

International Business Machines Corporation
Service Instructions ITR No. 203
January 1, 1938

Dial Recorders

The International Dial Recorder is used where it is desired to print the record for a number of employees, over a certain pay period on one sheet of paper. This recorder is made in two sizes for 50 or 100 employees, and also for three different lengths of pay periods; daily, weekly and eight-day or quadri-monthly. Some styles of dial recorders are made for 150 employees.

Ample space is provided on the weekly and quadri-monthly record sheets for the men's names and numbers, and the total time rate and earnings. On the payroll type of dial recorder ample space is provided which may be ruled off or divided as desired, to accommodate complete payroll information such as total time, gross earnings, deductions of various kinds, net earnings, etc. Pasting sheets may be provided for the daily time slips. The daily slips are attached to the pasting sheets in such a manner that only the total time is visible. All slips for a payroll up to semi-monthly in length may be attached to one pasting sheet and the payroll progressed daily or made up from the large pasting sheet. The pasting sheets usually contain complete payroll information.

Any type of dial recorder may be equipped with a two-color auditing device which automatically prints any irregularities of the working schedule in ink of a different color than that of the regular registrations.

The daily type of dial recorder is made in three styles. On the single drum recorder, a new record sheet must be installed each night after the last registration has been made, or the following morning before the first registration. On the daily double drum recorder, the new record sheet may be installed any time during the day as the drum being used is alternated from day to day. If more than six registrations are desired in any one day, a twelve registration machine will have to be used. The twelve registrations machine is similar to the double drum machine, the main difference being that a record sheet wide enough for twelve registrations is used and the carriage spaces twice daily instead of once.

Automatic Spacing

All International Dial Recorders are fully automatic, that is, it is not necessary to shift any levers to make the registration in its proper place. The spacing for the various days is taken care of by shifting the carriage to the proper position. The spacing for registrations is accomplished by automatically sliding the record sheet over the drum. For each number on the dial there is a corresponding spacing bar which locates the record sheet for the registration. These spacing bars act individually and have no effect on the next succeeding or preceding numbers. When a registration is made on any number the spacing bar of that number is moved one notch and thus the machine is prepared for the next registration on that number and the registration or spacing for all other numbers is not affected. This exclusive feature makes it impossible to blur the record

by printing one registration over another. Supplementing the spacing bar is an automatic lock which prevents more registrations per day or period than can be located in the space provided. At 12 o'clock midnight, or some other predetermined time, the carriage shifts from one day's space to the next, and at the same time restores the spacing bars to their original positions. On the daily single drum recorder the spacing bars must be restored manually, at the time of changing the record sheet. A lever which restores all spacing bars at once is provided for this purpose.

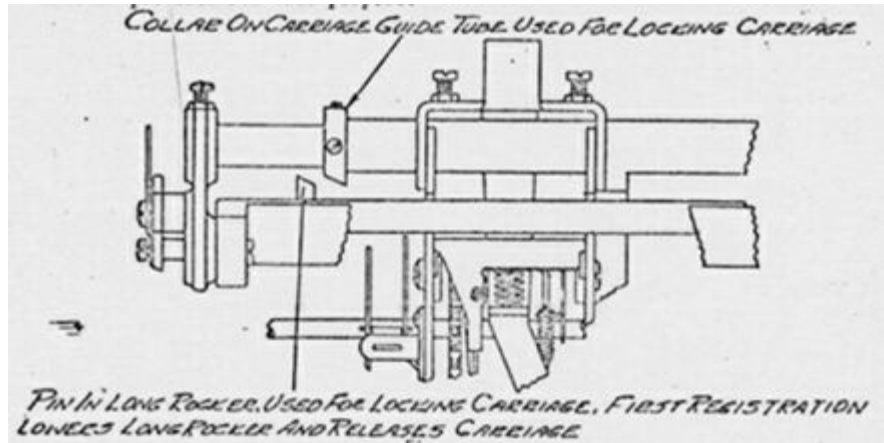


Fig. 1

The weekly and quadri-monthly recorders are so constructed that when the carriage is reset all the way back it becomes locked until the first registration is made. (See Fig. 1). This feature makes it very convenient where it is desired to change the record sheet and reset the carriage after working hours, as it prevents the carriage from spacing during the night. When the first registration is made on the recorder after resetting, the carriage is unlocked and travels to the proper position for printing. The carriage will then space properly through the week.

On the daily double drum machine, a lever is provided which will lock the carriage and prevent it from spacing when no changes are desired, as on Sundays and Holidays.

Installation

The recorder must be firmly attached to a level foundation. The recorder should be located so that all employees approach it from the same direction. A clean, light, dry place is essential for long life and efficient service. Attach recorder to its support with screws through the two holes in the bottom of the case. After the recorder is securely attached to its support, remove all cords and blocks, both outside and inside the case, before disturbing any levers or operating the recorder in any way.

If recorder is spring driven set the recorder to correct time as described below before starting pendulum. On the synchronous motor or impulse driven dial recorder there is a terminal block located at the rear left to which the wires are attached. There are porcelain bushings provided through which the wires are brought.

Setting the Recorder

After the recorder is properly installed, make a trial registration. Check to see that the same time is indicated and printed. The figures denoting P.M. time are smaller and underscored. There is no way for the hands to get out of synchronism with the type wheels except by accidental moving of the hour hand, which is friction drive. Never move the hour hand unless the timing of the carriage shift and the color change schedule are checked immediately after.

On the spring and synchronous motor driven dial recorders the time is set by opening the bezel and turning the minute hand slowly. To open the bezel raise the catch on the left inside front of the recorder. This will release the catch permitting the bezel to be opened.

On the impulse driven dial recorder it is necessary to depress the armature of the secondary movement to a neutral position which permits the minute hand to be turned. The armature is located in the impulse movement which is located directly behind the dial face.

The driving power for the carriage is furnished by an independent spring. This spring is wound and the carriage returned to its starting position at the same by turning the shaft that extends crosswise of the recorder just back of the front casting. A special key is provided for rewinding the spring. To get the recorder to print in the proper day space turn the winding key to move it backwards or operate the release lever located just back of the front casting. As stated before, the spacings for each day is governed by the position of the individual selective spacing bars.

Color Change

To set or change a color schedule proceed as follows: On the old style recorders remove the back board from the recorder. The timing wheel is located at the extreme top rear of the machine. The color change blocks are attached to the timing wheel with square headed screws and nuts. The square heads of the screws slide in the annular slot cut in the timing wheel.

Several holes are cut through the timing wheel to permit inserting the screws from the rear of the timing wheel. The blocks should be placed on the screws in such a position that the long side of the blocks will be toward the face of the pointer. (See Fig. 2).

The timing wheel is marked at fifteen minute intervals. Shift the blocks around the annular slot until the color changes at the exact minute. The color change pawl should drop into position preparatory to make the change from 2 to 4 minutes before the pointer drops from the block. Set the block to the correct height to obtain this condition. There must be an even number (2, 4, 6, etc.) of blocks on the timing wheel.

Care must be taken not to set the blocks too high or the recorder will be stopped.

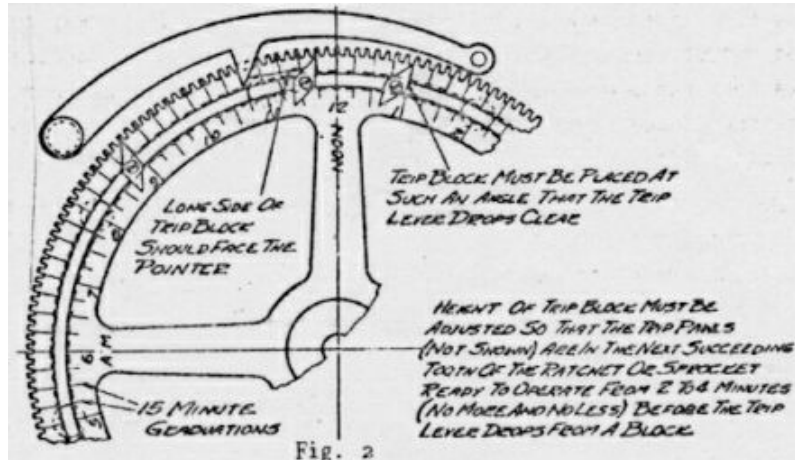


Fig. 2

Attaching Record Sheet

The record sheet must be creased at both the top and bottom edges. Make these creases evenly along the perforated lines at the top and bottom of the sheet. The record sheet is held to the drum by a clamp extending the entire length of the sheet. Insert the top edge of the sheet, to the crease, in the slot and clasp fast. Revolve the drum slowly, at the same time stretching the sheet. When the sheet is tightly drawn around the drum, insert the other creased edge and clamp. The record sheet should not extend over the ends of the drums, and the employees' numbers should be at the rear. A clamp is located on the rear end of the drum 180 degrees from the clamp. When this clamp is sprung over the edge of the record sheet it prevents the record sheet from creeping.

A friction device, operated by a knurled nut, is provided to hold the drum while attaching a record sheet. This friction should be released immediately after the record sheet is installed.

Ink Ribbon

It is important that the ink ribbon is properly installed to insure correct feeding and reversing.

The ink ribbon winds and unwinds from the bottom of the spool. It must travel under all ribbon guards so that it will not touch the type wheels. The small hooks which are on each end of the ribbon and are used for reversing the direction of travel of the ribbon should be pointing up as the ribbon travels over the drum. The ribbon spools should be placed on their arbors with the larger end of the hole toward the front of the machine. If a two color ribbon is used the red portion must be toward the front of the recorder.

If the recorder uses a one color ribbon, blue, order style 40. If it uses red and blue, order style 39.

Oiling

All bearing and wearing surfaces should be oiled occasionally with a good grade of light oil.

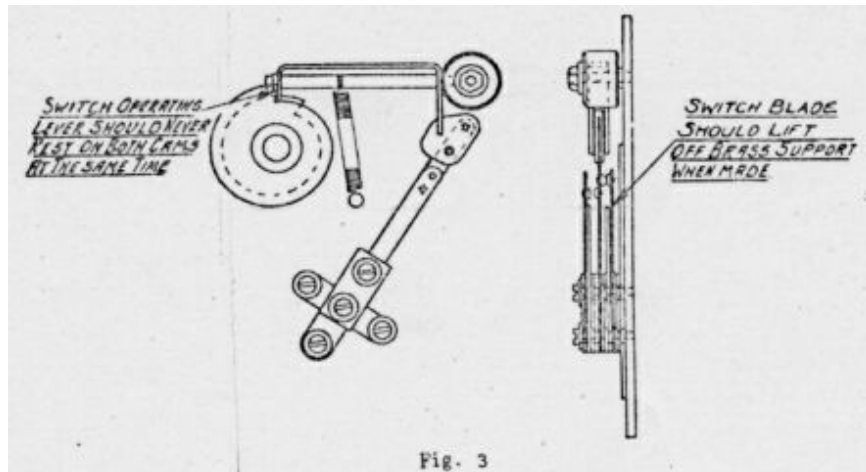
An automatic oiling device consisting of an oil well and wick is provided for oiling the main shaft. This is located at the front end of the drum and may be refilled by removing the small cap screw located just below the wick.

Self-Regulating Switches

On dial recorders which are self-regulating, the self-regulating switches must be adjusted as follows:

The switch cam is properly timed at the factory and should not require changing, however, the timing of the switch may be adjusted by shifting the entire switch block assembly. The secondary unit of recorder should transfer to the "B" wire just before it reaches the 59th minute. A quick drop of the lever from the cam is essential. If the lever rides down the face of the cam there is danger of a poor contact.

Make certain that the center switch blade does not touch both the "A" and "B" switch blades at the same time. The brass supports for the "A" and "B" switch blades should be adjusted so that the center switch blade makes equal and positive contact with each and so that the switch operating lever never rides on both cams at the same time. This assures that the full tension of the switch operating lever spring is applied to the switches. (See Fig. 3).



Numbering Plan

[This section discusses the four-digit product model or type designation applied to ITR dial recorders, e.g., 6125.]

First figure "6" means International Dial Recorder

Second figure "0" means Daily
 "1" means Weekly
 "2" means 8 days, 4 registrations
 "5" means Daily, 12 registrations

- Third figure “2” means 50 capacity
 “3” means 100 capacity
 “4” means 150 capacity
 “7” means Daily double drum - 50 capacity
 “8” means Daily double drum - 100 capacity
- Fourth figure “0” means one color
 “5” means two color

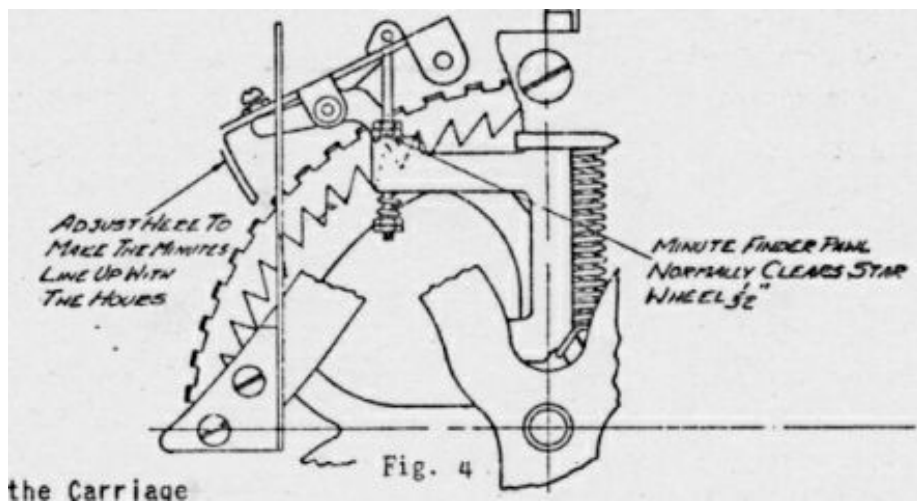
ADJUSTMENTS

Check the ribbon shift thoroughly to see that it shifts at least one tooth each registration and that the spools have enough friction so that the ribbon does not drag on the paper. To increase the friction, remove the gear and bushing from the ribbon spindle and lengthen friction spring. Use extreme care not to lose the small friction spring or friction stud.

Type Wheels

The pin on the minute wheel, used for tripping the hour, has adjusting screws that will allow it to be moved in several directions. This pin should be adjusted so that it seats as deeply as possible into the hour wheel sprocket and have equal clearance when the minute wheel is revolved in either direction.

The minute wheel should not be positioned at the 00 minute until after the hour wheel has tripped. The minute finding pawl should stand about 1/32” above the star wheel. (See Fig. 4).



Timing the Carriage

1. Shove the carriage back to its locked position.

2. Adjust the tape anchor post to its central position.
3. Connect up tapes. The front end of the short tape should be on the lower side of the pulley. The short tape should be placed on the anchor post first. Connect long tape on motor pulley giving two turns, over top of pulley, through rear pulley to anchor post.
4. Change the mesh of the column change gear with the gear on the motor drive arbor until the ear on the column change wheel is $1/8''$ from the accommodation gear when the backlash is removed.
5. Remove tapes from carriage.
6. Mark the accommodation gear and wind the motor spring twelve $1/2$ turns or 4 complete turns.
7. Reconnect the tapes and test the movements of the carriage making certain that it works freely enough to reset all spacing bars.

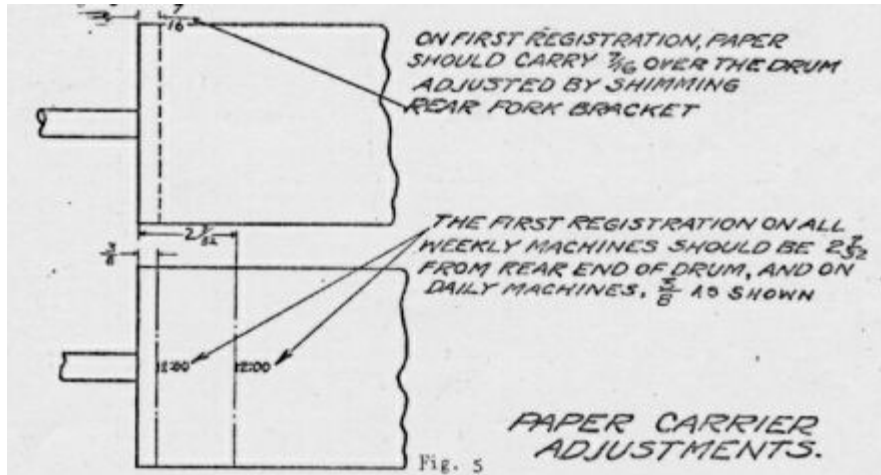
The next adjustment is to mesh the driving gear for resetting the spacing bars with the gear on the column change shaft so that when in the normal position of any day the resetting disc will be as far away from the spacing bars as possible. This means that the arm will be in a horizontal plane and at its extreme forward position. If the machine is not timed in this manner, six registrations cannot be made each day. The only exception to this adjustment is when less than six registrations are desired each day, as on the 8 column machine. The final adjustment is made by the eccentric bushing in the sliding disc, which is adjusted so that there is a slight clearance between the spacing bars and the stop on the disc after the sixth registration.

When timing the clock movement, carriage and color change timing wheel, proceed as follows: Time all units with the color change timing wheel, first turning it to 12:00 midnight. Disconnect the rear toggle and turn the hands of the clock until 12:00 midnight imprinted. Block the finder into the star wheel, loosen the front toggle and set the hands to correspond with the timing wheel and type wheels. Now tighten both toggles and check the printing with the hands several times during an hour especially at the even hour.

To time the day to day spacing of the carriage, turn the minute hand until the carriage shifts. Loosen the set screw in front end of accommodation gear shaft and turn minute hand until the recorder prints the desired time, then tighten set screw.

Sequence Adjustments

1. Adjust the position of the carriage in relation to the anchor post for tapes, so that when the first registration is made at 12:01 A.M., there will be a distance of $2 \frac{7}{32}''$ from the end of the drum to the first figure on a weekly dial and on a daily or double drum, the distance will be $3/8''$. (See Fig. 5)



2. Set the crosshead lever so that there is a clearance or $\frac{3}{32}$ " between the pin in the operating lever and the face of the dial. To get the proper adjustment, it may be necessary to bend the loop a trifle. This adjustment must be accurate to prevent the person registering from bending the spacing bars by swinging the operating lever. A gauge is provided for this purpose.
3. Adjust the connecting rod between the front and rear forks so that when the gauge for the printing drum is in position, the drum just rests lightly against it. When the drum is in its normal position, the hub should rest against the bumper spring. (See Fig. 6)

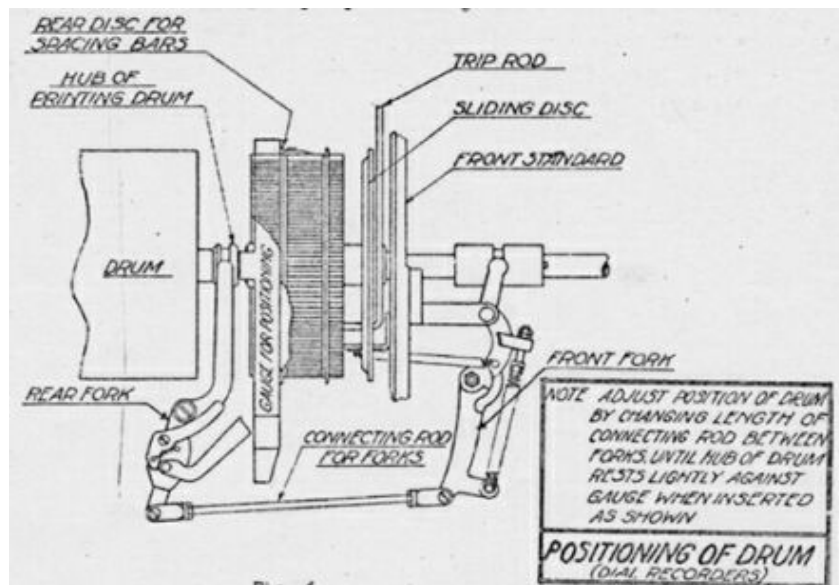
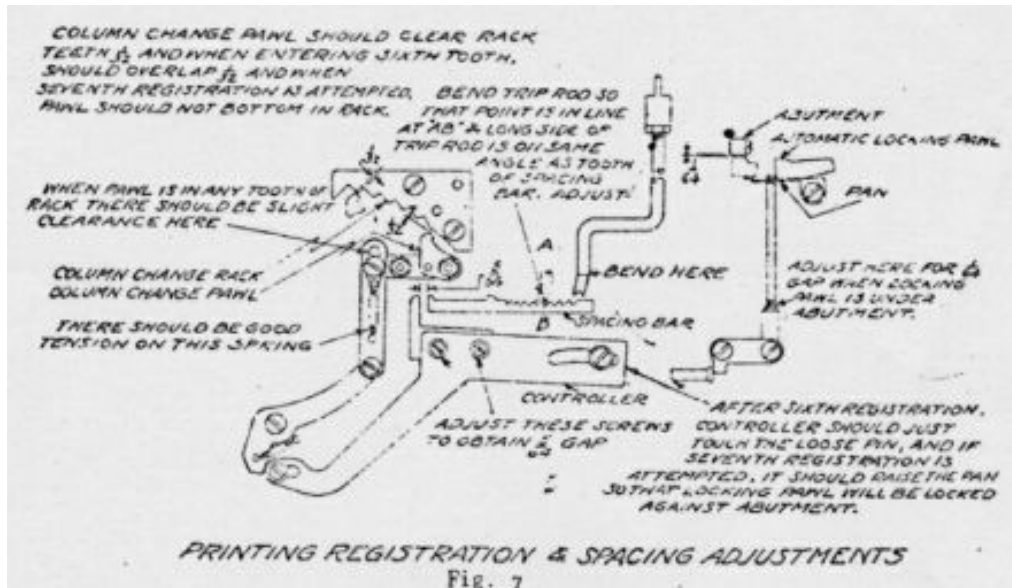


Fig. 6



4. Adjust the screw in the round rocker for a faint impression on the front end of the drum when the clip is on the operating lever or $\frac{3}{64}$ " clearance.

5. Adjust the screw in the rear end of the rocker arm for the proper impression on the rear end of printing drum.

6. Adjust the angle of the bell hammer trip pawl until the bell just trips with the clip under the operating lever. (See Fig. 8)

7. The bell hammer dog should be adjusted so that when the pawl trips under the dog after the third registration, there will be at least $\frac{1}{64}$ " air gap in the elbow of the front fork. (See Fig. 9).

8. Adjust the trip rod as per sketch. Use gauge for proper clearance between the trip rod and drum for spacing bars. Adjust the length of the trip rod so that the spacing bars will move only one notch. (See Fig. 7)

9. Adjust the position of the plunger for the spacing bars until the column change pawl overlaps the rack tooth $\frac{1}{32}$ " on the sixth registration. Also be sure that the column change pawl has no more clearance than $\frac{1}{32}$ " when traveling past the rack teeth. If this condition does not exist, it may be

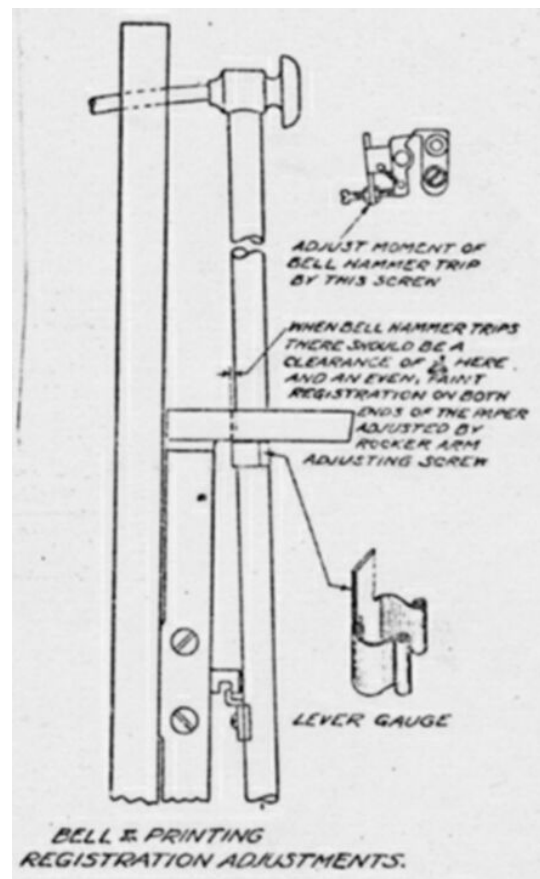


Fig. 8

adjusted by filing the elongated slot at the end of the controller link but also bear in mind that there should be a slight play in this link when the column change pawl is engaged in any tooth of the rack. The spring on this link must have good tension.

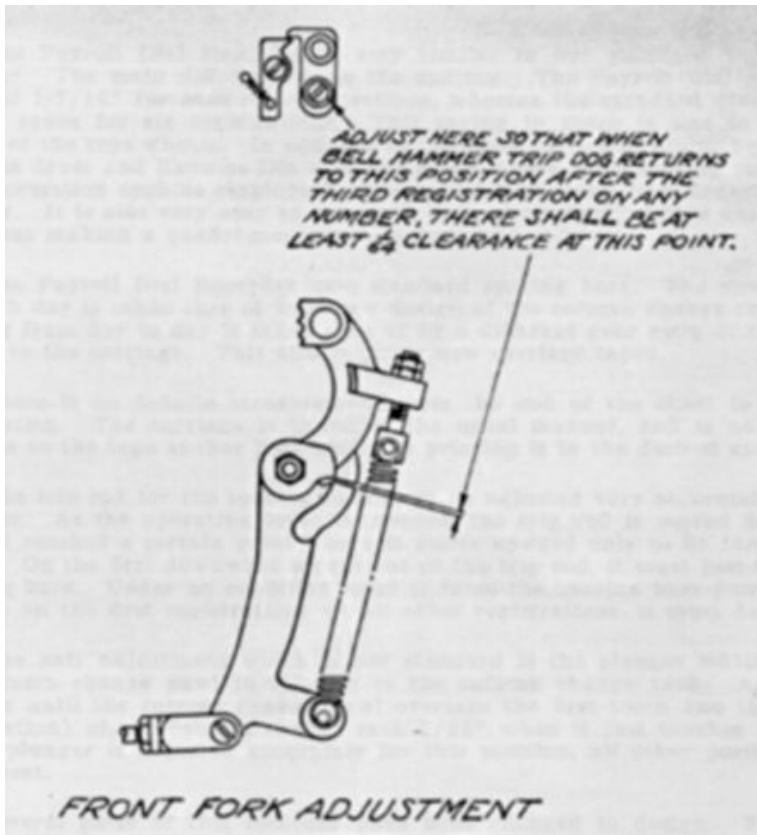


Fig. 9

operating lever is operated rapidly, the pawl riding on this beveled surface will receive a little kick thus locking the machine from registering. When the operating lever is pressed slowly, the locking pawl will slide under the abutment.

The retard device is for the purpose of preventing the carriage from operating too fast when spacing from one day to the next.

For one color recorder, use ribbon No. 40

For two color recorder, use ribbon No. 39

Payroll Dial Recorder

The Payroll Dial Recorder is very similar to our standard weekly dial recorder. The main difference is in the spacing. The Payroll Dial requires a space of $1\frac{7}{16}$ " for each six registrations, whereas the standard dial requires $2\frac{1}{8}$ " space for six registrations. This saving in

space is due to the new design of the type wheels. In addition to the space for registrations being made less, the drum and likewise the slips are made longer, thus leaving more space for information such as employee's name, total time, total pay, deductions and net pay. It is also very easy to get eight days of six registrations each on one slip, thus making a quadri-monthly recorder.

The Payroll Dial Recorder uses standard spacing bars. The new spacing for each day is taken care of by a new design of the column change rack. The spacing from day to day is taken care of by a different gear ratio of the motor spring to the carriage. This also requires new carriage tapes.

There is no definite measurement from the end of the sheet to the first registration. The carriage is timed in the usual manner, and is adjusted in relation to the tape anchor post until the printing is in the desired space.

The trip rod for the spacing bars must be adjusted very accurately on this recorder. As the operating lever is pressed, the trip rod is moved downward until it reaches a certain point where it starts upward only to be forced down again. On the first downward movement of the trip rod, it must just touch the spacing bars. Under no condition must it force the spacing bars down, except slightly on the first registration; on all other registrations, it must just touch

The only adjustment which is not standard is the plunger which adjusts the column change paw in relation to the column change rack. Adjust the plunger until the column change paw overlaps the first tooth (on the second registration) of the column change rack $1/32''$ when it just touches the rack. If the plunger is adjusted accurately for this position, all other positions will be correct.

Several parts of this recorder have been changed in design. Therefore when ordering parts, always specify for Payroll Dial Recorder.