March 17, 1959 A. S. BROUGH 2,877,952

PREDETERMINING COUNTER PRESETTING MEANS

Filed Feb. 24, 1955

2 Sheets-Sheet 1

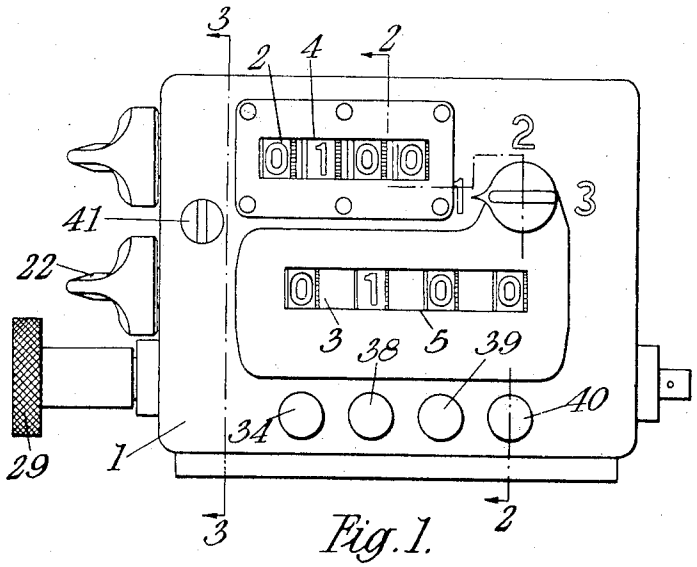


Fig. 1.

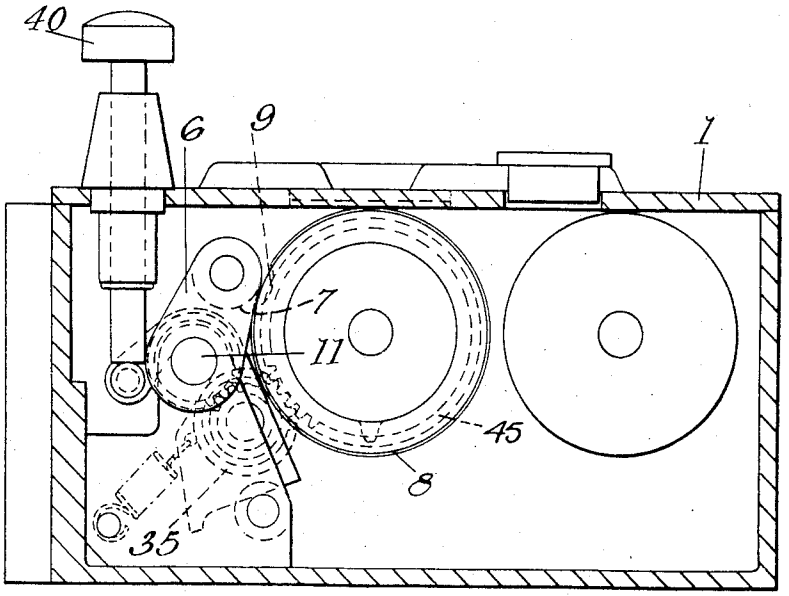


Fig. 2.

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2 Sheets-Sheet 2

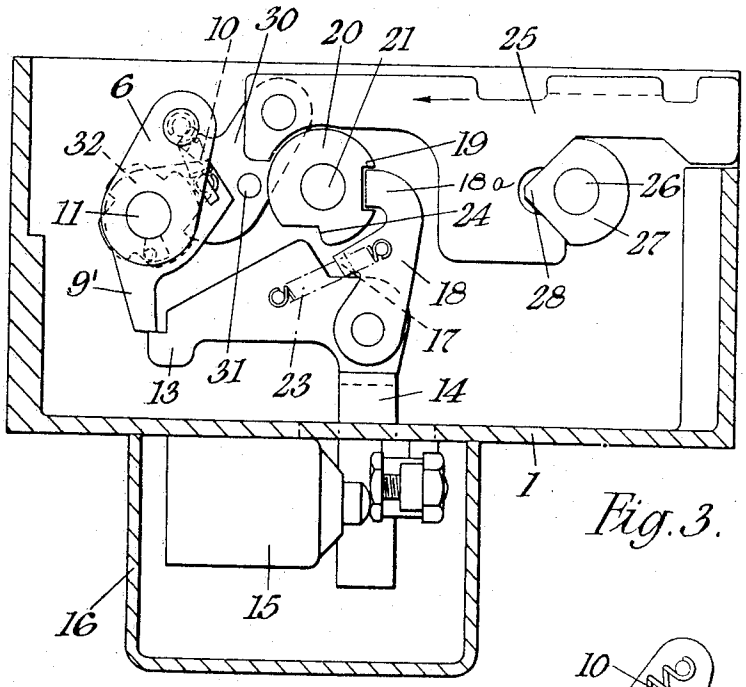


Fig. 3.

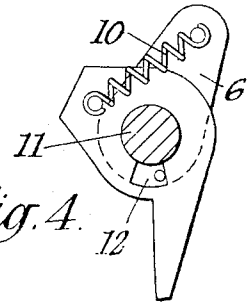
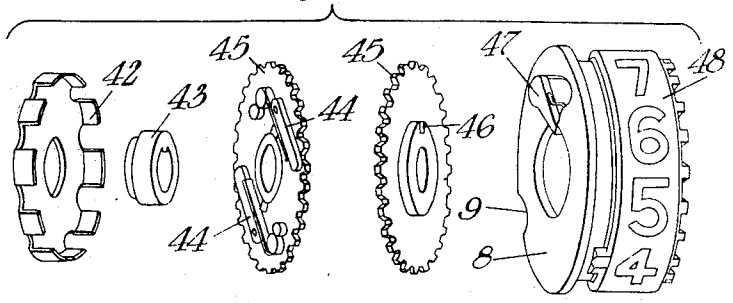


Fig. 4.

Fig. 5.



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PREDETERMINING COUNTER PRESETTING MEANS

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Application February 24, 1955, Serial No. 490,314

1 Claim. (Cl. 235—132)

This invention relates to counters for textile and other machines but will be hereafter specifically described as employed in connection with a textile drawing frame as being a typical application showing how the counter is employed for terminating the run of a machine when a predetermined amount of the product has been delivered.

It is known to employ with such drawing frames a counter hereinafter referred to as a predetermining counter having number wheels driven during operation of the frame, but which on a predetermined number of yards or other linear units of material having passed through the machine causes the operation of means for example, which actuates an electric switch to open an electric motor circuit so that the frame ceases to operate.

It is also known to provide what is known as a hank counter which has number wheels for registering the number of hanks which are equivalent to the predetermined yardage output.

The primary object of the present invention is to provide an improved predetermined counter.

A further object is to combine hank and predetermining counters as a single unit and in this connection it is pointed out that one or more hank counters may be combined with the predetermined counter according to the number of shifts worked at the mill. Thus in the case of day and night shifts two hank counters are employed, it being understood that one will be out of action during the day shift and the other during the night shift.

It may be explained that predetermining counters are known in which the number wheels are set to a predetermined number before the run of a drawing frame or other machine and when the predetermined yardage has passed through the machine the number wheels are all in zero position and have to be reset preparatory to another run of the machine.

Whereas in known predetermining counters the casing has to be opened in order to preset the number wheels to a predetermined number required, the present counter is totally enclosed and dust resistant and can be preset manually from the exterior.

According to a further feature the number wheels are each preset or reset by manual operation of a slotted sleeve which takes the place of a reset shaft. The means for setting each wheel individually is also provided with means for locking the sleeves relatively to one another in a manner somewhat similar to that in British patent application No. 9,557/52.

The invention may also include key actuated means for locking the presetting mechanism in the predetermining section and the resetting mechanism in the hank counter section, so that it cannot be changed without the use of the proper key for the counter.

According to a further feature means is provided whereby the operator of the machine cannot reset the counter during the predetermined run. This also enables the counter to be unlocked and reset during a run by means of the key in the event of a breakdown.

The reset mechanism is also so constructed that a reset knob of the predetermining counter can only be rotated through one revolution and is then positively prevented from further rotation.

As is to be understood the number of the predetermining counter will show at any time during a run the number of yards still to be run off the machine before the end of the run and it will be therefore appreciated that the number set up on the counting wheels will during the run be reduced by subtraction unit by unit until all the number wheels are zeroised when the contacts of an electric switch preferably a microswitch are separated to open a circuit of an electric motor.

Referring now to the accompanying drawings in which:

Figure 1 is a front elevation of a counter according to the invention;

Figure 2 is a sectional elevation taken on the line 2—2 of Figure 1 looking in the direction of the arrows;

Figure 3 is a sectional elevation taken on the line 3—3 of Figure 1 looking in the direction of the arrows;

Figure 4 is an elevation showing details of parts of the mechanism; and

Figure 5 is a perspective exploded view showing the number wheels and associated parts of the predetermining counter.

A casing **1** is provided which contains the counting trains including upper and lower sets of number wheels the upper set **2** being that of the hank counter and the lower set **3** that of the predetermining counter, the casing having a window **4**, **5** for each counter to enable reading of the number wheels thereof. Each counter as shown has four number wheels but a higher or lower number of number wheels may be employed.

The casing also has therein a pair of pivoted arms **6** having rotatably mounted on and between their outer end portions four rollers **7**, only one of which is shown in Figure 2, and each of which bears on the periphery of one of four cams **8** only one of which is shown in Figure 2, each provided with a single notch **9** and secured to one of the number wheels of the predetermining counter. The foregoing arrangement is such that when all the number wheels of the predetermining counter **3** have reached zero registering positions as will appear at the window **5**, the notches will be in transverse alignment and the arms **6** under the action of a spring (not shown) will be moved about their pivotal axis until each roller engages in the adjacent notch of one cam **8**. One of the arms **6** is connected at its outer end to one end of a pivoted latch **9'** by means of a tension spring **10** (see Fig. 4), said latch being pivoted intermediate its ends for movement about the same axis as the arms **6**. The arms **6** and latch **9'** are shown as supported for said pivotal movement on the shaft **11** hereinafter referred to, arm **6** and latch **9'** also have a pin and slot lost motion connection **12** permitting limited relative pivotal movement about the axis of the shaft **11**. The other end of the latch is in engagement during a run of the machine with one arm **13** of a bell crank lever, the other arm **14** of which projects through an opening in the casing and during said engagement holds the contacts of a micro-switch **15** in engagement, the switch being located in an auxiliary casing **16** secured to the casing **1**. When therefore the arms **6** move about the shaft **11** so that the aforesaid rollers engage in the notches, the pin and slot **12** co-operate to move the latch about its pivotal axis out of engagement with the first mentioned arm of the bell crank whereupon the latter is moved about its pivotal axis by a spring (not shown) to "off" position and the switch contacts are disengaged. Another function of the pin and slot and tension spring connections between the arms **6** and latch **9'** is to permit the latter to bear against the end of the

arm 13 of the bell crank lever during resetting as hereafter referred to, while the arms 6 are moving outwardly away from the axis of the cams so that the latch will move under the action of the tension spring 10 into engagement with the bell crank lever arm immediately the latter has reached "on" position during the said resetting.

As the bell crank lever moves about its pivotal axis to "off" position its arm 13 engages a projection or lug 17 on a pivoted locking pawl 18 and shifts the latter so that its outer end 18*a* is moved out of a slot 19 provided in cam 20 which is secured to a resetting shaft 21, the distal end of the pawl and the slot 19 in the cam 20 being such that when the outer end of the pawl is in the slot the resetting shaft 21 and cam 20 are positively prevented from rotation in either direction, when the pawl 18*a* is in the former position. The shaft 21 can be manually rotated through one revolution by means of a knob 22 exterior to the casing and is prevented from further rotation by re-entry of the outer end of the pawl 18*a* into the slot 19, the pawl being connected by a tension spring 23 to the bell crank lever. During said rotation of shaft 21, the number wheels will be rotated from their zero positions to the positions in which they were previously preset and in addition during said rotation of the shaft 21 the cam 20 by means of a V notch 24 cams the bell crank lever to a position such that the switch contacts are closed. The counter having been reset and the switch contacts closed the drawing frame or other machine can again be run until all the number wheels again reach zero. The closing of the contacts may condition the circuit for restarting the motor by manual operation of a press button switch.

Presetting

To preset the number wheels of the predetermining counter to a number for a different yardage output it is necessary individually to set the number wheels thereof and unlock the counter. Thus the insertion of a key into a lock carried by the casing and rotation of the key, actuates a sliding locking bar 25 from a locking position in which it locks a first reset shaft 26 for the hank counter from rotation to a second position in which the shaft 26 is released. Conveniently the shaft 26 carries a disc 27 having a V portion 28 which when the lock bar is in locking position, Figure 3, is engaged in a V-shaped notch or recess in the lock bar. The actuation of this bar to unlocking position permits the hank counter to be reset and releases the knob 29 and shaft 11 which is manually rotated for presetting. The movement of the lock bar to released position actuates a pawl 30 pivoted at 31 intermediate its ends to the casing and at one end to the lock bar 25 and having its other end normally in engagement with a lock cam 32 mounted on shaft 11 which carries the knob 29 for facilitating manual rotation of shaft 11 for presetting. A depressible button 34 for the unit number wheel is then depressed and thereby an intermediate gear pinion 35 which is permanently in mesh with a gear pinion on shaft 11 is moved into engagement with a gear 45 of the units number wheel. By then turning the knob 29 the units number wheel can be set so that a desired digit appears at the window opening. Similar depressible buttons 38, 39, 40 are depressed in succession and the other number wheels are similarly rotated to reset them in succession so that the digits viewed through the window opening 5 are in accordance with the number of yards desired for the run of the machine. The setting of the number wheels can then be visually checked to determine that the number desired to be preset has been correctly set up on the counter. If, for any reason, at any point other than the final trip off the reset knob 22 is to be rotated, it is necessary to rotate the key in the lock 41 to unlock and relock the counter. This unlocking action causes a lug on the pawl 30 to depress the top of the latch 9', thus causing it to free the lever 13. Presetting can then be repeated. To make clear the setting of the number wheels, an exploded view is given in the bottom left-hand corner of the drawing. This view shows the construction of and assembly of each wheel. A ratchet wheel 42 is secured to a hub 43 which is keyed to the main resetting shaft 21. In this ratchet wheel two spring pressed pawls 44 are provided pivoted to the gear 45 in such a manner that the rotation of this gear by rotation of the setting knob 29, the shaft 11 and the intermediate pinion 35, makes it possible to alter the position of the gear 45 relatively to the ratchet 42, and therefore to the reset shaft 21. In the hub of the gear 45 is a slot 46. This slot is of such a design as to pick up a spring pressed reset pawl 47 located in the number wheel 48. Rotation of the gear 45 and its slotted hub will therefore revolve the number wheel 48. The number wheel 48 is, however, of such a construction as to permit it to rotate freely about the hub of the gear 45 during a counting operation, and it is only during the resetting operation that the reset pawl 47 comes into action. The rotation of the setting knob through the intermediate pinion 35, therefore permits the setting of the slots 46 connected to each wheel 45. Once the positions of these slots have been obtained their relation to one another and to the reset shaft is maintained by means of the pawls in the ratchet 42. The actual number wheels 48 are of normal construction and, when actuated, operate in known manner for transfer by means of transfer pinions.

To summarise the above described mechanism permits:

(1) The locking of the counter in such a manner that neither the presetting knob 29 nor the reset knob 22 can be rotated.

(2) The knob 22 which resets the preset figures up into the window can only be rotated through one revolution, after which it is locked. A further rotation of this knob cannot be made unless the predetermining counter has counted down to 0000 and tripped the switch.

(3) No adjustment of the setting of the predetermining counter can be made unless it is unlocked and the method of setting is such as to set up a series of short reset sleeves in relation to one another and in relation to the position of the knob 22 in such a manner that when the counter is reset the preset figure always appears in the window.

(4) By means of the mechanism described, the unlocking of the counter frees all mechanisms within the unit allowing for action to be taken in the event of a machine breakdown halfway through the predetermined run.

I claim:

A counter for predetermining the run of a machine comprising a series of number wheels which are adapted to be driven by a machine during a run, a presetting shaft, a rotatably mounted reset shaft, a presetting member for each number wheel consisting of a gear wheel provided with a slotted hub rotatably mounted on said reset shaft, means interconnecting the reset shaft and each presetting member upon rotation of the reset shaft in one direction, means including a pawl on each number wheel adapted to engage the slot in the hub of the associated presetting member during one revolution of the presetting member in said one direction, gear pinion means respectively secured to said presetting shaft and disposed adjacent each presetting member, an intermediate gear in mesh with each respective gear pinion means and mounted for movement about the presetting shaft, and manually selectable means for moving each intermediate gear into mesh with said gear wheel of the associated presetting member to form a gear train between the presetting shaft and each presetting member individually, whereby the number wheels can be turned to an initial setting to predetermine the run of the machine by rotation of said presetting members to set positions about said reset shaft related to the number wheel setting upon rotation of the presetting shaft and operation of the manually

selectable means, said number wheels being returned after the run to the initial setting by rotation of the reset shaft in said one direction to drive the presetting members through one revolution to engage the slot in the hubs thereof with the pawls on the associated number wheels in a sequence determined by the set positions of the presetting members about the reset shaft.

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