May 13, 1930. J. H. HAMILTON ET AL 1,758,697

TENTER MACHINE

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Fig. 1.

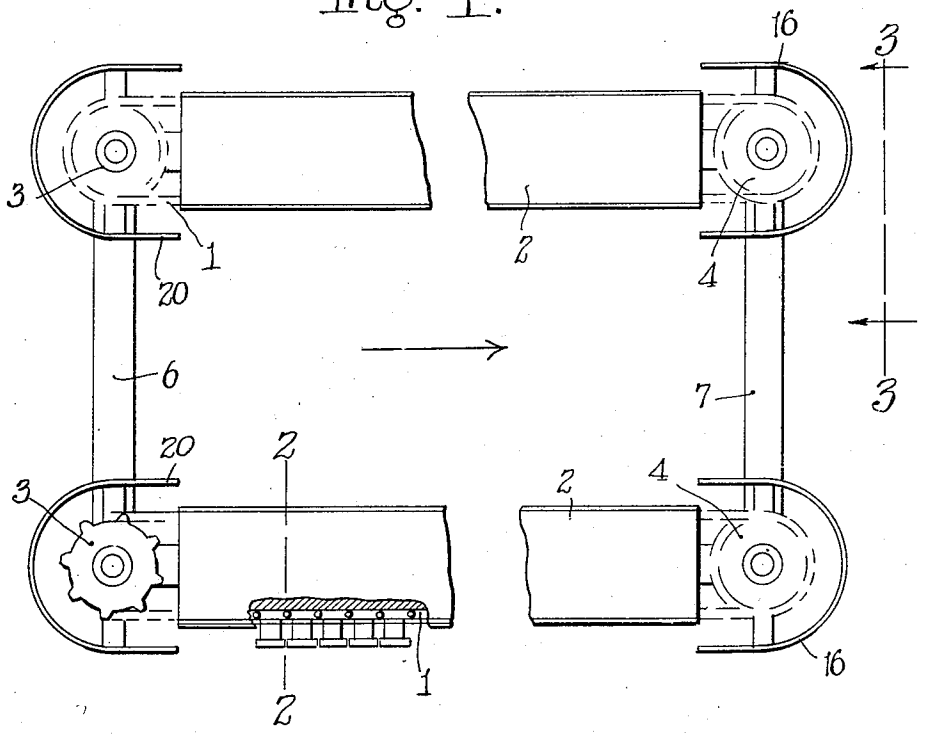
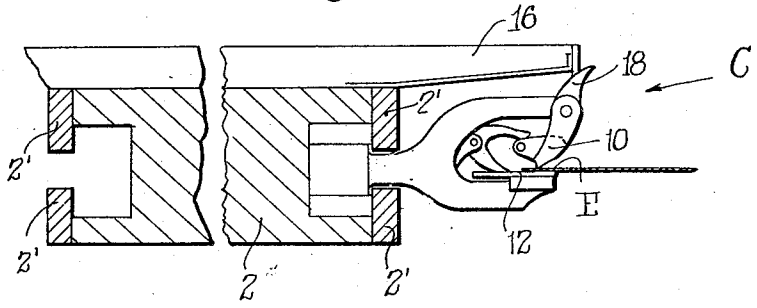



Fig. 2.




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Fig. 3.

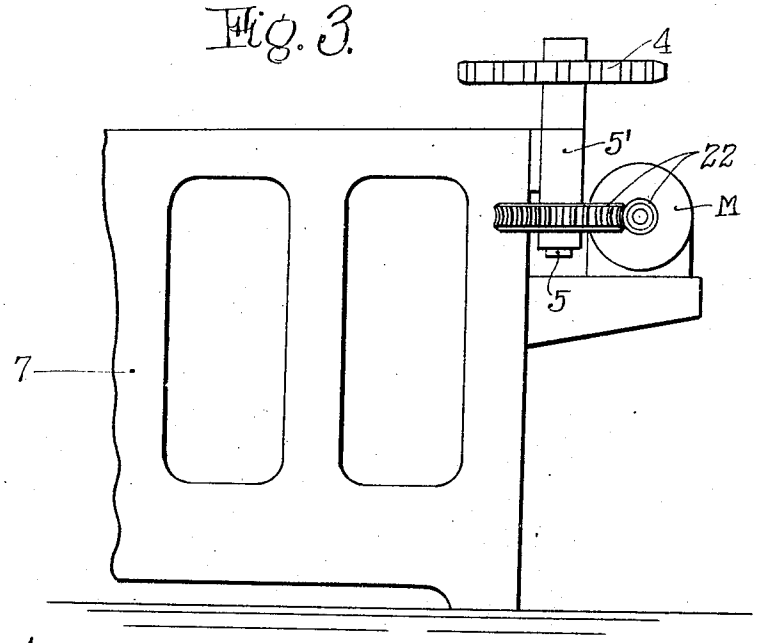



Fig. 4.

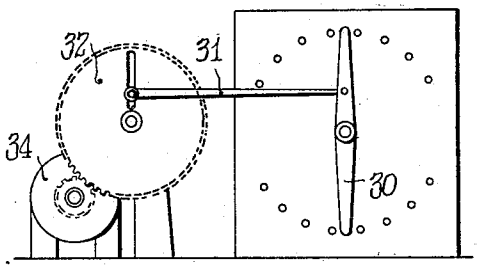



Fig. 5.

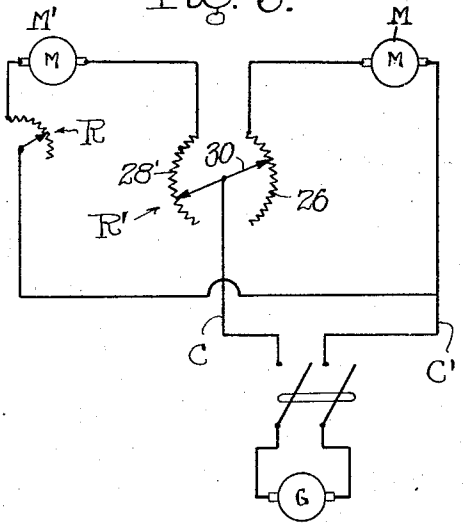
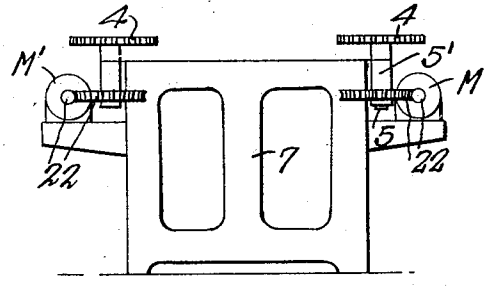



Fig. 6.




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Patented May 13, 1930 1,758,697

# UNITED STATES PATENT OFFICE

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## TENTER MACHINE

Application filed November 10, 1928. Serial No. 318,498.

This invention relates to improvements in tentering machines and is directed particularly to improvements in driving apparatus therefor.

Tentering machines of the type to which the invention relates consist essentially of endless traveling clamp chains formed from a plurality of clamps which are arranged for gripping opposite edges of a web of cloth. The chains are supported on spaced rails and pass around and are driven by sprockets. The clamps on the inner run of each chain grip opposite selvage edges of a web of cloth and travel forwardly simultaneously so as to carry the cloth forwardly of the machine. The cloth web is fed in between the clamp chains at one end of the machine, where the clamps are closed for gripping the cloth while at the other or discharge end of the machine the clamps are opened to release the cloth.

As the cloth is being fed forwardly by the chains it may be and often is acted upon by drying or other apparatus for some desired effect and at the same time the clamps function to stretch the cloth, or at least hold it against shrinking.

It is desirable that the weft and warp threads of the cloth be loosened to assist in the drying while it is being carried forwardly by the clamps and therefore to provide for this according to one object of the invention the clamp chains while traveling are alternately moved back and forth relative to one another. This is accomplished according to one novel feature of the invention by accelerating and decelerating the speed of one chain and then the other during their forward movement so that the opposite selvage edges of the cloth are moved relative to one another while at the same time the cloth is being carried forwardly.

Frequently when a web of cloth is stretched between the chains the filling elements of the fabric are found to be out of square with respect to the warp elements and according to another object of the invention I provide means for resquaring the filling while the web is held and fed forwardly by the chains. This is accomplished according to a further novel feature of the invention by varying the rate of travel of one chain with respect to the other so that one edge of the web is fed at a faster or slower speed than the other to bring about the desired squaring up of the transverse filling elements thereof.

Other novel features and advantages of the invention will be observed from the following description of the preferred form of the invention taken in connection with the accompanying drawings, in which

Fig. 1 is a diagrammatic plan view of a tentering machine embodying the novel features of the invention.

Fig. 2 is an enlarged sectional elevational view taken on the line 2—2 of Fig. 1 looking towards the right in said figure.

Fig. 3 is a partial end elevational view of one end of the machine taken on the line 3—3 of Fig. 1.

Fig. 4. is a side elevational view of the motor control apparatus constituting a part of the invention.

Fig. 5 is a diagrammatic view of a wiring diagram showing how the motors and control mechanism are connected.

Fig. 6 is a small scale and elevational view of the machine shown in Fig. 1 taken at the right of said figure.

Referring to Fig. 1 of the drawings in detail a tentering machine is shown diagrammatically and comprises a pair of endless clamp chains 1 and 1 which pass around rear idler sprockets 3 and forward driving sprockets 4 while intermediate said sprockets they are guided and supported by rails 2 which have their opposite ends supported by end frames 6 and 7.

The rails and chains may take any form desired but for the purpose of disclosing the novelty of the invention they will be described in connection with Fig. 2. Clamps C have their adjacent ends pivoted together so as to form the clamp chains 1 and each clamp includes a pivoted clamp bar 10 which is adapted to press the selvage edge E of a cloth web against a plate 12 so that as the chains are moved forwardly the clamps forming the chains may engage and hold opposite edges of the cloth so as to feed it for-

wardly in the direction of the arrow in Fig. 1. Opening cams 16 at the forward end of the machine are arranged to engage cam extensions 18 of the clamp bars as the clamps move therepast, so that the web is released thereby when it arrives at the discharge end of the machine while similar opening cams 20 at the rear end thereof are provided to hold the clamps open so they may receive the opposite edges of a web of cloth and allow them to close for their clamping action. The clamps forming the chain are in some manner guided in the rails 2 as, in suitable grooves and are held by guide members 2′ so that they may be guided in proper alignment. The apparatus thus far described is well known in the art and need not be more fully described while the apparatus for driving the chains and constituting important features of the invention will now be described with particular reference to Figs. 3, 4 and 5.

The driving sprockets 4 are fixed to shafts 5 which are mounted for rotation in bearings 5′ provided on the frame 7 and are driven independently of one another by means of suitable gearing 22 from separate variable speed motors M, and M′, which motors and gearing may be arranged to give the sprockets and clamp chains driven thereby the required direction of travel.

It will be understood that each sprocket is thus driven so that according to one important feature of the invention the current supply to each motor may be independently controlled so that the chains may be driven at various relative speeds to effect the special results to which the invention is directed.

The motors are connected and controlled in their operation after the manner now to be described with particular reference to Figs. 4 and 5.

M and M′ represent in a diagrammatic way the independent or separate variable speed electric motors, one for each chain which are connected through current control devices in the form of rheostats R and R′ to a current supply circuit including a pair of lead wires C and C′.

The rheostat R′ preferably comprises a pair of resistances such as 26 and 28 which have their ends connected to the motors M and M′ respectively. A single contact arm 30 associated therewith and pivoted for oscillating movements is connected to one of the supply leads such as C while its outer contact ends are in contact with the resistances.

The parts are arranged so that as the arm swings back and forth the resistance to one motor is increased while simultaneously therewith the resistance in the other circuit is decreased. In this way the current supply to the motors is varied and thereby the speed of each motor is varied or accelerated and decelerated between what may be termed a high and a low speed, one motor accelerating at the time the other is decelerating. By this novel arrangement while the chains are moving forwardly and carrying the cloth forwardly, one chain speeds up while the other slows down and vice versa. In this way there is a longitudinal relative movement of the selvage edges of the cloth during its forward movement which is much desired to effect a loosening up of the elements of the cloth during its travel through the machine.

To accomplish this the arm 30 as in Fig. 4 may be connected by a link 31 to a gear 32 which is driven by a motor 34 so that the motor on rotating will rotate the gear to swing the arm back and forth to bring about the variable control effect. The extent of the swinging movement of the arm may be varied by moving the pivotal connection of the link and gear back and forth radially of the gear by means of a slot connection as shown.

The rheostat R in the circuit to the motor M′ may be of usual form and adapted to control the current supply to the motor and thereby accelerate or retard the speed thereof to vary the speed of the chain driven by this motor with respect to the other chain. By varying the speed of one chain in this way with respect to the speed of the other chain one edge of the cloth may be carried forwardly at a different speed than the other. In effect one edge of the cloth is moved relative to the other during the forward movement thereof and brings about the desired squaring up of the filling element of the cloth with reference to the warp elements.

In operating, a web of cloth is fed between the clamps of the chain which clamps engage the opposite edges thereof and as the motors are supplied with current the sprockets are rotated to carry the chains forwardly. As the arm of the rheostat R′ swings back and forth the resistances to the motors are alternately decreased and increased so that one motor is caused to speed up while the other slows down. Thus each chain is fed forwardly at a speed varying between a low speed and a high speed so as to bring about a relative movement of the selvage edges of the cloth and effects a loosening up of the elements thereof. When desired the rheostat R of one motor may be varied to control the speed of the motor and retard or accelerate the speed of one chain with respect to the other so as to effect a movement of one selvage edge of the cloth with respect to its other edge and thereby resquare the transverse filling elements of the cloth.

Various gearing arrangements may be employed for connecting the independent motors to their respective chain sprockets and various devices may be used for controlling or varying the speed of the motors without departing from the spirit and scope of the invention. We prefer therefore to be limited by the appended claims rather than by the

foregoing description of the preferred form of the invention.

What we claim is:

1. The combination of driving sprockets and clamp chains of a tentering machine with operating means therefor comprising, separate variable speed electric motors connected to each of said sprockets, a circuit for supplying current to said motors and means for varying the supply to said motors simultaneously whereby the speed of the motors is alternately accelerated and decelerated, the speed of one motor being accelerated while the other is decelerated and vice versa.

2. The combination of driving sprockets and clamp chains of a tentering machine with operating means therefor comprising, separate variable speed motors operatively connected to each of said sprockets, a circuit for said motors including a resistance between each of said motors and said circuit and a common element included in said circuit for simultaneously varying the resistances.

3. The combination of driving sprockets and clamp chains of a tentering machine with operating means therefor comprising, separate variable speed motors operatively connected to each of said sprockets, a circuit for said motors including a resistance between each of said motors and said circuit and a common element included in said circuit for simultaneously varying the resistances, and means for actuating said element.

4. The combination of driving sprockets and clamp chains of a tentering machine with operating means therefor comprising, separate variable speed motors operatively connected to said sprockets, a circuit common to said motors including a current control device for each of said motors whereby the current thereto is simultaneously controlled.

5. The combination of driving sprockets and clamp chains of a tentering machine with operating means therefor comprising, separate variable speed motors operatively connected to said sprockets, a circuit for supplying current to said motors, including a rheostat for controlling current to said motors and means for operating said rheostat.

6. The combination of driving sprockets and clamp chains of a tentering machine with operating means therefor comprising, a pair of independent motors operatively connected to said sprockets, a circuit for supplying current to said motors including a pair of leads one of which is connected to said motors, resistances connected to said motors and an oscillatable arm in contact therewith which is connected to the other of said leads whereby when the arm is oscillated the resistances are varied to control the current to said motors.

7. The combination of driving sprockets and clamp chains of a tentering machine with operating means therefor comprising, a pair of independent motors operatively connected to said sprockets, a circuit for supplying current to said motors including a pair of leads one of which is connected to said motors, resistances connected to said motors and an oscillatable arm in contact therewith which is connected to the other of said leads whereby when the arm is oscillated the resistances are varied to control the current to said motors and means for oscillating said arm.

8. The combination of driving sprockets and clamp chains of a tentering machine with operating means therefor comprising, a pair of independent motors operatively connected to said sprockets, a circuit including a pair of leads for supplying current to said motors, one of said leads being connected to said motors, resistances connected to said motors, an oscillatable arm in contact therewith arranged to simultaneously increase and decrease the resistance as it oscillates and being connected to the other lead of said pair and means for oscillating said arm.

9. The combination of driving sprockets and clamp chains of a tentering machine with operating means therefor comprising, a pair of independent motors operatively connected to said sprockets, a circuit including a pair of leads for supplying current to said motors, one of said leads being connected to said motors, resistances connected to said motors, an oscillatable arm in contact therewith arranged to simultaneously increase and decrease the resistance as it oscillates and being connected to the other lead of said pair, and means for oscillating said arm and a current control device in the first named lead to one motor for varying the current supply thereto with respect to the other.

10. The combination of driving sprockets and clamp chains of a tentering machine with operating means therefor comprising, independent electric motors operatively connected to said sprockets, a circuit for supplying current to said motors, a rheostat in said circuit for controlling the supply of current supply to said motors adapted to simultaneously and alternately decrease and increase the current supply to said motors respectively.

11. The combination of driving sprockets and clamp chains of a tentering machine with operating means therefor comprising, independent electric motors operatively connected to said sprockets, a circuit for supplying current to said motors, a rheostat in said circuit for controlling the supply of current supply to said motors adapted to simultaneously and alternately decrease and increase the current supply to said motors respectively and a second rheostat in said circuit for controlling the supply of current to one of said motors.

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