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MARKING TAG MACHINE COUNTER DEVICE

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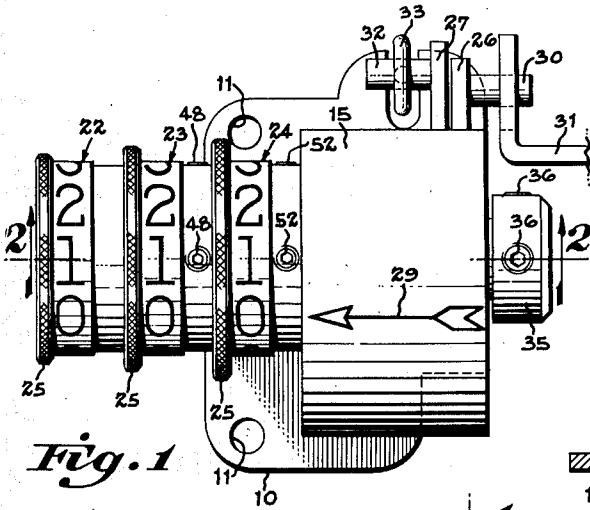


Fig. 1

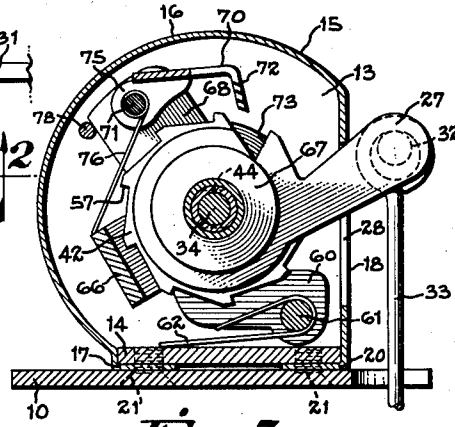


Fig. 3

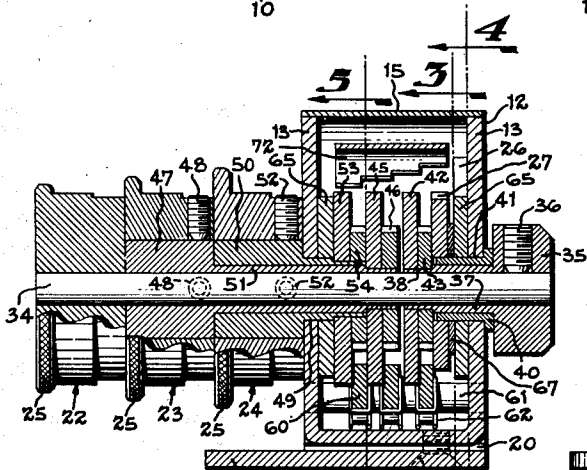


Fig. 2

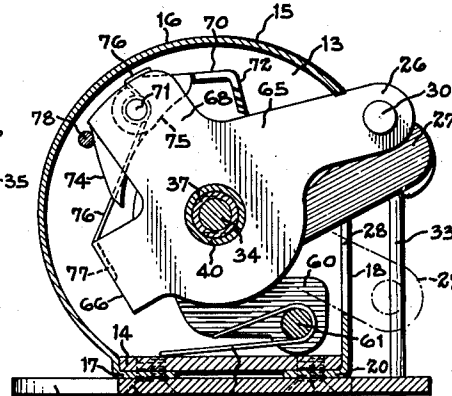


Fig. 4

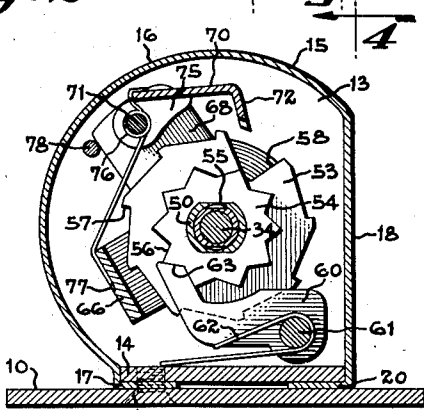


Fig. 5

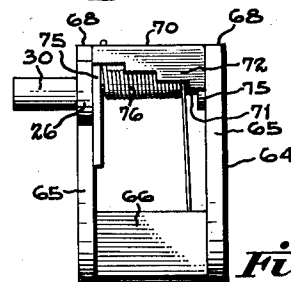


Fig. 6

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MARKING TAG MACHINE COUNTER DEVICE

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2 Claims. (Cl. 235-132)

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This invention is directed to an improved counter device which is designed primarily to be utilized in power driven marking tag printing machines for effecting automatic shut-off after a predetermined number of tags have been processed.

The counter device operates on the subtracting principle, the indicator dials of the device being set at the start to the number of tags desired and the dials indexed one digit at a time from the set number backwards toward zero during the run-off. The device is adapted to be actuated through linkage attached to any moving part of the machine which reciprocates once during each cycle, or in other words, once each time a tag or label is processed. The device also is arranged so that upon reaching zero a lever is tripped, the lever providing the motive force for effecting shut-off of the machine either by disconnecting the drive, such as by disengaging a clutch interposed between the drive and the driven parts of the machine, or by throwing a switch to shut off electric current to the drive motor.

The marking machines for which the present counter is designed operate cyclically. The tags are fed through the machine in strip form and the end tag cut off after it has been printed. The cycle stops after the cut-off. In most instances, cut-off occurs at the same time that the printing head descends. This arrangement is particularly efficient because with the printing head on the strip of tags, the strip is clamped against endwise movement during the cut-off. Thus, with the cycle stopping just after these two simultaneous operations, there remains at the printing station a printed, but unsevered, tag. At the start of the next operation, this printed tag is the first one dispensed, and since in most instances the indicia which are impressed on different runs of tags are changed between runs, the first tag off does not correspond to those dispensed during the rest of the run-off; or in other words, if it were desired to dispense 100 tags having the same indicia impressed upon them, it is necessary to set the machine to operate through 101 cycles. To an inexperienced operator, it is rather confusing to have to set the counter to one more than the number of tags required. For this reason, the present counter is designed to effect shut-off one unit passed zero in the subtracting direction, or in other words, in a three dial unit, at 999. To reset the machine for the next run, the starting point is thus 999 instead of 000.

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Subtracting counters have been utilized in power operated marking tag printing machines in the past. However, they have been constructed in such a way that it is impossible to manually rotate the numbered dials of the counter in either direction in order to set the counter. This arrangement is inconvenient for the operator of the machine and causes delay in setting up the machine prior to a run-off. Thus, with the counter stopping at 999, in order to reset the mechanism to run off, say 210 tags, it was necessary with past counters to move the 100's dial backwards from 9 to 2, the 10's dial backwards from 9 to 1, and the units dial backwards from 9 to 0. With the present machine, since the dials can be moved in either direction, such a change is very quickly accomplished by turning the respective dials through only one or two notches in the forward direction.

In the present device, the indicator dials are not only arranged so that they can be rotated manually in either direction, but they are also arranged so that they can be set independently of each other and in any desired sequence. Or in other words, each dial is free to be turned as the operator sees fit, in either direction, and in any order. There is no interconnection between the dials. Thus, when the machine is being set up in moving the 10's counter, for example, past zero in either direction, the digit's counter is not effected. In addition, even though the dials are independently movable and can be moved in either direction, their relative positions after being set are not changed with respect to the counter actuating mechanism so that the counter is ready to start counting off cycles immediately upon being set without the necessity of engaging or disengaging other elements of the counter or the actuating mechanism.

These and other advantages of the improved counting mechanism will be readily apparent from the detailed description of the drawings in which:

Figure 1 is a top plan view of a counter device embodying the improvements of this invention.

Figure 2 is a cross sectional view taken on the line 2-2 of Figure 1.

Figure 3 is a cross sectional view taken on line 3-3 of Figure 2.

Figure 4 is a cross sectional view taken on the line 4-4 of Figure 2.

Figure 5 is a cross sectional view taken on the line 5-5 of Figure 2, and

Figure 6 is an elevational view of the ratchet pawl of the assembly looking at the assembly from the right, as shown in Figure 5.

Referring to Figure 1, the counter device comprises in general a base plate 10 which is pierced by holes 11 in order to provide means for affixing the device to the frame of a marking tag machine. The counting mechanism is enclosed partly by a frame 12 having side walls 13—13 and a base portion 14. Around the outside of the frame 12, a housing member 15 is provided to complete the enclosure. The housing 15, shown in profile in Figures 3, 4, and 5, includes a semi-circular portion 16 which terminates in a flange 17 and a straight-walled portion 18 terminating in a flange 20. The two flanges 17 and 20, extend toward each other under the base portion 14 of the frame and are clamped between the frame base and the base plate 10 by flat headed bolts, indicated at 21. The two flanges preferably are pierced to accommodate the bolts 21.

The numbered dials are at the left side of the counter housing. In this particular instance, only three dials are utilized. More may be added if desired. The 100's dial, which is to the left, is indicated by the numeral 22, the 10's dial by the numeral 23, and the digit's dial by the numeral 24. Each of these dials is provided with a knurled rim 25 to facilitate manual rotation. It is suggested that these knurled rims be of different sizes so that the various dials can be determined by touch. In the devices shown, the digit's dial has a larger rim than the other two, the 10's dial being somewhat smaller, and the 100's dial being smaller still. An indicator such as the inscribed arrow 29 is provided on the housing opposite the dials to indicate the point at which the dials are to be set.

An actuating lever 26 and a trip lever 27 extend from the rear of the counter through a slot 28 in the straight-walled portion 18 of the housing. The actuating lever 26 includes a pin 30 which is in connection with a forked link 31. The actuating lever may be attached to any one of the parts of a marking tag machine which reciprocates once each time that the marking machine functions to the print or dispensing a tag. In United States patent application Serial No. 133,175, filed January 13, 1950, a marking machine of this type is disclosed. In the drawings of the identified application, a counter made in accordance with the principles disclosed here is shown in operative connection with the tag cut-off knife. It is preferred that the linkage between the actuating lever and reciprocating part be arranged to have the lever in the elevated position at the end of each cycle.

The trip lever 27 is depressed by the counter mechanism when the dials are turned from 000 to 999. This lever also includes a pin 32, similar to the pin 30, the pin being attached to a rod 33 which controls throw-out mechanism adapted to disengage the clutch between the drive mechanism and the driven part of the machine. The link 32 may be adapted, if desired, to throw a switch cutting off electric current to the drive motor. The link and clutch, or switch mechanism, form no part of the present invention and are, therefore, not shown. It will be obvious to those skilled in the art that the link may take various forms depending on the type throw-out or switch mechanism utilized in order to stop the machine at a point determining a completion of a full cycle of operation.

The numbered dials assembly and the counter

mechanism disposed within the housing are supported on a shaft 34 which extends through the housing. On the right end of shaft 34, a collar element 35 is affixed by a pair of set screws 36—36, the set screws being disposed at 90° to one another. The inner end of collar 35 is counterturned to provide a bushing 37 which extends inside of the housing around shaft 34. The bushing 37 is also counterturned near the inner end thereof to provide the journal sleeve 38. The bushing 37 is mounted within a bearing sleeve 40 which is journaled within an aperture 41 provided in the right side wall 13 of the frame 12. Journal sleeve 38 carries a ratchet wheel 42 and an index wheel 43, these two elements being keyed on the sleeve by the flat shown at 44 in Figure 3. Thus, the index wheel 43 and ratchet wheel 42 turn with shaft 34. At the right end of the shaft, the numbered dial 22, which is the 100's dial, is affixed to shaft 34 so that the 100's dial also turns with shaft 34. Thus, dial 22, index wheel 43 and ratchet wheel 42 comprise a set which operates in unison.

The 10's dial 23 is also keyed to a similar set of wheels, these being the ratchet wheel indicated at 45 and the index wheel indicated at 46. This assembly is rotatably journaled on shaft 34, the interconnection being made by a sleeve 47, one end of which is affixed to dial 23 by a pair of set screws 48, and the other end of which is keyed to the respective wheels 45 and 46 by a flat similar to the one shown at 44.

The digit's dial 24 is mounted on a sleeve 50 which is in turn rotatably journaled on the sleeve 47 of the 10's dial assembly, the latter sleeve being counterturned as at 51 to accommodate sleeve 50. Sleeve 50 is also counterturned to provide a journal 49 which resides within an aperture in the left wall 13 of the frame similar to aperture 41. Dial 24 is affixed to sleeve 50 by the set screws 52. At the inner end of sleeve 50, a set of index and ratchet wheels are provided, the ratchet wheel being indicated at 53 and the index wheel at 54. These two wheels are keyed to the counterturned inner end of sleeve 50 at the flat shown at 55 in Figure 5.

The index wheels 43, 46 and 54 are substantially identical, the only difference being that index wheel 54 has a larger center opening than the other two in order to accommodate the sleeve 50. As shown in Figure 5, each index wheel is provided with ten symmetrical teeth which define ten detent depressions 56 corresponding to the ten numbers on each dial. It is to be noted that each of the detent depressions 56 is cut at a greater angle than 90°, or, as shown, at approximately 135°.

Each one of the ratchet wheels 42 includes nine rather shallow ratchet teeth, indicated at 57, and one deep recess 58. Unlike the teeth in the index wheels, the teeth in the ratchet wheels are cut at approximately 90° or less to provide sharp radial shoulders for the engagement of pawl mechanism to be described below. The deep recess on each ratchet wheel corresponds positionally to the zero numeral on the dial to which it is keyed.

Each index wheel is engaged by a spring urged detent finger 60. The fingers are journaled on a common shaft 61 which extends from side wall to side wall in frame 12. The spring, indicated at 62, which is utilized with each of the detent fingers, is of bent, U-shape configuration engaging the underside of the detent and extending around shaft 61 to lay against the upper face of

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base 14. The spring being under tension when in the position shown in Figure 5 tends to urge the free end 63 of the detent finger upwardly. The index wheel engaging end of each detent finger is cut on an angle corresponding to the angle of the detent depressions 56. The particular configuration of the teeth in the index wheel makes it possible to force the detent finger out of engagement with the detent depressions when the dial to which the index wheel is keyed is turned manually in either direction. The relationship of the detents and index wheels to the ratchet mechanism employed for turning the ratchet wheels is explained below.

The actuating lever 26 is a continuation of a U-shaped pawl carriage 64. The carriage includes a pair of journal members 65 at the two sides, these two being tied together by a cross-piece 66. The journal 65 at the right side of the pawl carriage is mounted upon bearing sleeve 40 just inwardly of the right side wall 13 of frame 12, and the left journal of the carriage is mounted on sleeve 50, both mountings are slip fits so that the carriage is free to rotate thereon. At the right side a washer 67 is provided to decrease friction between the journal 65 and the trip lever 27. At the top of the carriage 64 a ratchet pawl 70 is journaled on a pin 71 which is mounted between a pair of ears 68—69 extending upwardly from the respective journals or side walls 65 of the pawl carriage. At the rear edge of ratchet pawl 70, a depending flange 72 is provided. The lower edge of the depending flange is cut in steps, as shown in Figure 2. Four such steps are provided. The one at the left being the lowermost of the four is adapted to engage with ratchet wheel 53, or the digits ratchet wheel; the second step from the left is adapted to engage with the 10's ratchet wheel 45; and the third step from the left is adapted to engage with the 100's ratchet wheel 42; while the fourth step from the left is adapted to engage with a deep recess 73, similar to the deep recesses 58 in the ratchet wheels, which is cut into the trip lever, the trip lever being journaled on bearing sleeve 40 and adapted to pivot around shaft 34. At the front of the ratchet pawl 70, a cam surface 74 is formed, the surface being cut on a continuation of one of the pawl journaled flanges 75—76, turned downwardly at right angles at the two sides of pawl 70 through which pin 71 extends. The pawl 70 is urged to pivot clockwise, as shown in Figure 4, by means of a spring 76 which is wound around pin 71 and engaged in a slot 77 in the forward face of crosspiece 66 at the lower end, and against the forward edge of pawl 70 at the upper end.

When the pawl assembly is in the position shown in Figure 4 of the drawing, the cam surface 74 is in engagement with a pin 78 which extends across the space between the two side walls of the frame, which engagement lifts the stepped end 72 of the pawl upwardly pivoting the pawl 70 about the pin 71. In the position shown, the actuating lever 26 is in the uppermost position.

Operation

With the numbered dials set at a selected number, the marking machine is turned on, and the actuating lever 26 is moved up and down with the cyclically operating part to which it is attached. As the lever starts down, the pawl carriage 64 pivots about shaft 34 and cam surface 74 is moved away from pin 78. Such movement

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permits the spring 76 to force the stepped end 72 of the pawl downwardly until the lowermost, or left hand step of the four engages with a notch in the digit's ratchet wheel 53. Each time the actuating lever is depressed, the ratchet wheel is indexed one notch. On each upstroke of the actuating lever, the stepped end 72 of the pawl rides over the ratchet in clockwise direction, the ratchet wheel being maintained in position and held against counter rotation by means of the detent finger 60 which engages the notches 56 of the index wheel 54. When the actuating lever approaches the uppermost position, the cam surface 74 engages with pin 78 and the pawl assembly is pivoted about pin 71, thus raising the toothed end 72 from contact with the ratchet wheel.

As an example, suppose that the counter is set for a run of 253 tags. After the actuating lever 26 has depressed three times, the deep recess 58 in the unit's ratchet wheel 53 is under the lowermost step on the pawl, and under the action of spring 76 the pawl is depressed until the second lowermost step of the pawl engages with one of the shallow teeth 57 on the 10's ratchet wheel 45, and the 10's dial is therefore indexed one notch from 5 to 4 as the unit's dial moves from 0 to 9. Thus, on every ten movements of the actuating lever thereafter, ratchet wheel 45 is indexed one notch every time that notch 58 in the unit's ratchet comes under the lowermost of the steps on the pawl. The same thing happens between ratchet wheel 45 and ratchet wheel 42, ratchet wheel 42 being interconnected with the 100's dial. The indexing between ratchet wheels continues until finally all three of the deep recesses 58 on the three ratchet wheels are aligned, this occurring when the three dials read 000. With three of the deep recesses lined up, the pawl 19 can, on the next reciprocation of the actuating lever, lower to a point where the uppermost, or right step of the four, engages with the deep recess 73 in the trip lever 27. Upon the next depression of the actuating lever 26, the trip lever 27 is moved to disengage the drive and, therefore, shut off the machine. It will be noted that in this last mentioned movement, all three dials are indexed one notch at the time the trip lever is moved. This motion brings the numbers on the dials to a position where they read 999, or one more than the number to which they were originally set, thus compensating for the tag first off the run which was left in the machine at the end of the previous run.

At this time any one of the dials is free to be turned in either direction since the ratchet pawl 70 is in the elevated position as a result of the contact between cam face 74 and pin 78. Under these conditions, the only means restraining the dials are the three detent fingers 60 which are in engagement with the respective index wheels. Thus, at the completion of any run, the dials are free to be reset by movement in either direction, and also in any order, since there is no interconnection between the various ratchet and index wheel assemblies of the three sets. This condition prevails not only at the end of a complete run, when the dials read 999, but also at any time that the machine is shut off manually at the end of a complete cycle during a run because the actuating lever is in the up position at the end of every cycle. This arrangement is particularly convenient in case it is found that a mistake has been made in the characters impressed on the tags first run off, and it is neces-

sary to reset the dials to start the run over again.

Having described my invention, I claim:

1. In a marking machine counter mechanism a rotatable dial having the numerals zero through nine indicated thereon at equally spaced intervals, a ratchet wheel and an index wheel keyed to said dial and adapted to rotate therewith, said ratchet wheel including nine shallow teeth corresponding to the numerals one through nine on said dial and a deep recess corresponding to the zero on said dial, said index wheel having ten symmetrical detent teeth corresponding to the numerals zero through nine on the dial, a spring urged detent finger engageable with the detent teeth of said index wheel and arranged to permit movement of the index wheel in either direction, a reciprocating pawl adapted to engage said ratchet teeth and advance the ratchet wheel one-tenth of a revolution when moved in one direction and slide over the ratchet teeth when moved in the opposite direction, a trip lever mounted adjacent said ratchet wheel, a recess on said trip lever corresponding to a zero setting of the dial adapted to be engaged by said pawl when said pawl is engaged in the deep recess on the ratchet wheel whereby said trip lever is moved with the ratchet wheel for one-tenth of a revolution, and means lifting said pawl from engagement with the ratchet wheel teeth when said pawl is retracted whereby the dial is free to be moved manually in either direction.

2. A subtracting counter device adapted to effect shut off of a cyclically operating marking tag machine after a set number of cycles plus one comprising, a frame, a shaft mounted in said frame, a numbered dial affixed to said shaft having the numerals zero through nine indicated thereon at equally spaced intervals, a ratchet wheel and an index wheel keyed to said shaft, said ratchet wheel having nine shallow ratchet teeth thereon corresponding to the numerals one through nine on the dial and one deep recess corresponding to the numeral zero on the dial, said

index wheel having ten detent teeth thereon corresponding to the numerals zero through nine on the dial, a spring-urged detent finger engageable with the detent teeth and configured to permit movement of the index wheel in either direction, a pawl carriage pivotally mounted on the shaft, means linking the pawl carriage to a part of the machine which reciprocates once during each operating cycle of the machine whereby the carriage is moved in the direction corresponding to the subtracting direction of the dial during the first portion of the reciprocal movement and is retracted during the second portion of said movement, a pawl pivotally mounted on the carriage and adapted to move therewith, spring means urging said pawl into engagement with the ratchet teeth, cam means adapted to move said pawl out of engagement with said teeth at the completion of each reciprocating movement of the carriage, a trip lever pivotally mounted on the shaft adjacent the ratchet wheel, said lever having a recess corresponding to a zero setting of the dial and engageable by the pawl only when said pawl is engaged in the deep tooth of the ratchet wheel whereby the trip lever is advanced one-tenth of a revolution with the ratchet wheel from the position corresponding to the zero setting of the dial to a position corresponding to the nine setting of a dial, and means linking said trip lever to shut-off mechanism of the machine.

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