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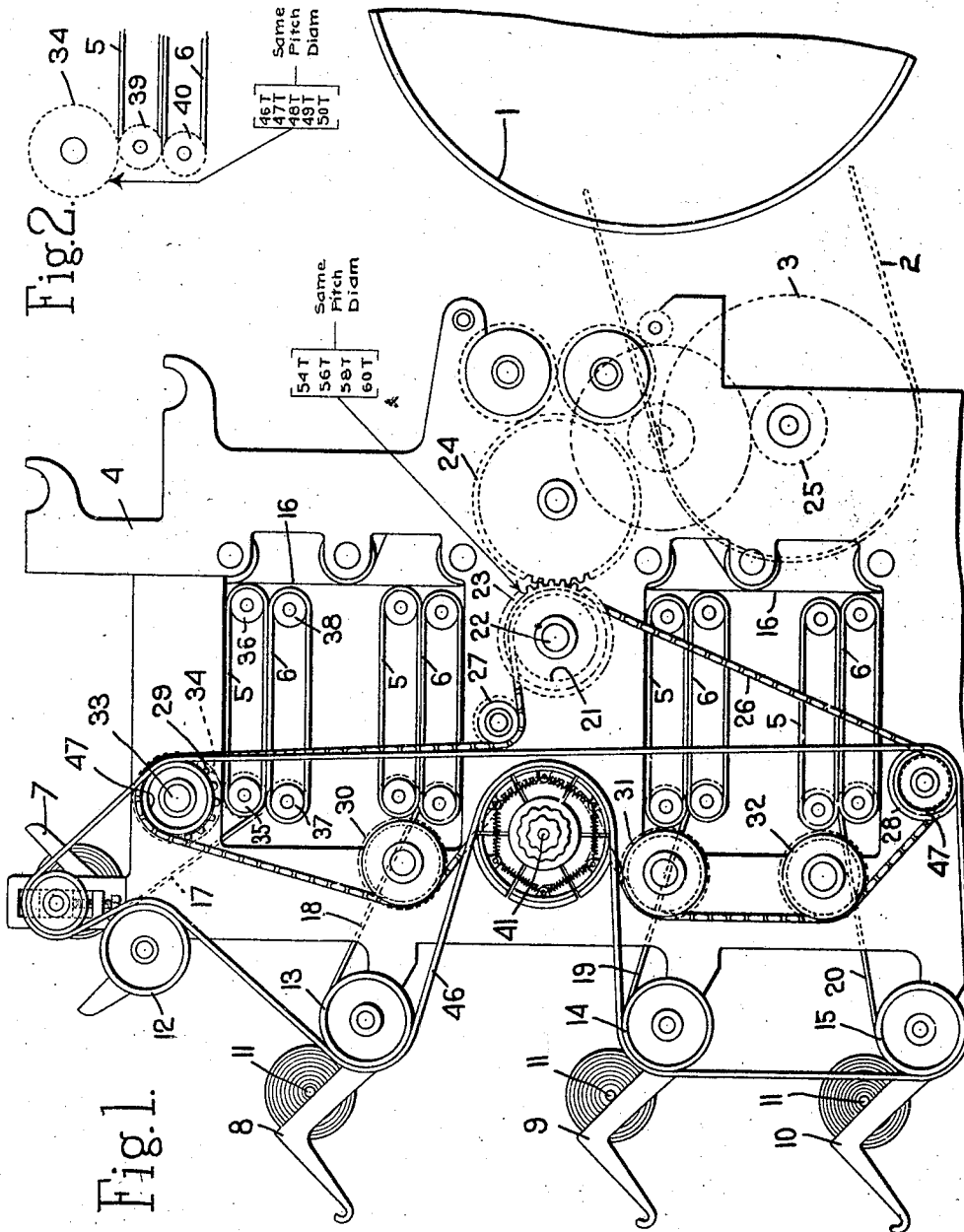
1,574,441

W. T. PUTNAM

TAPE CONDENSER

Filed Sept. 14, 1925

2 Sheets-Sheet 1



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Fig. 3.

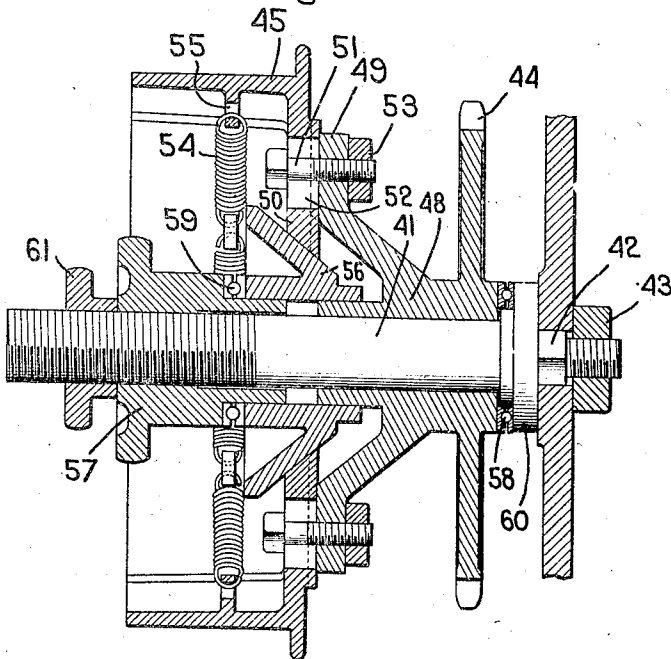
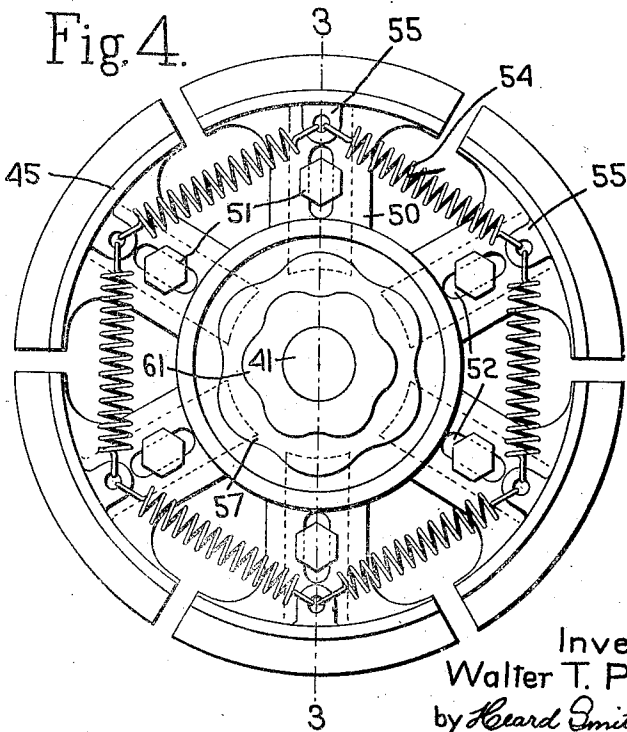


Fig. 4.



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UNITED STATES PATENT OFFICE.

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TAPE CONDENSER.

Application filed September 14, 1925. Serial No. 56,183.

To all whom it may concern:

Be it known that I, WALTER T. PUTNAM, a citizen of the United States, and resident of North Andover, county of Essex, State of Massachusetts, have invented an Improvement in Tape Condensers, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to a condenser of the apron type which is employed for condensing the stock doffed from carding machines into roving.

The object of the invention is to provide simple and efficient means for readily adjusting in accordance with the conditions prevailing the speed of the condensing elements, the speed of the aprons, and the peripheral speed of the winding drums.

The object of the invention more particularly is to provide a simple and efficient means for adjusting the peripheral speed of the winding drums with respect to the speed of the corresponding aprons so as to vary the tension on the rovings as they pass from the banks of aprons to the winding drums.

The object of the invention is further to provide a simple and efficient adjusting means for the latter purpose which may be operated while the condenser is in operation and consequently without stopping the machine.

These and other objects and features of the invention will appear more fully from the accompanying description and drawings and will be particularly pointed out in the claims.

The general type of tape container illustrated in connection with a preferred embodiment of the present invention is well known and familiar to those skilled in the art and has long been in use. Consequently it is necessary here to illustrate and describe only so much of the construction and operation thereof as is necessary to an understanding of the present invention.

In the drawings—

Fig. 1 is a side elevation, chiefly in diagrammatic form, of a portion of a tape condenser and a carding machine;

Fig. 2 is a detail also in diagrammatic

form illustrating the drive for one bank of aprons;

Fig. 3 is a view, chiefly in cross section, taken on the line 3—3, Fig. 4;

Fig. 4 is a view in end elevation of an expansible pulley employed in a preferred embodiment of the invention in the machine.

A portion 1 of the carding cylinder of the carding machine is illustrated and a portion of the driving belt 2 extending therefrom to and driving the main pulley 3 of the condenser.

One of the side frames 4 of the condenser is shown at that side of the machine where the main elements with which the present invention is more particularly concerned are located. The condenser is illustrated as provided with four banks of two aprons 5 and 6 each. Inclined face brackets 7, 8, 9 and 10 are located on the machine frame at proper points to receive and guide the spindles 11 on which the rovings are wound as they pass from the respective banks of aprons. A series of winding drums 12, 13, 14 and 15 are journaled in the side frame, one for each bank of aprons and in each case the rovings pass from the corresponding bank of aprons over one of these winding drums and onto the corresponding spindle. The mass of roving as it is wound on the spindle rests on the winding drum.

The stock taken from the carding machine and divided by the usual dividing rolls is carried by the tapes 16, only partially illustrated, in the usual manner to the upper aprons of the upper two banks and the lower aprons of the lower two banks. The strands of stock are condensed by the aprons in the usual manner and passed therefrom in the form of rovings 17, 18, 19, 20 over the respective winding drums 12, 13, 14 and 15 and are wound upon corresponding spindles 11.

The present invention has to do with the driving mechanism for the aprons and the winding drums, and as already pointed out, it is unnecessary further to describe the construction and operation of the machine.

The aprons are driven by means of an adjustable drive for each bank of aprons and a common driving mechanism for all of these drives which itself is adjustable so that not only may the speed of the aprons be adjusted in common but the speed of each bank of

aprons may be adjusted independently. In the construction illustrated a driving, sprocket wheel 21, which is the common driving element for the several banks of aprons is journaled at 22 in the machine frame and has rigidly connected thereto a gear 23 meshing with a gear 24 driven through a suitable train of gearing from a pinion 25 and driven by the pulley 3. The gear 23 is one of a set of interchangeable gears, each of which has a different number of teeth but all of which have the same pitch diameter. Consequently any one of the set of gears may be substituted for another and consequently the speed of this common driving element may be adjusted as required. As an illustration the gears 23 are indicated as having respectively 54, 56, 58 and 60 teeth.

A sprocket chain 26 extends around the sprocket wheel 21, around suitable idlers 27 and 28 and around sprocket pinions 29, 30, 31 and 32 which respectively form part of the drive for each bank of aprons.

As the drive for each bank of aprons is the same in each case it will be sufficient to describe the one for the uppermost bank. The sprocket pinion 29 is journaled at 33 and carries rigid therewith a gear 34 which is one of a set of interchangeable gears each having a different number of teeth but all of the same pitch diameter. As indicated in Fig. 2 as an example these gears may have 46, 47, 48, 49 and 50 teeth respectively.

The apron 5 is carried by the rollers 35 and 36 and the apron 6 by the rollers 37 and 38. The rollers 35 and 37 have rigidly connected therewith intermeshing pinions 39 and 40 respectively and the pinion 39 intermeshes with the gear 34. It will thus be seen that the aprons are driven by the sprocket pinion 29 and that by substituting one or the other of the interchangeable gears 34 the speed of the aprons may be adjusted.

The drive for the winding drums is a belt drive. A stub shaft 41 is keyed in the side frame at 42 and held in place by a nut 43. This stub shaft has journaled thereon a combined sprocket wheel 44 and pulley 45. A belt 46 passes around the pulley 45 and leads around each of the winding drums 12, 13, 14 and 15 and around suitable idlers 47. The sprocket chain is utilized to drive this combined belt and sprocket wheel unit and for that purpose passes around the sprocket wheel 44 as shown.

The speed of the belt 46 is adjusted as required by expanding and contracting the pulley 45. A simple and preferred form of construction of expandable pulley is illustrated in detail in Figs. 3 and 4. As shown therein the hub 48 of the sprocket wheel 44 is provided with radially extending arms 49. The pulley itself is divided into segments each having an inwardly projecting radial arm 50 splined to slide radially on the cor-

responding arm 49. A guide bolt 51 passes through the slot 52 in each arm 50 and is threaded into the corresponding sprocket arm 49 and locked in place by a lock nut 53. It will thus be seen that the several segments of the pulley may slide on the arms 49 radially to expand or contract the circumference of the pulley. These segments are yieldingly held contracted by helical springs 54 extending between lugs 55 of adjacent segments. The inner ends of the arms 50 of the pulley segments are shaped to present conical faces and these faces engage a cone 56 mounted to slide upon a portion of the hub 48 and a portion of a hub screw 57 threaded onto the end of the stub shaft 41. It will be seen, therefore, that by screwing in the hub screw 57 the cone 56 will act to slide the pulley segments outwardly and expand the pulley and that when the hub screw is screwed outwardly the springs 54 will act to contract the pulley segments. Ball thrust bearings 58 and 59 are provided between the hub 48 and a flange 60 on the stub shaft 41 and between the sliding cone 56 and a shoulder on the hub screw 57. A lock nut 61 is threaded onto the stub shaft to lock the hub screw 57 in its adjusted position.

The construction of the sprocket wheel and pulley unit illustrated is such that the lock nut 61 and hub screw 57 may readily be operated when the machine is itself in operation to effect the expansion or contraction of the pulley and consequently the adjustment of the peripheral speeds of the winding drums relatively to the speed of the banks of aprons and this is an important feature of the invention because it enables the rovings running from the banks of aprons to the winding drums to be put under proper tension according to the observed conditions during the operation of the machine.

The combination of the means for adjusting the belt drive 46 with the means for adjusting the common drive for the banks of aprons and the means for adjusting independently the drive for each bank of aprons presents a very elastic arrangement by which all adjustments of apron speed and winding drum speed may readily be effected as required.

I claim:

1. A tape condenser comprising a plurality of banks of aprons, a winding drum for each bank of aprons, a driven pulley, a belt extending around the pulley and all of the winding drums, and means for radially expanding and contracting the pulley to adjust the speed of the belt and thereby the peripheral speed of the winding drums relatively to the speed of the aprons.

2. A tape condenser comprising a plurality of banks of aprons, a winding drum for each bank of aprons, a driven pulley, a belt

extending around the pulley and all of the winding drums, and means, operable while the condenser is running, for radially expanding and contracting the pulley to adjust the speed of the belt and thereby the peripheral speed of the winding drums relatively to the speed of the aprons.

3. A tape condenser comprising a plurality of banks of aprons, a drive, including a set of interchangeable gears of the same pitch diameter, for each bank of aprons, a common driver for all of the said drives also including a set of interchangeable gears of the same pitch diameter, a winding drum for each bank of aprons, a driving pulley, a belt extending around the pulley and all of the winding drums, and means for radially expanding and contracting the pulley, whereby the speed of the banks of aprons may be simultaneously or independently adjusted and whereby the peripheral speed of the winding drums relatively to the speed of the aprons may also be adjusted.

4. A tape condenser comprising a plurality of banks of aprons, a winding drum for each bank of aprons, a pulley, means for radially expanding and contracting the pulley, a driven sprocket wheel having a driv-

ing connection with the pulley, a driving sprocket wheel, a gear drive, including a set of interchangeable gears of the same pitch diameter, for driving the driving sprocket wheel, a sprocket pinion drive, including a set of interchangeable gears of the same pitch diameter, for driving each bank of aprons, a belt extending around the pulley and all of the winding drums, and a sprocket chain extending around the two sprocket wheels and all of the sprocket pinions, whereby the speed of the condenser, the speed of the banks of aprons, and the peripheral speed of the winding drums may be adjusted as required.

5. A combined sprocket wheel and pulley unit for a tape condenser in which the sprocket wheel carries a sprocket chain leading to the several apron drives, and in which the pulley carries a belt leading to the several winding drums, and in which means are provided for radially expanding and contracting the pulley whereby the relative speeds of the belt and sprocket chain may readily be adjusted as required.

In testimony whereof, I have signed my name to this specification.

WALTER T. PUTNAM.