peculiar to this invention. According to the invention it is possible to accumulate (to store as working reserve) on the rails a certain number of mandrels. These are ready to proceed automatically as described. For example, with a machine of the invention, 25 mandrels of 100 mm. diameter can be stored on the machine to provide a mandrel supply sufficient for 20 minutes operation of the machine. With prior art machines employing 100 mm. mandrels, machine operation would be interrupted every 50 seconds to change the mandrel. Similarly, 10, 200 mm. mandrels can be stored on the machine for 20 minutes operation, and with prior art machines, it would be necessary to interrupt operation every 2 minutes.

The operation of devices for checking the mandrels at the pipe making position can be realized by suitable mechanical means such as is shown in Figs. 3*a*–3*d*, 4*a*–4*d* and 5*a*–5*c*.

Figs. 3*a*–3*d* show a mandrel **18** which has just reached the operative position shown by the broken lines where it is stopped by a pair of arms **44**, another pair of stop arms **46** is then raised to prevent the mandrel **18** from moving back; the raised pressure device **22**, **24** is then lowered to keep the mandrel firmly in the right position during the operation and the stop arms **44** and **46** are lowered.

These operations are accomplished in four steps, as shown in the figure.

The details of one example of the stopping device can be seen from Fig. 6 which shows the pairs of arms **44** and **46** as each having a roller **50** or **52** adjustably fixed in any position along the arms. The arms **44** and **46** are pivotally mounted by pins **60** and **61**, respectively, on pedestals **64**, and are provided, respectively, with elongated slots **44***a* and **46***a*. The roller **50** is provided with end pins **50***a* which are journaled in roller supports **63** and the roller supports **63** are secured to the arms **44** by bolts **63***a* which are received in the elongated slots **44***a*. The position of the roller supports **63** in the slots **44***a* can be adjusted by manipulation of the bolts **63***a*. Similarly, pins **52***a* journaled in roller supports **62** and the roller supports **62** are secured to the arms **46** by bolts **62***a* which are received in slots **46***a*, and the position of roller **52** can be adjusted by manipulation of bolts **62***a*. Preferably, the arm is in the stop position at 45° inclination. Each pair of rollers **50** and **52** can be shifted along the arms as shown at **50'**, **52'**, **50''**, **52''** so as to accommodate mandrels having different diameters, as indicated by broken lines in the drawing, and maintain the 45° inclination of arms **44** and **46**. In case of an inclination other than 45° the stopping device may be constructed so as to permit the roller to shift not only along the arm but also perpendicularly to the arm. The rollers **50** and **52** are short and only engage the bare ends of the mandrels, which project from the machine.

Figs. 4*a*–4*d* illustrate the operation of a modified stopping device, in which the roller **24'** is situated lower than the roller **22**. When the pressure device is lifted by the extent required for clearing the roller **22** of the mandrel, the roller **24'** holds the latter. In order to prevent a backward movement of the mandrel, a pair of arms **46** are subsequently lifted. The pressure device **22**—**24'** is then lowered, so that roller **22** exerts on the mandrel the required radial pressure. On completion of the pipe the pressure device is lifted so that both rollers are cleared of the mandrel and the pipe thereon.

When the mandrel **18** has passed on the arm **46** is lowered and the pressure device is lowered partially to the first stop position.

The roller **24'** is not intended to exert so heavy a pressure as the roller **22**, but to act as a felt-guide, that is to keep the upper felt **20** in contact with the mandrels **18** besides serving to stop the mandrels as described. Its connection with the body of the pressure device must not be rigid and it is therefore spring loaded (as shown) or connected by a lever with a counterweight or by similar means. The roller **24'** should be adjustable to accommodate mandrels of different diameters. The roller **24'** can be replaced by two short rollers acting only on the bare ends of the mandrel which project from the machine. The upper felt **20** is then guided only by the roller **22**.

Figs. 5*a*–5*c* show a third device in which the pressure device again has but one roller **22**, a roller arm **54** being arranged before the cylinder **16** and somewhat higher. The roller arm **54** can be displaced to the right or left preferably through 45° to accommodate different mandrels. It can also act as a guide for the felt **14** so that the felt passes and contacts the mandrel for a substantial extent and not only just over the cylinder **16**, and tangentially to the mandrel.

The roller **54** is kept against the mandrel **18** by any suitable means such as a lever with a counterweight **54***a*, as shown, or by a spring or a pneumatic or hydraulic piston.

In the first step of the operation the pressure roller **22** is raised and a pair of arms **44** raised to the stop position. In the second step the pressure roller **22** is lowered to exert the necessary pressure. In the third step the pressure roller **22** is raised and the arms **44** lowered to allow the coated mandrel to move on.

Other stopping devices can be arranged by combining the features of the devices described above.

All the stopping devices described above can be applied to machines operating with a lower felt **14** and without the upper felt **20** provided that the rollers **22** and **24** be either constructed of or coated with appropriate materials which will permit working under such conditions.

What I claim is:

1. In a machine for manufacturing pipes by means of winding on a mandrel a layer of fibrous material mixed with binder of asbestos fibres mixed with a cement slurry, of the type comprising an endless felt conveyor having a lower run and an upper run carrying said layer, a felt driving roller for moving the felt and for supporting and rotating the mandrel in its pipe making position, and means for compressing said layer wound on the mandrel, the combination of a pair of parallel guides for carrying and guiding said mandrels at the opposite end portions of the latter and for storing said mandrels, said guides extending along the upper run of said conveyor and above the latter and intersecting the plane of the upper run of the conveyor near the driving roller supporting the mandrel on which said layer is wound in its operative position and of means for arresting the mandrels in said operative position.

2. The combination as set forth in claim 1, wherein said guides are sloped towards said driving roller.

References Cited in the file of this patent

UNITED STATES PATENTS

1,479,149	Mattei et al.	Jan. 1, 1924
1,497,344	Parker	June 10, 1924
1,717,236	MacMenigall	June 11, 1929
2,430,411	Rembert	Nov. 4, 1947

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,937,701 May 24, 1960

Luciano Toniolo et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, lines 1 and 11, and in the heading to the printed specification, line 4, name of second inventor, for "Giralamo Garbin", each occurrence, read -- Girolamo Garbin --.

Signed and sealed this 6th day of December 1960.

(SEAL)
Attest:

KARL H. AXLINE
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