

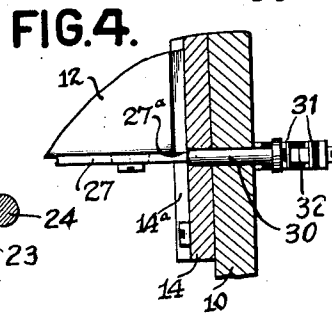
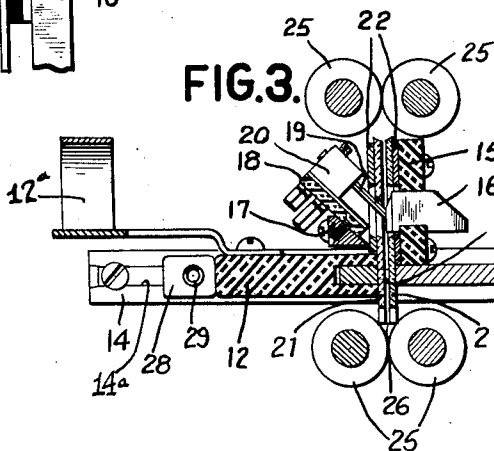
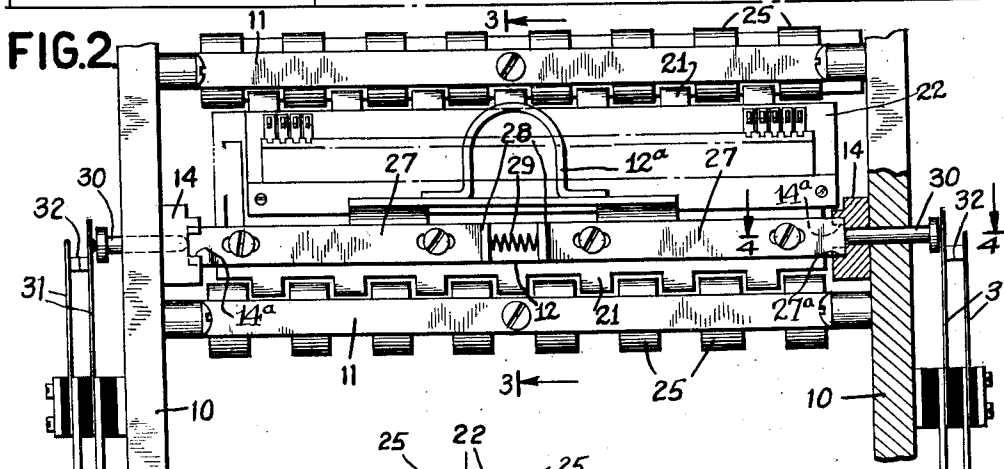
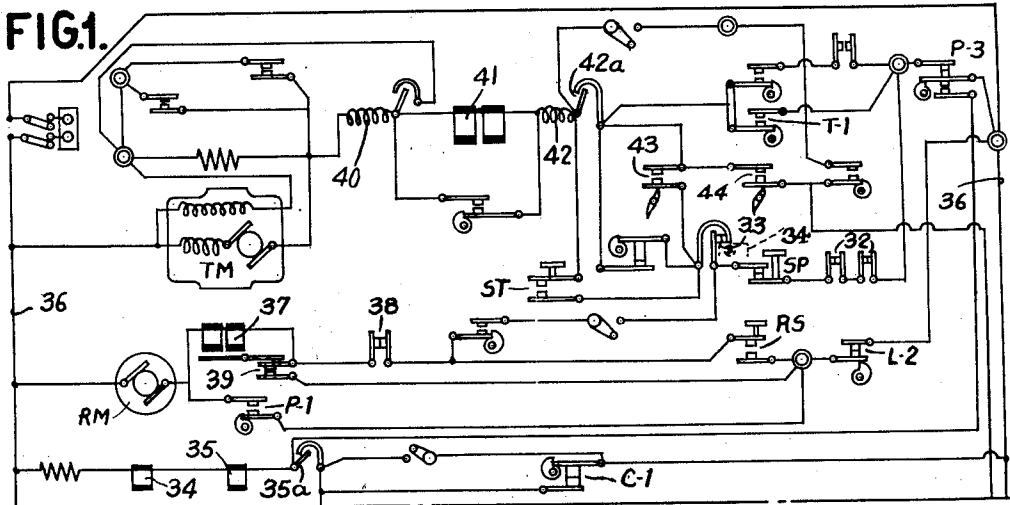
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1,944,678

RECORD ANALYZER

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RECORD ANALYZER

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7 Claims (Cl. 235—92)

This invention relates to record controlled accounting and statistical machines in general, particularly to machines embodying the well-known Hollerith system in which perforated record cards control the functioning of the machine.

Such machines, when of the electrically controlled type, of which the Hollerith system is an example, are usually equipped with a record analyzer composed of analyzing or reading brushes which are, as a general rule, so constructed as to be readily removable as a unit without disturbing the connections. This feature is extremely desirable in order to permit the operator of the machine to remove torn record cards which sometimes become jammed while being fed under the brushes and also to readily permit cleaning of the brushes and contact blocks of the dirt and fine paper shreds which are produced by the constant rubbing between the cards and the brushes.

The brush holders are usually assembled as a unit and mounted upon a support and the entire assembly may be removed as a unit from the machine by simply releasing a latch whenever it is desired to remove a damaged card, make repairs to the brushes, or clean the brushes and contact blocks. It sometimes happens that the operator, in replacing the brush holder, fails to latch the latter with the brushes in proper relation to the contact blocks with the result that the machine fails to function properly in subsequent tabulations owing to the brushes failing to make proper contact either in whole or in part.

It is an object of the present invention to provide an arrangement which prevents the operator from starting the tabulating machine driving motor unless the brush holder has been properly latched in place.

Various other objects, advantages, or features of the present invention will be pointed out in the following specification and claims or will be apparent after a study thereof and of the accompanying drawing.

In said drawing:

Fig. 1 is a portion of the circuit diagram of a tabulating machine to which the present invention has been applied.

Fig. 2 is an elevation of the back of the brush holder, parts having been omitted for sake of clearness.

Fig. 3 is a vertical section taken approximately on the line 3—3 in Fig. 2.

Fig. 4 is a horizontal section taken on the line 4—4 in Fig. 2.

The present invention may be best understood

by illustrating its application to the form of tabulating machine shown and described in Letters Patent No. 1,762,145, granted June 10, 1930, however, it is not limited in its application to that particular machine as it may be applied to other machines as well. The construction and arrangement of the brushes is illustrated and described in Letters Patent No. 1,600,413 granted September 21, 1926, to Clair D. Lake. Since the construction and operation of the machine to which the present invention has been applied is now well-known in the art only brief mention will be made herein of its general arrangement and operation and only portions of the circuits for the tabulating motor and resetting motor will be described in detail.

The numerals 10 indicate the frame supporting the card feeding and analyzing devices and are held in spaced relation by cross bars 11. The brushes and the contact blocks therefor are mounted upon removable blocks 12 and 13, respectively, which are slidably mounted in horizontal grooves 14a formed in guides 14 rigidly attached to the side frames 10. The block 13 supports a cross bar 15 on which is mounted a contact block 16 for each brush. The block 12 is composed of insulating material and carries a cross bar 17 of substantially triangular cross section (Fig. 3) which supports a flat strip of insulating material 18.

The individual analyzing brushes 19 are carried by brush holders 20 which are set in grooves in the strip 18. The blocks 12 and 13 also support plates 21 which are composed of insulating material and are provided with slots through which project the contact blocks 16 and the brushes 19. Since the spacing of the brushes is usually quite close, the left hand plate 21 (Fig. 3) is provided with a number of slots, one for each brush 19, through which the brushes project. The slots guide the brushes and prevent contact between the ends of adjacent brushes and yet allow the brushes to flex freely on passage of a card and maintain uniform contact pressure against the associated contact block 16. The plates 21 are supported by means of metallic plates 22 which give rigidity to the plates 21. The block 13 is ordinarily of metal and is provided with a plurality of screw studs carrying adjusting nuts 23 abutting a cross rod 24 which serves as a stop. By suitably adjusting the nuts 23 the block 13 may be positioned so that cards fed by the usual feeding rollers 25 will be guided between the plates 21. The rollers 25 are driven by suitable connections to the tabulating motor

TM. The blocks 12 and 13 are held in spaced relation by means of studs 26 projecting from block 13 which are of sufficient length to permit the card to move freely between the plates 21.

5 The block 12 carries a member 12a by means of which the block may be grasped for ready removal. Slidably mounted upon the block 12 is a pair of latches 27 which are provided with angular lugs 28 between which is interposed a compression spring 29. The latches 27 slip into rectangular notches or recesses 27a formed in guides 14 adjacent the walls of grooves 14a and thereby hold the blocks 12, 13 firmly in place. When it is desired to remove the blocks 12 and 13 for the purpose of cleaning the brushes or removing a torn or damaged card or to make repairs, it is merely necessary to grasp the lugs 28 with the fingers and pinch them together thereby disengaging the opposite ends of the latches 27 from the notches 14a in the guides 14 so as to permit withdrawal of both of the blocks 12, 13 by sliding them to the left (Fig. 3).

10 It sometimes happens that the operator in replacing the blocks 12, 13 will not exercise the necessary care to latch the block 12 in its proper position so that all or some of the brushes 19 do not make proper contact with their associated brush blocks 16. If such should be the case, the machine would not function properly on a subsequent tabulation, therefore, means is provided for preventing restarting the tabulating machine driving motor unless both of the latches 27 are in their associated notches. For this purpose the frames 10 carry plungers 30 which are slidably mounted in holes in both the frame 10 and the guides 14, the plungers being arranged to abut the ends of the latches 27 when said latches are in their notches in the guide 14. Associated with each plunger 30 is a pair of spring contact members 31 one of which is provided with a button of insulating material resting upon the end of the adjacent plunger 30. The arrangement is such that when the ends of the latches 27 are properly positioned in their notches the force of the spring 29 will be sufficient to press the plungers 30 outwardly and close the contacts 32 of the spring contact members. When, however, the brush block is removed for any of the purposes mentioned, the spring pressure of the contact members carrying the insulating button forces the associated plungers 30 inwardly to an extent sufficient to break the circuit through the contacts 32. In order to permit easy insertion and removal of the brush block and to insure that the plungers 30 will not catch the latches 27, said plungers are slightly rounded at the ends so that when the brush block is pushed into place with the thumb pieces 28 only partially pinched together, the ends of the latches will strike the rounded ends of plungers 30 and force said plungers outwardly to a slight extent until the latches enter the notches in the guides 14 whereupon the spring 29 will force the plungers completely outwardly and close the contacts 32.

15 The contacts 32 are in series with the tabulating motor stop key SP which is in series with contacts 33 of the motor control relay. The motor control relay contacts 33 are closed by means of a magnet 34 in series with a relay 35 and the lower contacts of cam contacts P—3. Under normal conditions the upper contacts P—3 are closed so that before a series of tabulations is commenced the relay magnet 34 and relay 35 ordinarily will be deenergized, consequently the contacts 33 will be open. The cam contacts P—3 are controlled by one of the resetting and total taking shafts so that it is necessary to first go through a total taking and resetting cycle before a new series of tabulations may be commenced. When the lower cam contacts P—3 close during a reset cycle the relay magnets 34, 35 will be energized thereby closing contacts 33 and 35a, respectively. The contacts 35a set up a holding circuit for the relay magnets 34, 35 which is maintained until a change in the group designations and the opening of cam contacts C—1 during the last cycle of a group of cards causes the deenergization of both relay magnets 34, 35. The magnets 34, 35 operate substantially as described in Patent No. 1,762,145. It is customary before commencing a series of tabulations to go through a total taking and resetting cycle for the purpose of ensuring that the counterwheels of the accumulators are all clear as, if they were not all standing at zero, an erroneous tabulation would be secured.

20 In order to start the resetting motor RM which drives the resetting and total taking mechanism, it is merely necessary to depress the reset motor starting key RS thereby establishing a circuit from left side of line 36, the resetting motor RM, reset motor clutch magnet 37, contacts 38 (which are closed when the tabulating motor clutch magnet is deenergized), starting key RS, cam contacts L—2 (which are closed when the tabulating machine is at rest) and thence to right side line of 36. Energization of the magnet 37 causes the engagement of the one-revolution clutch connecting the reset motor RM to the total taking and resetting mechanism and closes contacts 39 associated with reset motor clutch magnet 37 and thereby establishes a circuit momentarily around the key RS so that said key may be released. A short interval of time after closure of the contacts 39 has been effected, the cam contacts P—1 close and short circuit the reset motor clutch magnet 37. The cam contacts P—1 remain closed throughout most of the total taking and resetting cycle and open just at the end of said cycle thereby breaking down the circuit through the reset motor and the latter will then come to rest.

25 At the beginning of the resetting and total taking cycle the lower cam contacts P—3 close thereby energizing the relay magnets 34, 35 with the result that the contacts 33 and 35a will be closed. Closure of the contacts 33 at this time has no effect upon the motor control circuits since the contacts of the tabulating motor starting key ST are open and in series with the relay contacts 33. Energization of relay magnet 35 closes contacts 35a and thereby establishes a holding circuit through the cam contacts C—1 to the right side of the line 36 so that when a total taking and resetting cycle is completed the contacts 33 will remain closed. The cam contacts C—1, which are controlled by the tabulating machine, open for a brief interval of time towards the end of a tabulating cycle and are used for the purpose of testing out the automatic control circuit to determine if there has been a change in group number of successive cards. The functioning of the cam contacts C—1 will be readily understood by reference to Patent 1,762,145 already mentioned.

30 The operation of the reset motor RM while the brushes 19 are out of proper contact with their associated contact blocks 16 produces no harmful results since the brush circuits are not involved in total taking and resetting cycles and the circuit through said brushes is usually open during said cycles, therefore, the operation of first going

through a total taking and resetting cycle will not in any way have a harmful effect upon the machine as a whole. After the preliminary total taking and resetting cycle has been completed the tabulating machine is in readiness for commencing a new series of tabulations. If it should happen that the operator has carelessly omitted to latch the brush blocks 12, 13 properly in place with the brushes 19 squarely in contact with the associated brush blocks 16, it will be impossible to start the tabulating motor TM since contacts 32 are in series with the tabulating motor start key ST and one or more of said contacts 32 remain open as long as the block 12 remains unlatched.

When the blocks 12 and 13 have been properly latched in place the tabulating machine motor TM may be started by depressing the key ST whereupon a circuit will be established in the usual fashion from left side of line 36, through the tabulating motor TM, relay 40, tabulating motor clutch magnet 41, relay magnet 42, tabulating motor starting key ST, contacts 33 (now closed), tabulating motor stop key SP, the contacts 32 (now closed), upper cam contacts P—3 (closed), to the right side of the line 36.

Energization of relay magnet 42 closes contacts 42a and thereby establishes a holding circuit for one cycle through the cam contacts T—1 which are closed at the beginning of the tabulating cycle and remain closed until near the end of the cycle. Closure of the contacts T—1 permits the tabulating motor starting key ST to be released so that the tabulating machine will now operate through one card cycle and as a result a card will be fed out of the card magazine under the upper brushes thereby closing the upper card lever contacts 43 and establishing a circuit from the relay contacts 42a to the contacts 33 so that when the cam contacts T—1 open near the end of the first tabulating cycle the motor TM will continue in operation and as long as cards are fed beneath the upper brushes the tabulating motor will continue to operate.

It will be seen that it is not sufficient to push the blocks 12, 13 all of the way to the right (Fig. 3) to again condition the machine for tabulating operations as the latches 27 must be securely seated in their co-acting recesses in order to close the contacts 32 and permit starting the tabulating motor TM.

It is not desired to limit the scope of the invention to the precise form of analyzing unit described herein as it may be varied in practice. For instance, the contact blocks 16 might be replaced by a cylindrical contact roll as is frequently the case or the relative arrangement of the brushes and the contact blocks or contact roll (if used) may be reversed. Nor is it desired to limit the invention to the particular location of the contacts 32 in the motor circuit as they might be placed at a number of points in the motor circuits and be equally as effective.

The invention has been illustrated and described as embodied in a specific type of machine and in a specific form of embodiment, however, it is not to be considered as being limited to the specific machine or embodiment illustrated as it may be embodied in other machines as well and in various forms, all within the scope of the following claims.

I claim:—

1. In a machine of the class described, the combination of a removable record analyzing de-

vice, driving means for said machine, and means controlled by a part of the analyzing device for preventing an operation of the driving means when the record analyzing device has been removed.

2. In a machine of the class described, a main frame, a record feeding device mounted in said frame, driving means for said feeding device, a record analyzer having a normal cooperative relation with the record feeding device and removably mounted in said frame, a latch forming part of the analyzer for holding the latter in its normal cooperative relation with the record feeding device, and means controlled by said latch for disabling the driving means when the latch is released to permit removal of the analyzer from cooperative relation with the feeding device.

3. In a machine of the class described, the combination of a main frame, a record feeding device mounted in said frame, driving means for said feeding device, a record analyzer mounted in said frame and having a normal cooperative relation with said frame, said analyzer being removable from said cooperative relation by a movement relative to the frame, means forming part of the analyzer for retaining the latter in said cooperative relation, and means controlled by the retaining means for disabling the driving means when the analyzer is moved from cooperative relation with the feeding device by a movement relative to the frame.

4. In a record controlled machine, driving means, a removable record analyzer including a latch for holding the analyzer in analyzing position, and means controlled by said latch for disabling the driving means when the analyzer is unlatched for removal from analyzing position.

5. A record controlled machine comprising record analyzing means removably mounted in the machine, means for feeding records to the analyzing means for analysis by the latter, a driving motor for the feeding means, a control circuit therefor, and means controlled by a part of the analyzing means for interrupting the control circuit when the analyzer is removed.

6. A record controlled machine having record feeding means, a record analyzer for sensing records fed by the feeding means, said analyzer comprising two removable and coacting parts between which pass the records fed by the feeding means, releasable means for retaining both parts of the analyzer unit in proper cooperative relation with the feeding means, and means effective upon release of the releasable means when removing one of said parts for preventing operation of the feeding means.

7. A record controlled machine comprising, means for feeding records, an analyzer for sensing data designations in records fed by the feeding means, said analyzer being composed of two coacting parts between which pass the records fed by the feeding means, said parts being both removable from the machine by a movement in a direction transverse of the line of feed of the records, releasable means associated with one of said parts of the analyzer for preventing movement of both parts in the direction of removal, and means controlled by the analyzer when partly moved in the direction of removal for preventing the feeding means from feeding records to the analyzer.

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