



National Association of

WATCH & CLOCK
 Collectors, Inc.

NAWCC Chapter 52 - Los Padres

IBM Model 15 Plans & Pics

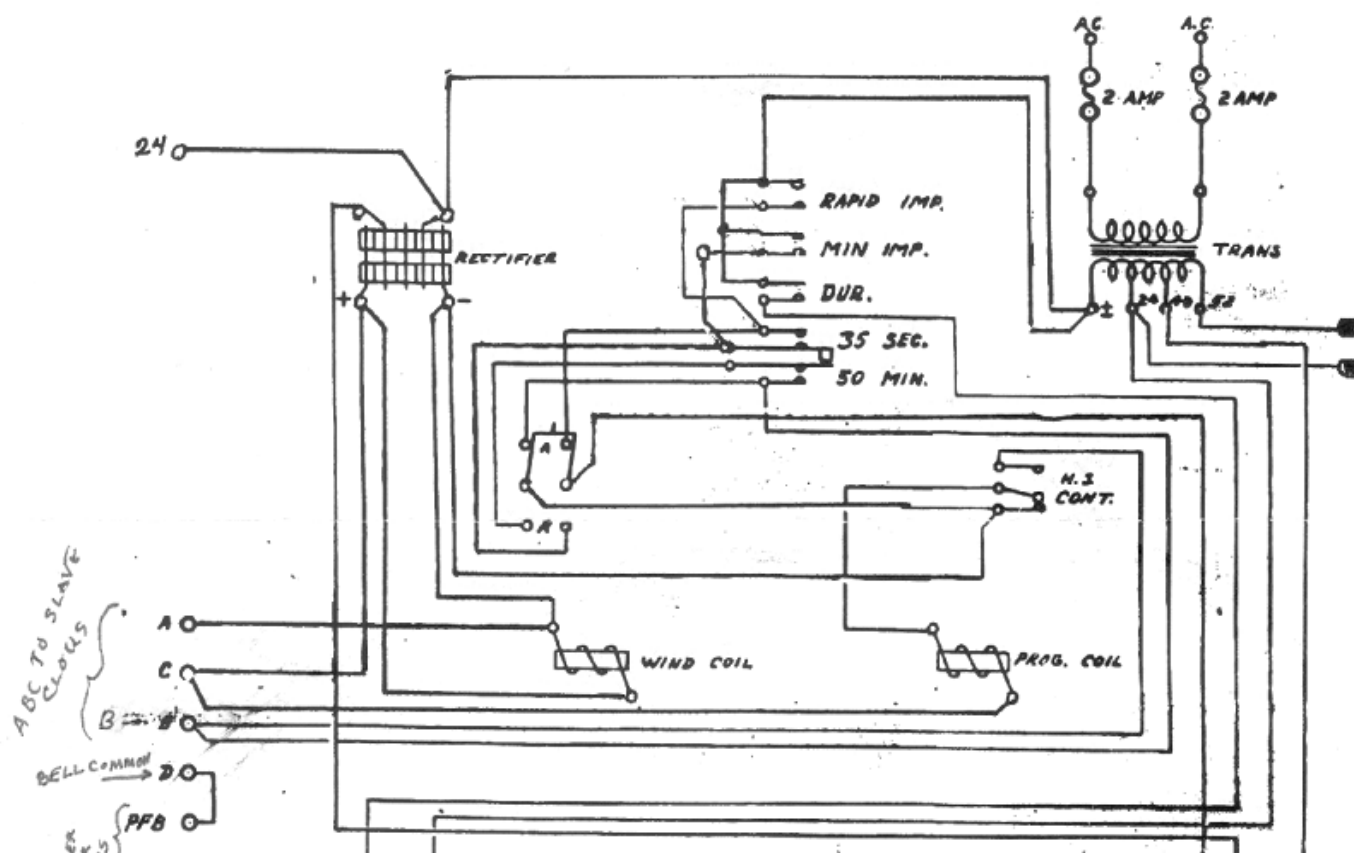
3/21/2011 update: A MUST SEE, TWO MEMBERS OF CHAP 190'S IBM MODEL 15 PROJECT!!

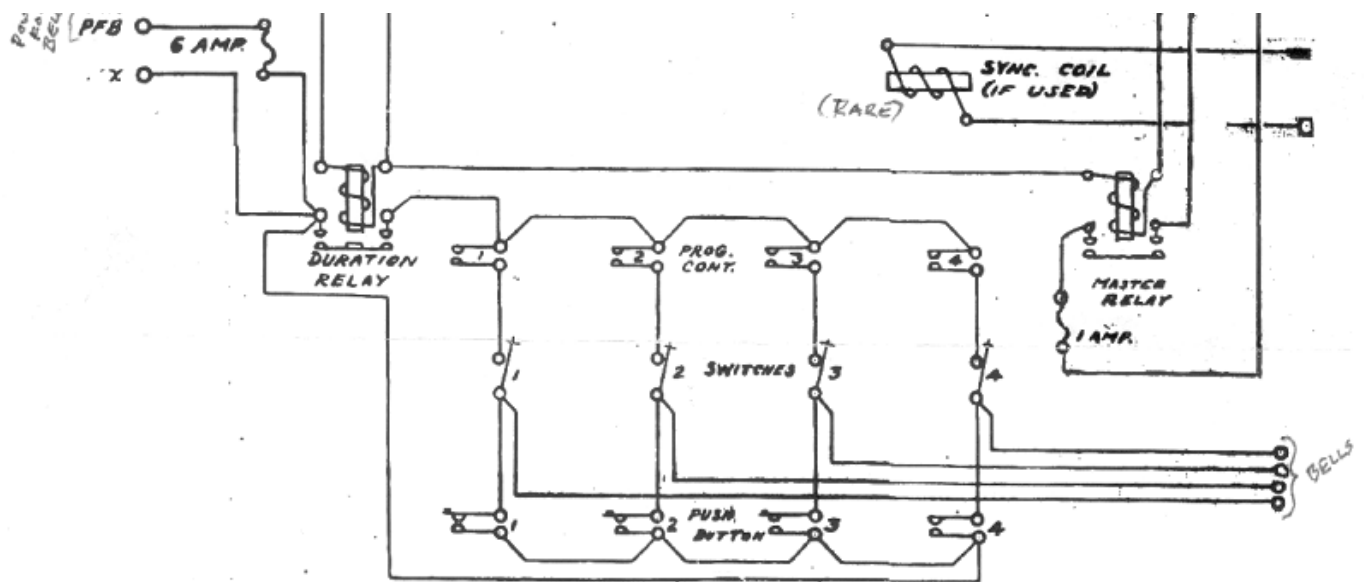
[IBM_Model_15_Master_Clock_final\[1\]with attachments.doc](#) (WORD COMPATIBLE)

[IBM_Model_15_Master_Clockpdfver\].pdf](#) (PDF VERSION)

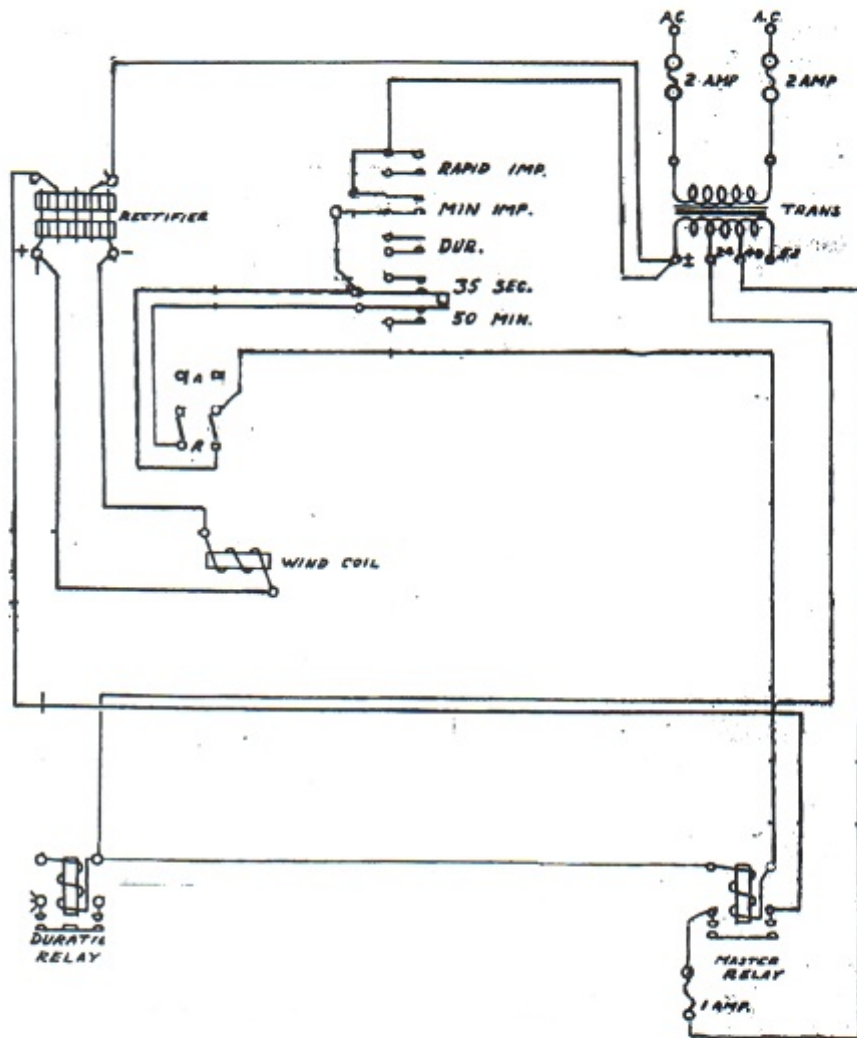
[NAWCC message board discussion of article](#)

10/21/2010 update: Just found a few more pages of wiring diagrams and am placing them here before the blueprints and other info





International (IBM) 72 beat Master Program
Clock Wiring Diagram - Model 15-7 (1937)



International (IBM) 72 beat Master Program Clock Wiring Diagram - Model 15-7 (1937)

Modified to illustrate only the winding circuit 990729

itrs1.cdr

It's not easy getting these oversize pages on the scanner. You are going to have to paste the two pages

together and because the top of the scanner lid gets in the way, you will have to invert the second page and fit it together like a jigsaw puzzle.

The first two pages look kinda like a blueprint and has number 87982-A

The last two pages have the number 401249 and states wiring diagram in the printed corner along with the model 15-7

I have a garage full of these puppies, two model 15's (72beat), a big 60 beat one that I don't know the model number of, and a 60 beat Standard Electric in the hat style case, A pretty 60 beat standard Elec in a gorgeous case and two 60 Beat Self Winding Co and I 80 beat Self Winding

Suckers are too heavy but maybe I will bring a few of them to the Los Angeles Regional this year.

10/21/2010 update to include 1948 memorandum #213 RE: type 25 and 35

INTERNATIONAL BUSINESS MACHINES CORPORATION
INTERNATIONAL TIME RECORDING DIVISION
590 MADISON AVENUE, NEW YORK, N. Y.

CUSTOMER ENGINEERING INSTRUCTION
MEMORANDUM #213

SUBJECT: HIGHLY POLISHED VERGE IMPROVES TIME
KEEPING ACCURACY - TYPE 25 & 35

Improved time keeping accuracy can be obtained from pendulum type Master Clocks by polishing the verge faces that are actuated by the teeth of the escape wheel.

To polish a verge effectively it should be removed from the movement and held in a vice. First clamp the verge so one of the flats is just even with the top of the vice. Polish gently with a piece of well worn emery cloth or worn crocus cloth held flat by a thin file or steel ruler. Even though a verge appears to be very smooth, its surface can be polished to even greater smoothness by the above method. Next, polish the other flat on the verge. Then polish the left hand, convex outside surface of the verge, and finally the right hand, concave inside surface of the verge.

Burred or feathered edges may be created where two polished surfaces meet. These should be removed, but the edge should not be rounded off in the process.

After polishing each surface, a film of oil should be applied to prevent rusting.

A Master Clock will run much better when a drop of light oil IBM #1 is applied to each pallet of the verge.

Adjust verge bridges equally until verge is as close to the escape wheel as possible without catching on teeth.

Adjust verge wire until the pendulum is in beat with the movement.

IBM

PENDULUM ADJUSTMENT CHART

60 BEAT MERCURIAL

NO. OF TURNS	RATE OF ADJUSTMENT
1 GRAD. NUT	1 SEC. PER HOUR
1 GRADUATION	1 SEC. PER DAY
1 SPOKE NUT	1 SEC. IN 5 DAYS
1 SPOKE (1 OF 5. NUT)	1 SEC. IN 20 DAYS

60 BEAT INVAR

NO. OF TURNS	RATE OF ADJUSTMENT
1 SPOKE NUT	1 SEC. IN 5 DAYS
1 SPOKE (1 OF 5. NUT)	1 SEC. IN 20 DAYS
1 BOB	1 SEC. PER HOUR
1/4 BOB	6 SEC. PER DAY

72 BEAT INVAR

NO. OF TURNS	RATE OF ADJUSTMENT
1 SPOKE NUT	1 SEC. IN 2 DAYS
1 SPOKE	1 SEC. IN 8 DAYS
1 BOB	40 SEC. PER DAY
1/4 BOB	10 SEC. PER DAY

60 BEAT WOOD

NO. OF TURNS	RATE OF ADJUSTMENT
1 NUT	30 SEC. PER DAY
1/4 NUT	7 SEC. PER DAY

C.E.I.M. #151 - Page 3

bob one point for each second of change desired.

- (b) If the average gain has been about one second or less per day, do not stop the pendulum but lower the free running, spoked nut on the basis that five turns will change the rate approximately one second per day. Keep in mind that at this stage it is desirable to stay at least half a second per day fast.

9. From this point on, the rating of the clock must be based on its average rate over periods of not less than thirty days, disregarding the first twenty-four hours of run following an adjustment. If at any time the clock should inadvertently be biased slow, adjust by turning up the spoked nut, and if necessary, by stopping the seconds hand to correct the seconds and then resetting the minute hand. An ordinary steel paper clip laid on top of the bob will increase the rate about three-fourths of a second per day. Always keep a record of the number of seconds the time indication is changed. Under no circumstances interfere with the swinging of the pendulum or even adjust the free running spoked nut during final rating until a run of sixty or ninety days has definitely established an average bias. Keep in mind that for even rating the amplitude or swing of a pendulum must be kept constant, which means that the power must be kept constant. Long power interruptions that drop the amplitude of the pendulum swing considerably, may cause a magnet wound master clock to gain several seconds. Also high humidity by increasing the effect of the lubrication in the clock movement, will produce a wider swing and consequently slightly slower rate. These conditions must be taken into consideration when establishing an average bias.

Changes in rate obtained by adjusting a pendulum are listed below.

	Approx. Rate Change
60 Beat Mercurial Pendulum	
1 turn of regulating nut	24 sec. per day
1 turn of auxiliary adjusting nut, spoked	1/5 sec. per day

C.E.I.M. #151 - Page 4

	Approx. Rate Change
60 Beat Invar Pendulum	
1 turn of pendulum bob	24 sec. per day
1 turn of auxiliary adjusting nut, spoked	1/5 sec. per day
60 Beat, Metal Ball, wood rod	
1 turn of regulating nut	30 sec. per day
72 Beat Invar Pendulum	
1 turn of bob	40 sec. per day
1 turn of auxiliary adjusting nut, spoked	1/2 sec. per day

The weight of a pendulum remains constant but the distance of the weight from its suspension point will vary with temperature changes because of the expansion and contraction of the rod. The purpose of the mercury in a mercurial pendulum is to help compensate for the lengthening or shortening of the pendulum rod.

Compensation of the 60 and 72 beat Invar pendulums is controlled by using a low expansion invar rod and a steel or brass spacer nut in the bob. Because both the steel and brass nut expand faster than the Invar rod, compensation takes place by raising or lowering the bob through the nut and bob expansion to counteract the expansion or contraction of the rod length. The selection of the type of nut to be used, is made at the factory. Pendulum rods marked 1111 and 11111 use a brass spacer nut and rods marked 11 and 111 use one of steel. At the upper end of all Invar pendulum rods are notches, indicating by the quantity of notches the number of thousandths of an inch expansion of the rod for each 100 degrees of temperature change.

If after installation, a pendulum is found to be slightly over or under compensated, the compensation can be changed a little by changing the pinning at the hook on the upper end of the rod. This applies to pendulums shipped since 1946. Because the steel hook expands faster than the Invar rod, the more steel there is between the pin and the hook, the more expansion there will be. Do not change the relationship of the hook and rod, but simply move the pin from one location to another. If the rod is marked 11 or 111 the pin will be located in the lower hole. If more compensation is necessary use a brass spacer nut. If the rod is marked 1111 or 11111 the pin will be in the center hole and can be shifted

C.E.I.M. #151 -

up or down to the
is for field use.

In the compensation is the pendulum bob with the mercury end of the jar. sated and has the a time, since one turning both over mercury down, i ing of the position increasing or de

Under
pendulum, when
correct compensa
lapsed.

Be c
To quickly check wheel and in a pendulum to win this condition. If in 15 or 20 min amount is repa contributing fact

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in
U. S. A.

C.E.I.M. #151 - Page 5

up or down to increase or decrease compensation. The upper hole is for field use.

In the case of a mercurial pendulum, a reduction in compensation is possible by inverting one or both of the jars in the pendulum bob. Mercurial pendulums are regularly shipped with the mercury end on top (the small screw is in the mercury end of the jar). If a mercurial pendulum is slightly over compensated and has the mercury in the top of the jars, invert one jar at a time, since one jar may provide sufficient compensation without turning both over. If the pendulum is under compensated with the mercury down, invert the jars. This in conjunction with the changing of the position of the hook and rod by pinning, allows for either increasing or decreasing the compensation.

Under no circumstance change the assembly of the pendulum, when it is believed the adjusting nuts will not provide correct compensation, until a period of two to three years has lapsed.

Be certain the movement is in good working condition. To quickly check on the amount of power delivered to the escape wheel and in turn the amplitude of pendulum swing, allow the pendulum to swing just far enough to release the escape wheel. With this condition, if the pendulum does not attain a near normal swing in 15 or 20 minutes, or if considerable time in excess of this amount is required, it indicates a dirty movement or some other contributing factor to the lack of driving power for the pendulum.

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in
U. S. A.

J. L. Turney

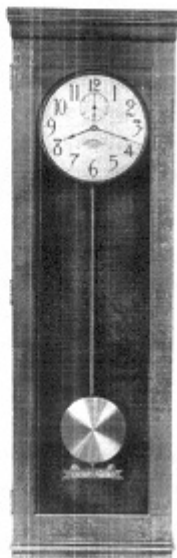
September 17, 1948

10/21/2010 update to insert Bulletin no 102 TYPE B AND C MASTER CLOCKS

[The following is a partial reproduction of an IBM product data sheet -- published prior to 1938 -- on the Types B and C master clocks.]

Bulletin No. 102

Type B and Type C Master Clocks



TYPE C MASTER CLOCK

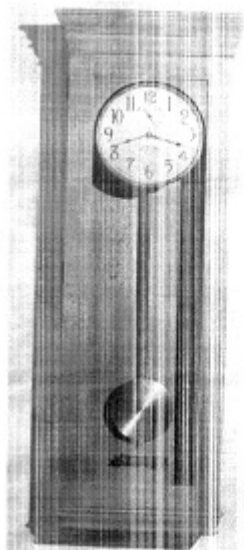
The type B Master Clock is in reality a small edition of the above described type C. It has a 72-beat regulator movement, ten-inch diameter etched and silvered dial with seconds circle, and comes in a case measuring approximately 48" by 18 1/2" by 9". It is equipped with a 2 1/2 -pound wood rod brass bob pendulum only.

The cases for both type B and type C Master Clocks are regularly furnished in quartered oak, finished dark golden. They will be furnished in birch finished standard mahogany upon request. They can be furnished in special woods and to match any special finish at a small additional cost. All electrical equipment in these clocks is constructed and installed in accordance with the requirements of the National Board of Fire Underwriters' Laboratories for voltages not exceeding 250 volts. They are designed to operate from a

2407MBC1

International type B and type C Master Clocks are designed to meet the demand for a medium priced clock that is substantially built and is accurate in operation. These clocks are spring driven and automatically keep themselves wound from a battery, usually the storage battery used to operate the time system controlled by the clock. They wind once a minute and will run for about an hour with the battery disconnected.

The type C Master Clock [has a] 60-beat regulator [movement] and comes in a case measuring approximately 65" by 24" by 10" with a twelve-inch diameter etched and silvered Arabic dial with seconds circle. It is regularly equipped with a 10-pound wood rod brass bob pendulum. A 15-pound mercurial compensating pendulum can be furnished where close time keeping qualities are desired. We will guarantee this clock equipped with mercurial pendulum to rate within ten seconds per month of correct time when hung in a place free from vibration and regulated in position.



TYPE B MASTER CLOCK

constant source of electric current supply and therefore should not be connected to the electric lighting service excepting where such service is operated in connection with a storage battery plant for the purpose of keeping it constant. These clocks will operate from direct current only.

The movements in the type B and type C Master Clocks are identical excepting that they are fitted with different sized escapements. They are very substantially built of tool steel and hard brass. The pinions and gears are specially cut and burnished. The pivots are hardened and lapped to size. All bearings are wide and carefully polished. The escapements are of the Graham deadbeat type and are fitted with screw adjustments for putting the clocks in beat.

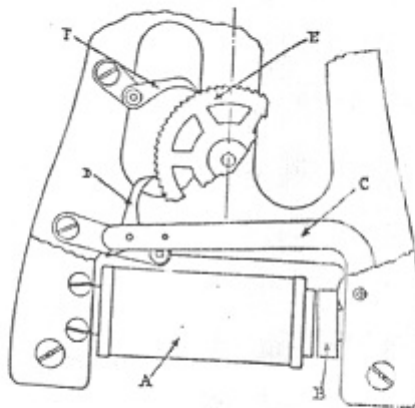
The minute interval contacts used on these movements are of unusually heavy construction. They are of the finger and cam type. The fingers themselves do not carry the electric current. They simply operate to close a pair of contactors that are made of a special non-corrosive contact metal of such low electrical resistivity as to insure a practically dead closing of the electrical circuit when the contact fingers come into position.

The contact fingers are eccentrically pivoted to provide for a contact duration adjustable from a fraction of a second to several seconds' duration. The operating cam is of metal. It is carried on its own shaft independent of the clock train and therefore does not interfere in any way with the time keeping qualities of the clock.

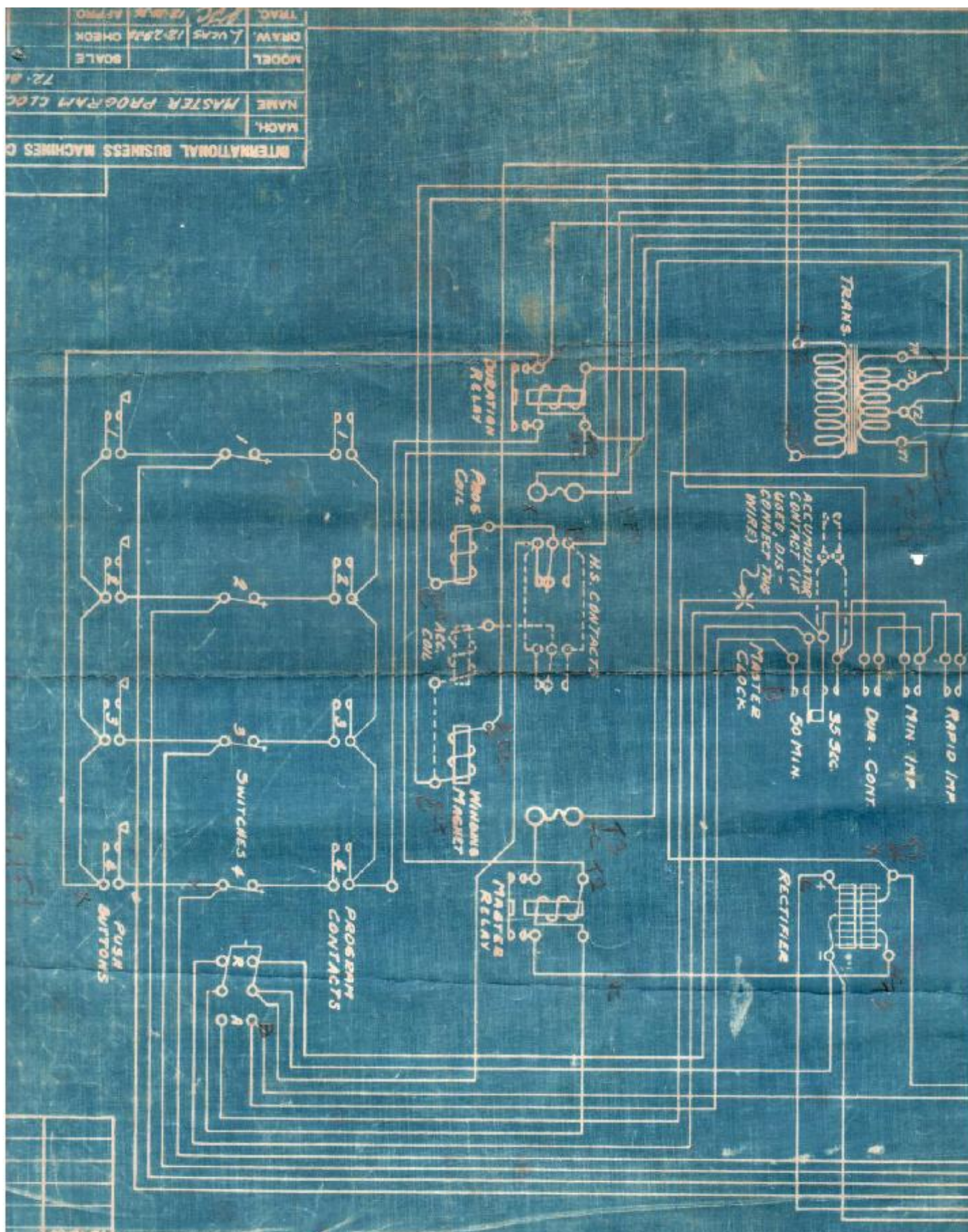
The movements in these clocks are substantially mounted on heavy cast iron brackets. These brackets also carry the pendulum support. This construction serves to always keep the clock movement and the pendulum in perfect alignment with each other which is very important for the securing of even time keeping qualities.

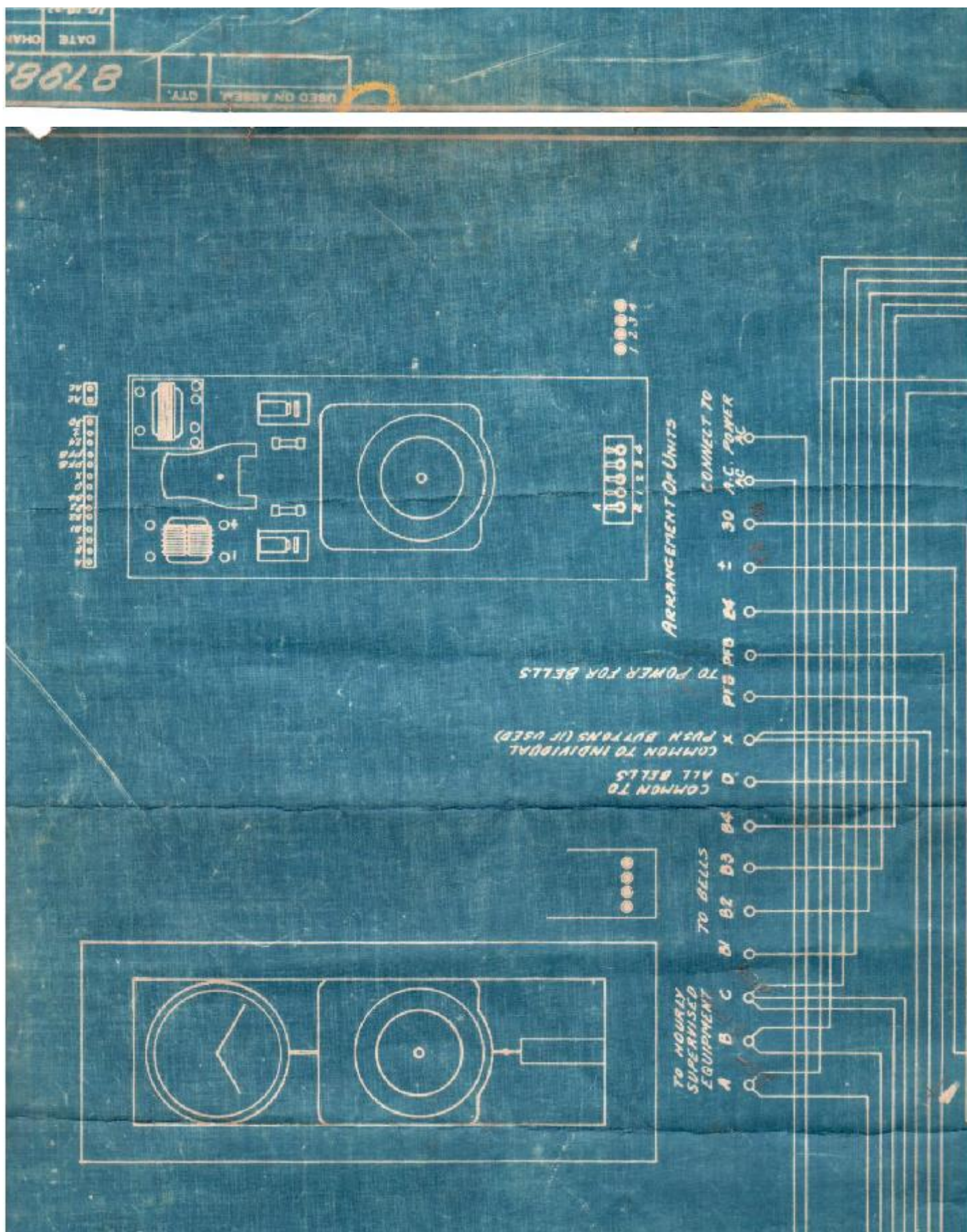
The clocks are kept wound by means of an electromagnet and ratchet and pawl that are built into the movement itself. The electrical connections are so arranged that once each minute the magnet is energized and winds up the driving spring as much as it ran down during the preceding minute. The arrangement contains no delicate parts and operates perfectly so long as battery is kept connected to the clocks.

The diagram at the right illustrates the winding arrangement used in the type B and type C Master Clocks. A is the electromagnet, B is its armature, D is the driving pawl operated by the armature B through the arm C. E is the ratchet wheel that winds the clock spring. F is a back-stop pawl that prevents backward rotation of the ratchet wheel E.

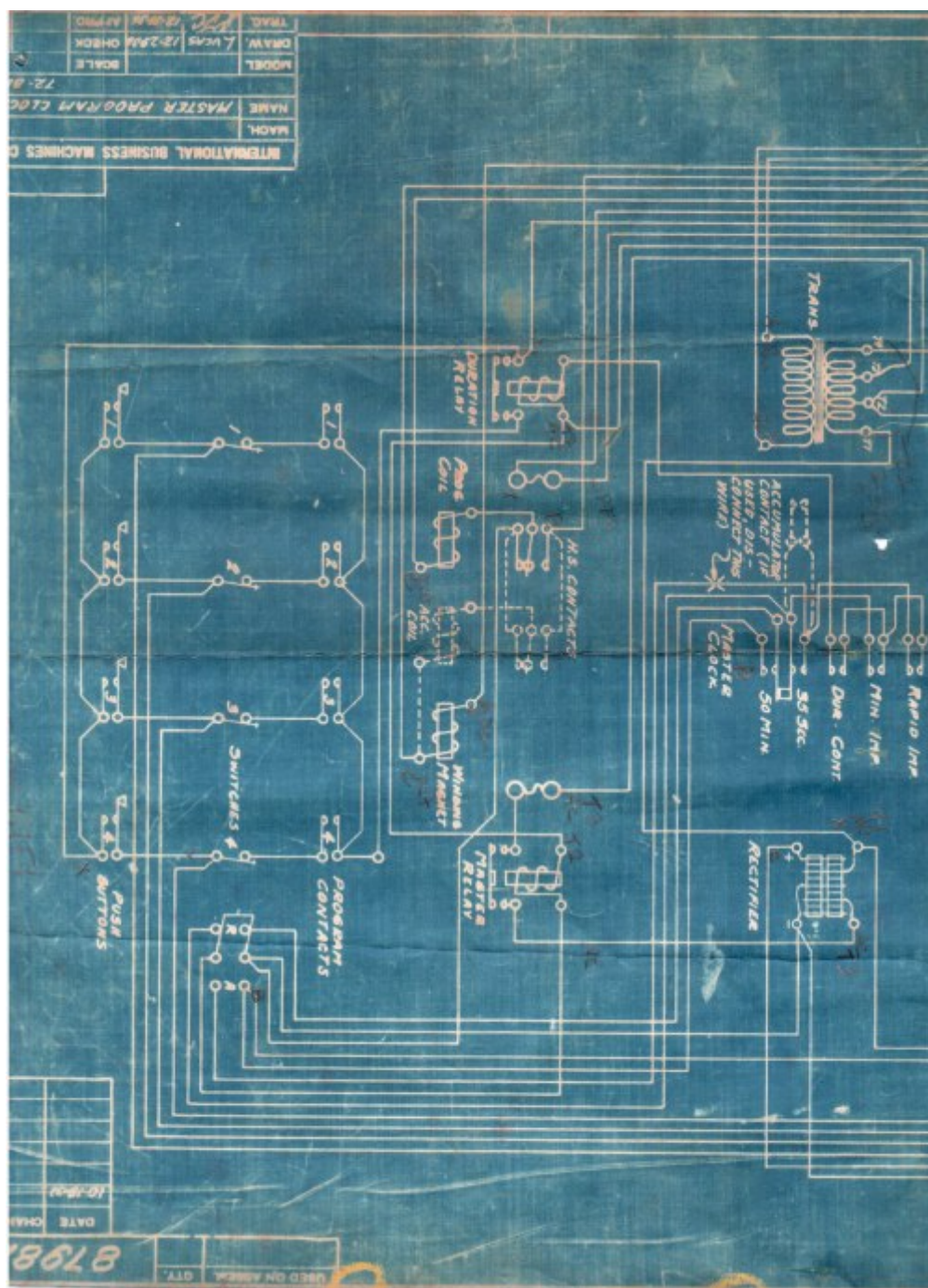


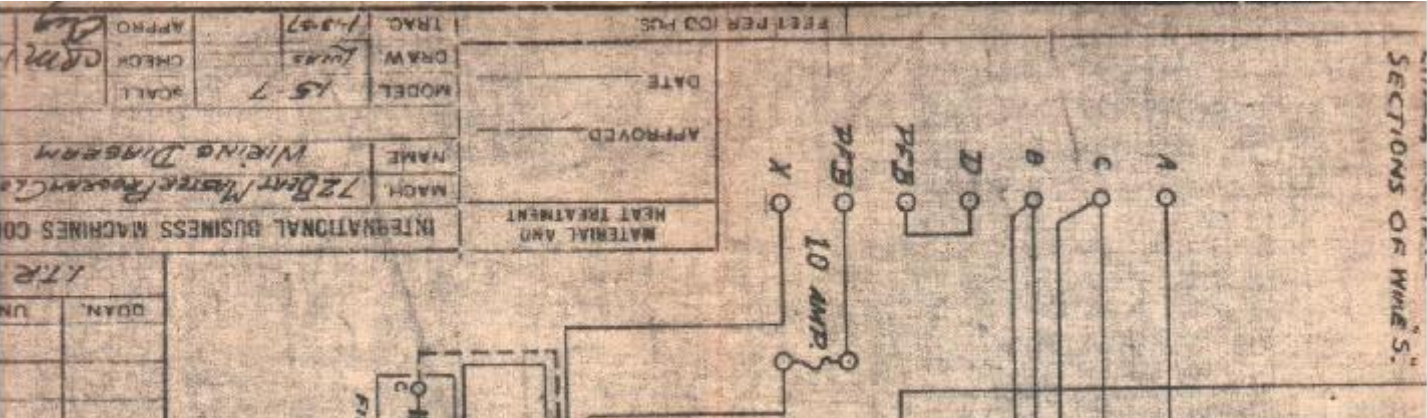
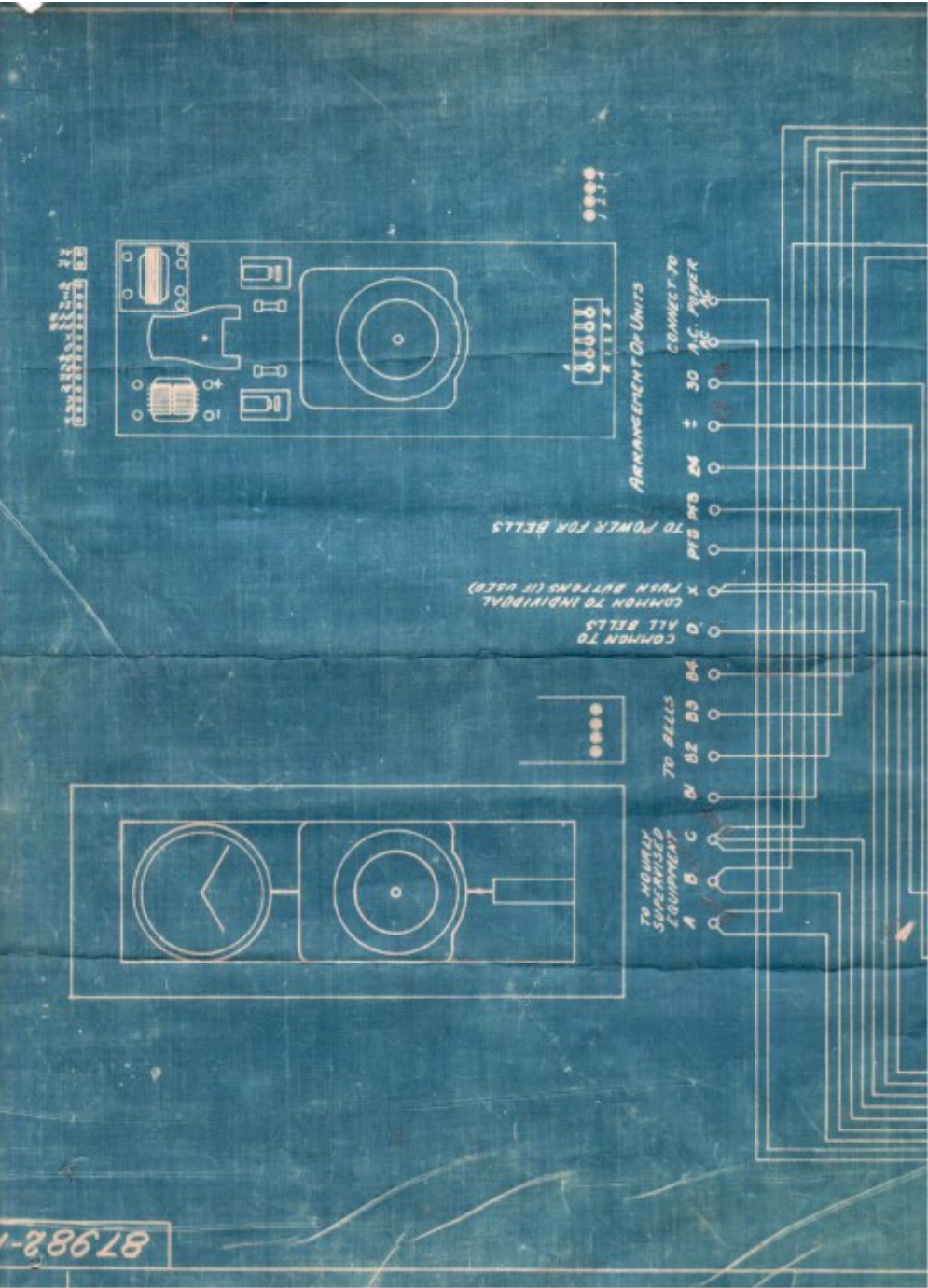
2407MBC1

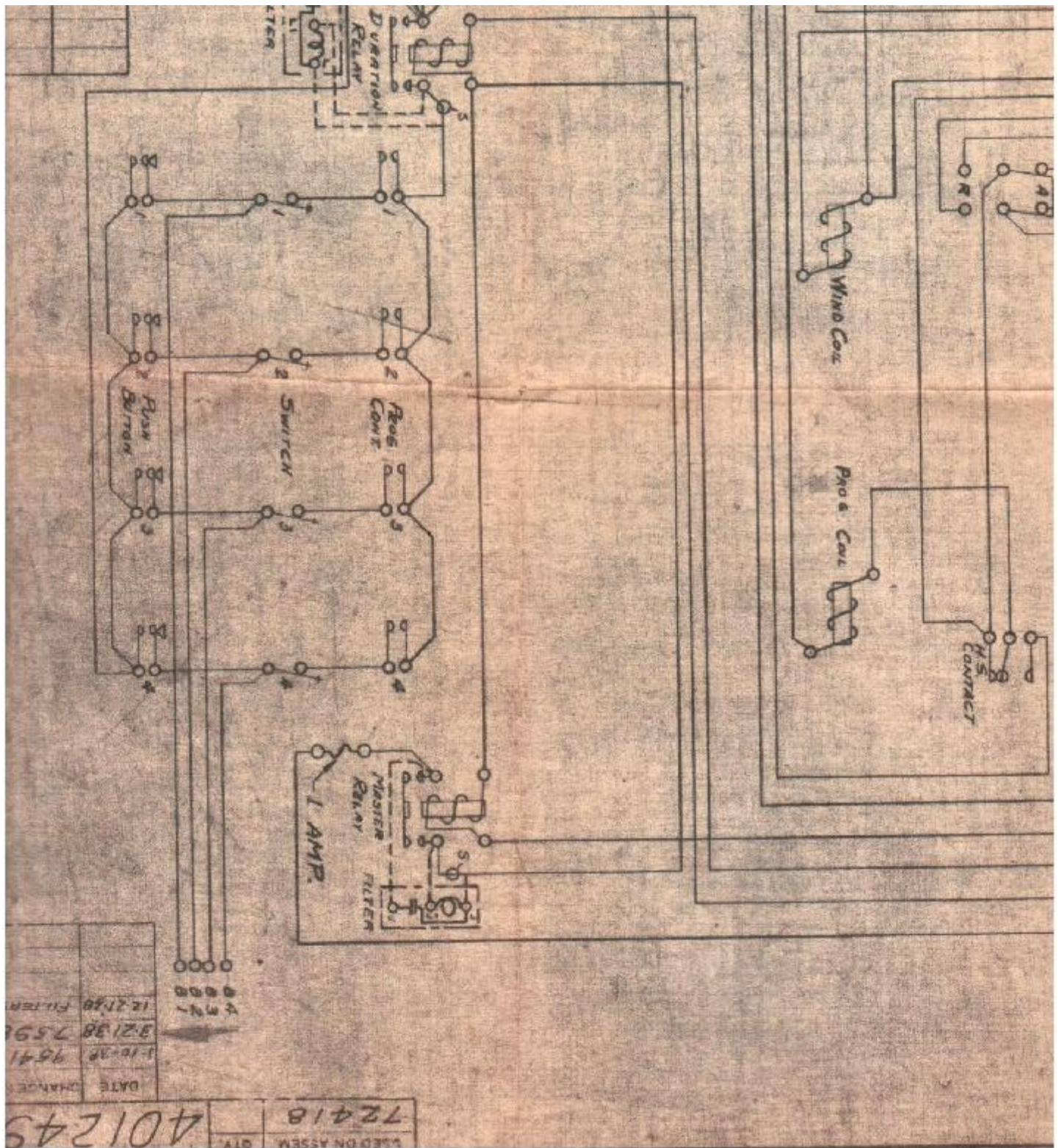


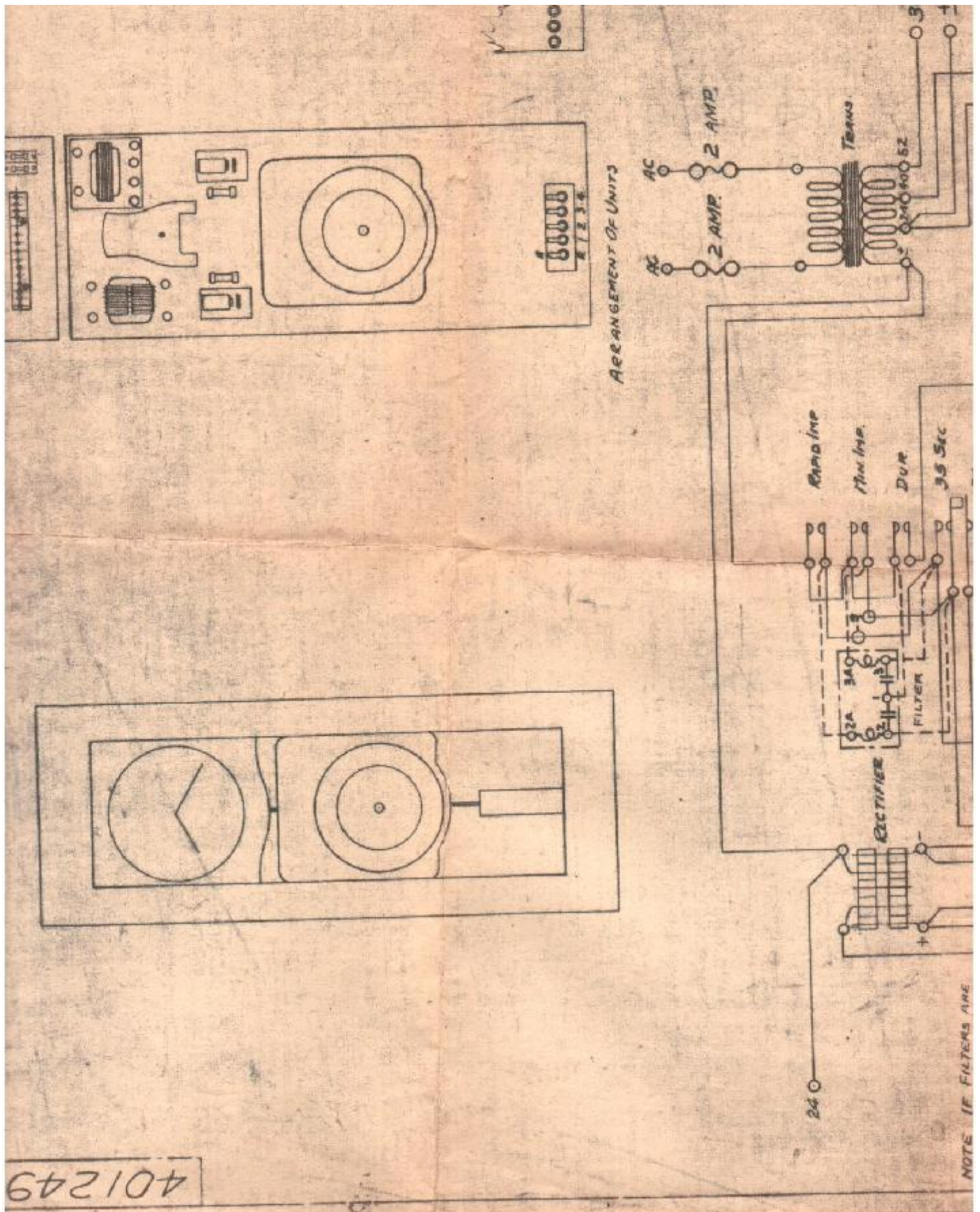


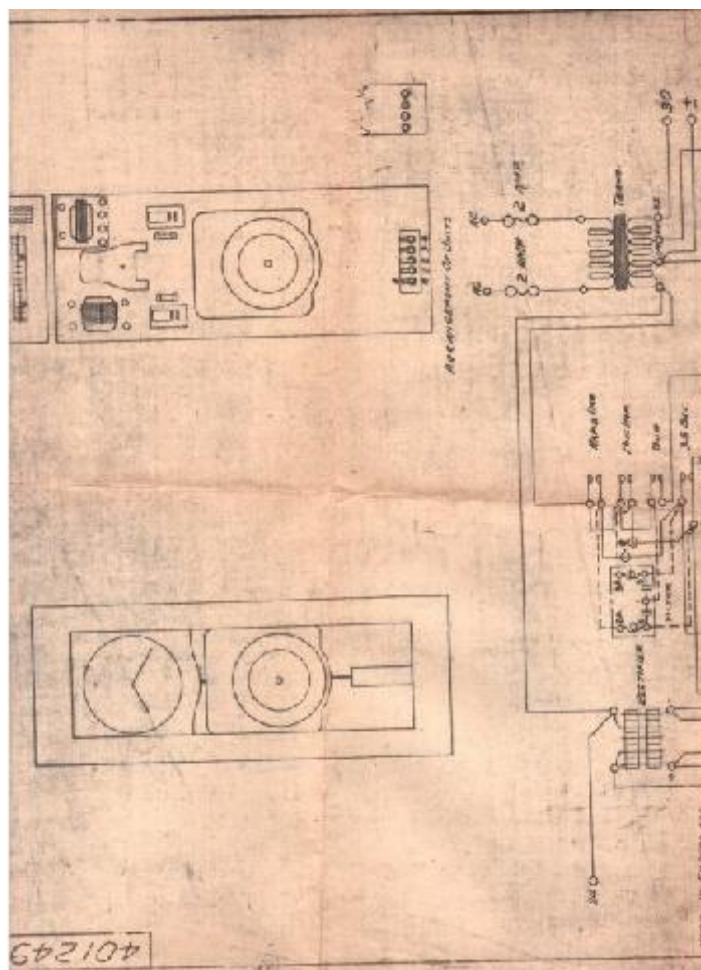
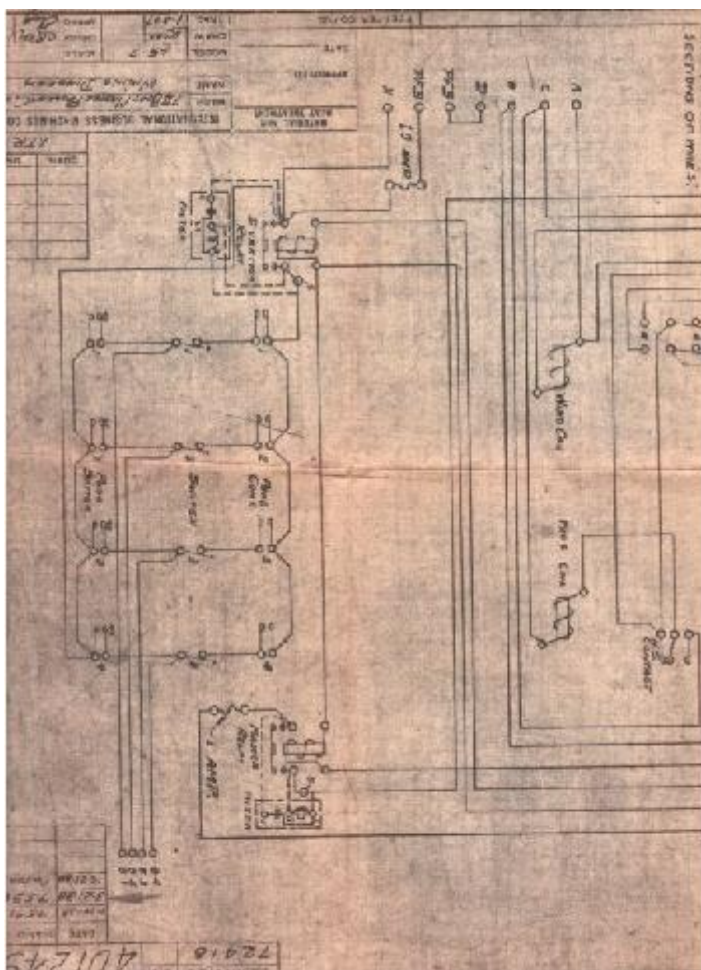










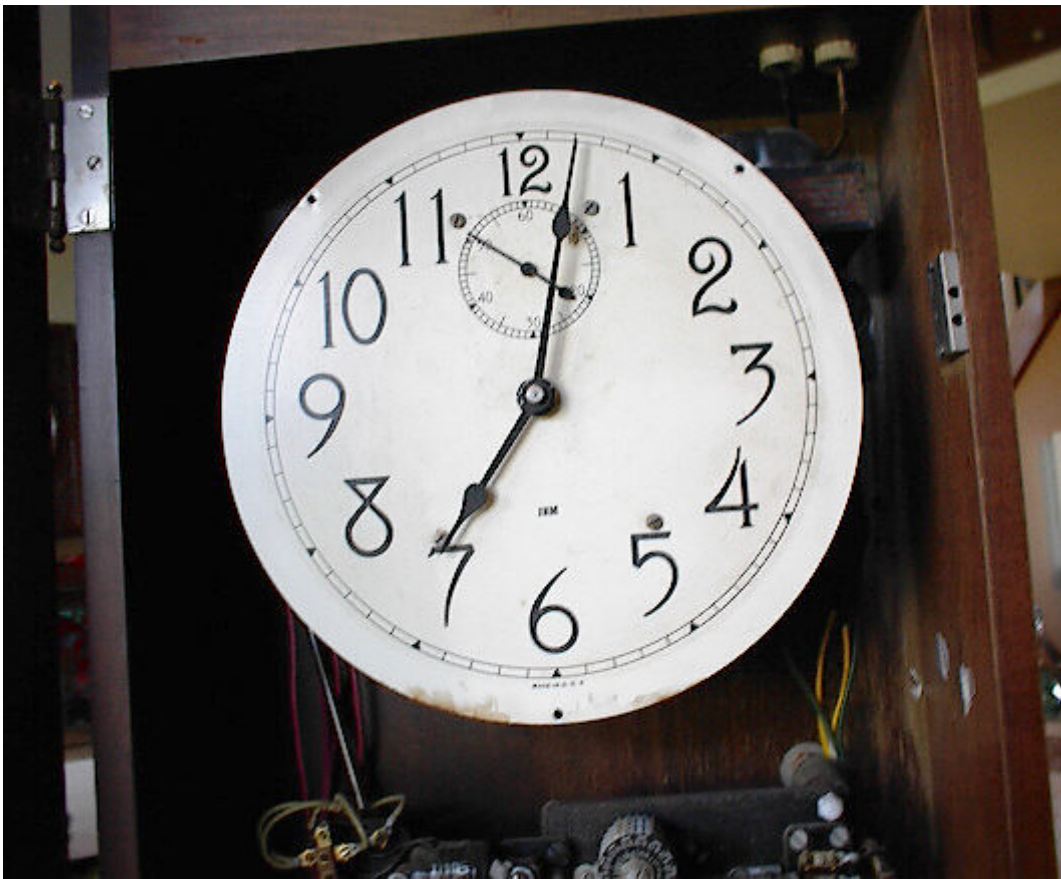


Case is 16.5 inches wide, 8 inches deep and 43.25 Tall. 11 inch dial, 9.5 inch chapter ring.

Pendant rod is 32 inches + and when I move the crutch, I am getting 72 beats to the minute. Suspension spring is broken and there is no way to hang the rod.



Dial is pretty nice, you can see the discoloration left and right below the 6. There is a five amp fuse kinda behind the 3 on the case. Strangely enough there is a spare fuse on the right side behind the 9 but it is 2 amp



There are 8 more discs behind the top time disk. I also see where there are 8 contacts that can be activated. Only 7 days on the calendar wheel at the top right center. I notice by advancing the min hand that I hear a click at 10 min of the hour and also a click on the hour. I would guess that would be the end of one class and the beginning of another in the school.. Note that the 4 wires on the right don't seem to be going anywhere. I assume there is something missing there.



Looks like 4 manual buttons on the side if you want to ring the bells. Other pic is just the wiring on the back.



Note that the 4 wires on the left go to that metal device that is hanging loose. I see some screw holes just above it that I believe are meant to mount it. The left switch on the beat plate says advance on the top of the switch and on below the switch. The next 4 switches say on at the top and off at the bottom. the line below say 1, 2 bells 3, and 4.

There are two business cards in the bottom, one from an IBm CE and one from a Simplex rep. Both In Oregon. I believe that tells us that it was in service in 1958 when Simplex took over this product from IBM. The Bob weighs five pounds.

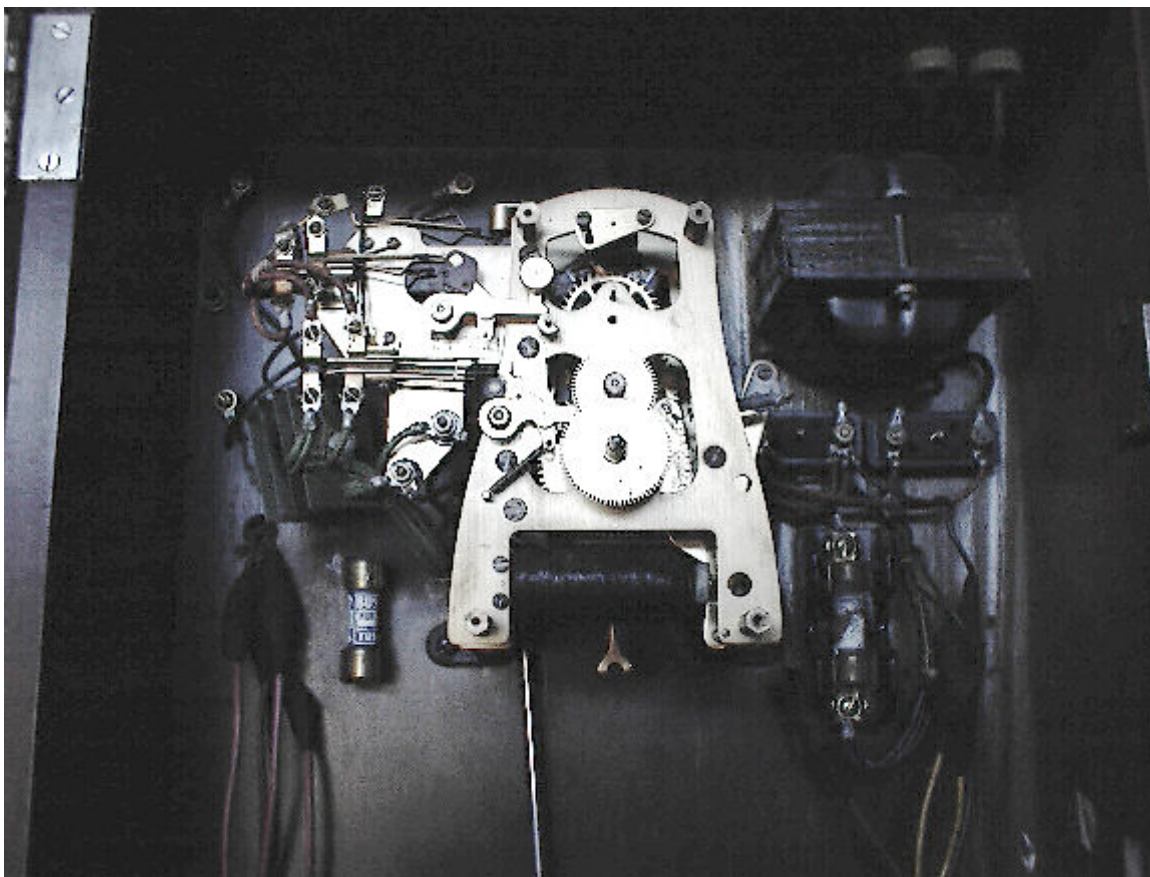
The metal tag, left front say IBM, NEW York etc Model 15MC Serial # 952291DL



One of these is labeled 110 V, 60 cycle and 125 watts, but I don't know if they are talking about input or output. I don't see any cord to hook to a wall outlet and not sure how you would hook this to a wall outlet. Another of these labels says 24 V Dc, Max 50 Watts, Another says 50 Watts per circuit, Max 125 Watts. Then there is something that looks like Model ABE F. I haven't a clue how to hook any of this up. I am sure It will run slaves and ring bells at scheduled times. Of course I have no idea how to fire it up. I will take it with me to Chapter 52 this Sunday. One of the guys will be able to hook up suspension spring



What I assume must be the transformer has a black and white input (110v). The yellow and green 4 wires terminate in unconnected fashion lower down the case. That is the 5 amp fuse I mentioned. The red wires at the top left, came from the red wires in the previous pic. That thingy dangling on the left is attached to 4 screws in the case that connect to the wiring in the back. Nothing from it goes to the movement. Looks like some kind of rehostat, must be an add on as there is no place it reaches that looks like a proper mount. The spare 2 amp fuse is mounted there. No wires attached to it. The 4 red wires going down end in that dangling thing that was in a previous picture.



just an overall view of the top behind the dial. patent # 1878931 on the movement

Below, I am adding some pictures of what I think is an IBM model 16 60 beat, Its been in the garage a few years and I really don't know a lot about it. Pretty looking though! Its one of those that the weights are raised by a motor every so often. There were some papers in the clocks with instructions and schematics and I copied those in my scanner. They were oversized and you will have to copy and figure out which is up/down/right left.



From the plate it would seem to be a model 16 and from the pat dates, mfg early 1920's



Dial is in really nice shape!



It was crated up about 20 years ago, and other than take the lid off for these pics I haven't fooled with it.

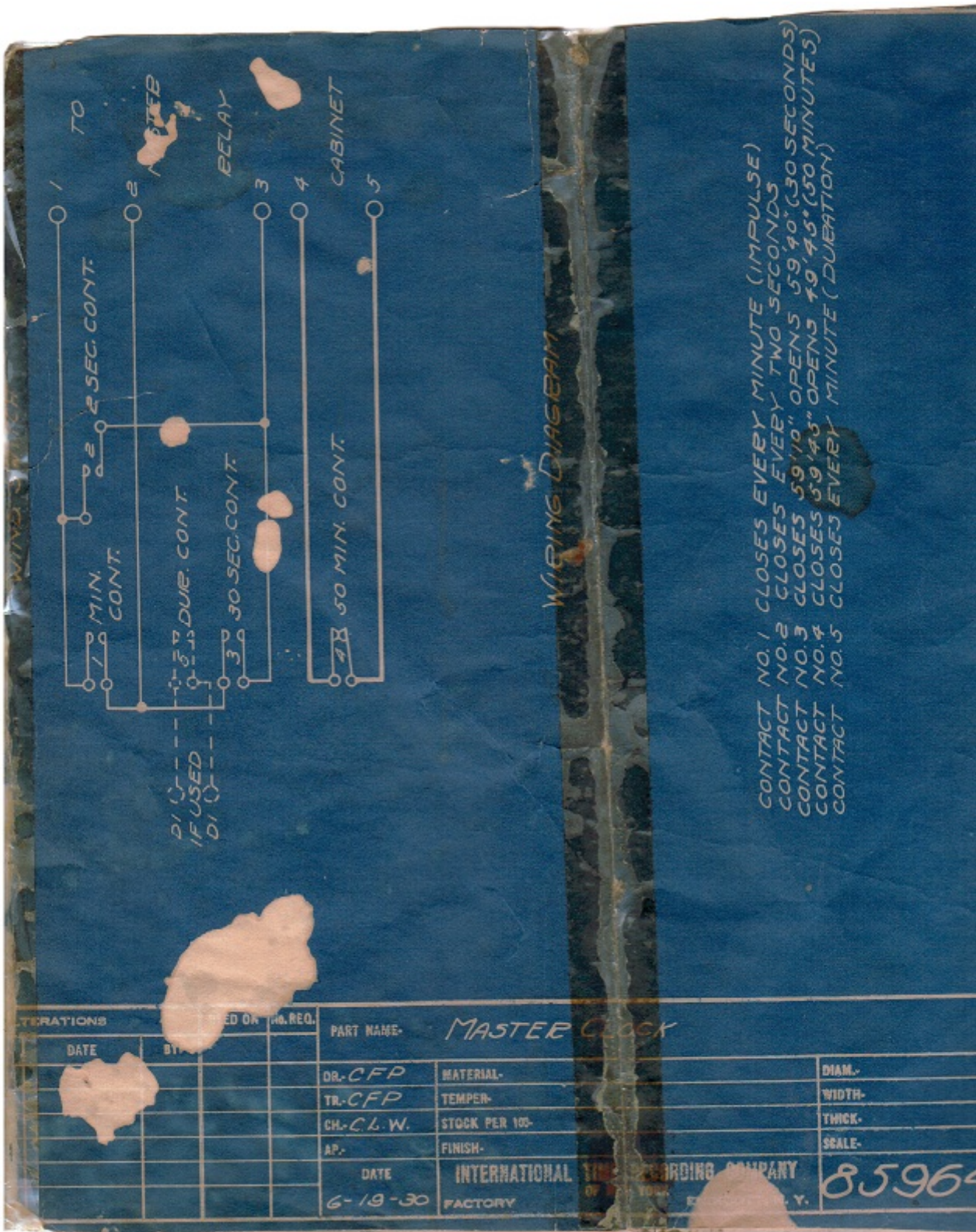


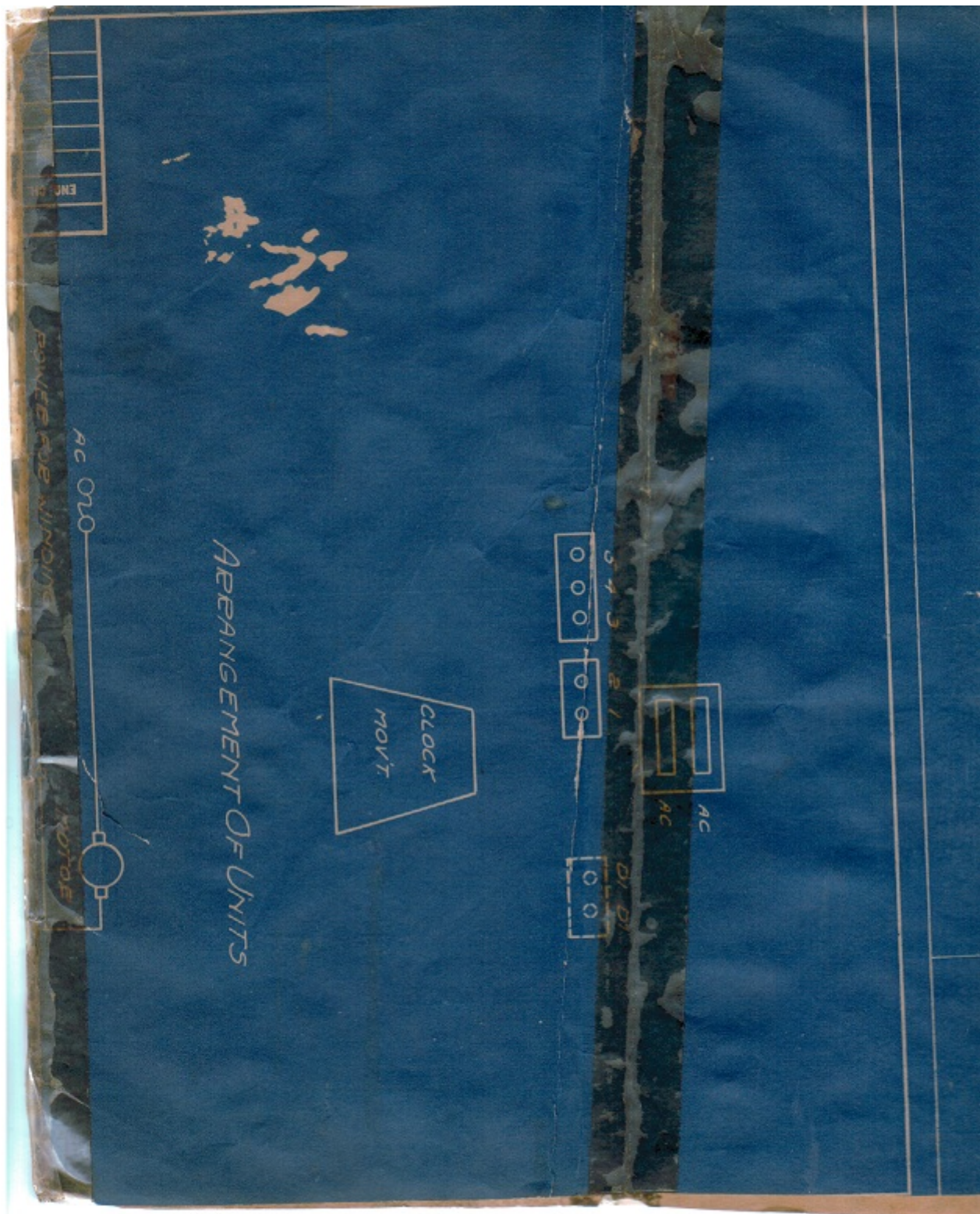
Forgot to look, but I think that is a 110 v motor.



those weights thread into two cables on pulleys and the motor lifts the weights.

scanned pics of paperwork follows:





84527

MASTER RELAY
CABINET
(DIAGRAM NO. 85791)

AC. A
AC. B
AC. C

1 2 3 4 5
(ACS) 1 2 3 4 5

3 WIRES

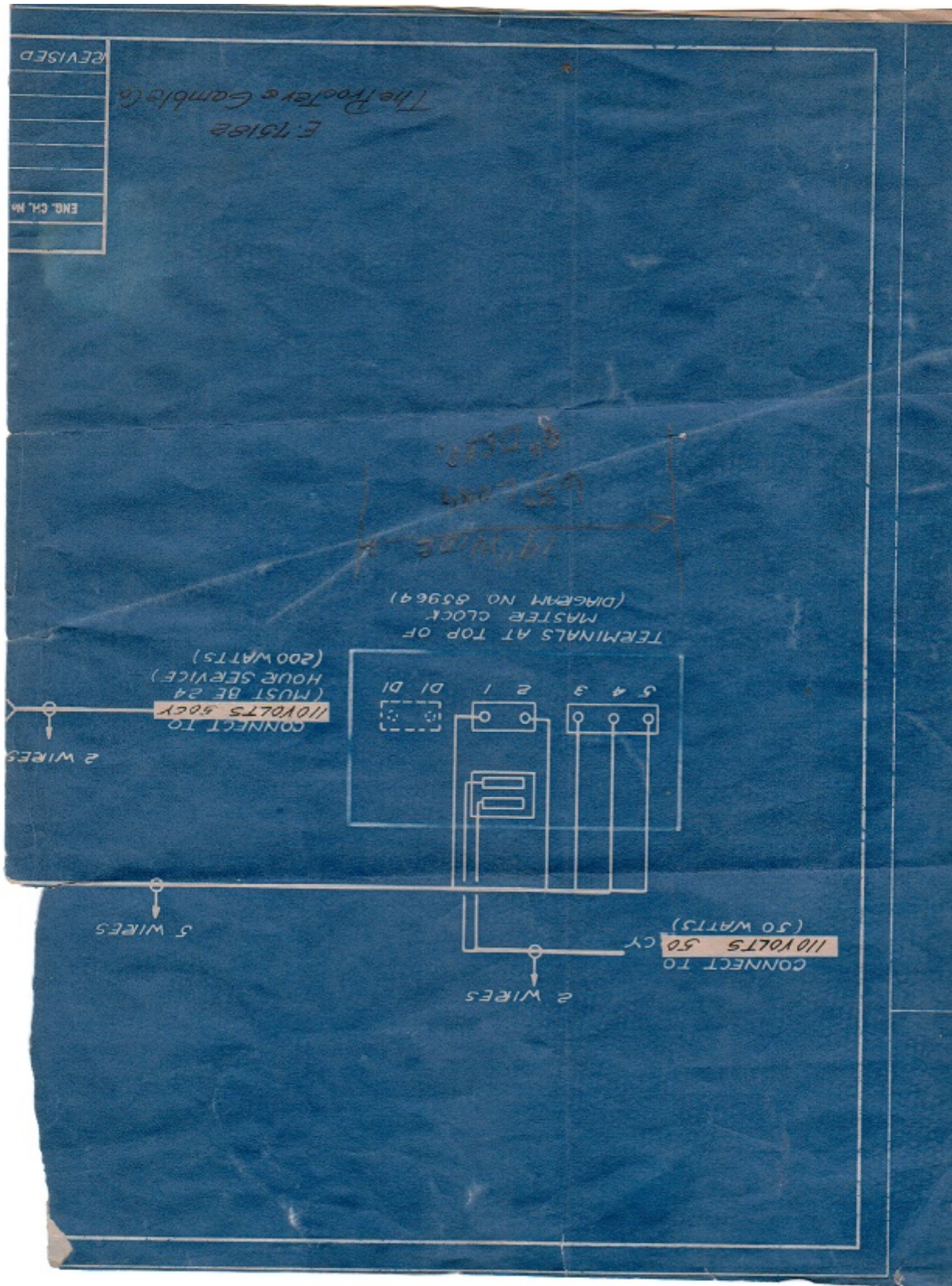
A.C. SUPERVISED SECONDARY
EQUIPMENT

NOTE - IN EVENT ANY 7300 TIME STAMPS
ARE USED PROVIDE 2 WIRE 110 VOLT
OUTLET AT EACH TIME STAMP LOCATION
FOR OPERATING THE PRINTING HAMMER

SYSTEM WIRING DIAGRAM

CONDITIONS		USED ON	NO. REQ.	PART NAME	SYSTEM WIRING DIAGRAM
DATE	BY				
0-27-30 CP					
DATE					
9-25-30					
DR. CL					
TR. GL					
CH. CLW					
AP.					
FINISH					
STOCK PER 100					
TEMPER.					
MATERIAL					
DIA.					
WIDTH					
THICK.					
SCALE					

INTERNATIONAL TIME RECORDING COMPANY
OF NEW YORK
ENDICOTT, N. Y.
84527



INSTRUCTIONS

INSTRUCTIONS

INTERNATIONAL MASTER CLOCK

INSTALLATION

It is advisable to call our local service office for assistance in installing the master clock. Our representative being present at the time of installation may prevent damage to the clock movement.

The master clock is the heart of the time system, therefore its location as a time piece is of secondary importance. It should be installed on a substantial perpendicular post or wall that is as free from vibration as possible. It should also be a clean dry place.

The top of the master clock should be approximately eight feet from the floor. This leaves the hands within easy reach for setting and the pendulum in a convenient position for regulating. It should be securely attached to the wall at both top and bottom with the screws provided. The bottom screw should be placed so that when the pendulum is at rest it will hang directly over the scale at the zero position. It is advisable to use the pendulum as a plumb. (See later instruction for hanging pendulum.) The top screw should be placed so that the outlet box is completely covered by the extended top or moulding of the master clock.

INSTALLING WEIGHTS

If the master clock is weight driven the weights should be installed as soon as the clock is securely attached to the wall. The weight cords are properly wound around the drum and then tied. Extreme care should be used to see that they do not become crossed on the drum as this will rob the movement of its power. The weight cords are attached to the weights with plugs that have standard right hand threads. Do not touch the brass weights with the bare hands as it may discolor them. Use tissue paper or a cloth for handling them.

INSTALLING PENDULUM

If the pendulum is of the brass bob type all that is necessary is to hang it over the suspension spring pin. Care should be taken not to kink or crack the suspension spring. The suspension spring is located almost directly back of the seconds hand shaft. The hook on the top of the pendulum stick may be easily placed over the suspension spring pin by inserting the top of the rod up between the back plate of the clock movement and the casting. The pendulum stick may be guided over the suspension spring pin by reaching back of the dial and over the clock movement. After the pendulum is properly supported insert the verge wire in its slot. If the pendulum being installed is of the mercurial compensating type the verge wire straddles the steel rod.

INTERNATIONAL BUSINESS MACHINES CORPORATION

Manufactured by

INTERNATIONAL TIME RECORDING COMPANY

Endicott, N. Y., U. S. A.



INST. FORM NO. 1006

JULY 1, 1930

(SEE OTHER SIDE OF CARD)

IN U. S. A.

If the pendulum is of the mercurial compensating type it should be installed as follows:

This pendulum is shipped from the factory knocked down and the mercury in jugs marked right and left, the glass jars being marked in the same manner. It is important that the mercury is placed in the glass jars as marked to insure the same conditions as in the factory test. It is advisable to strain the mercury through cheese cloth to remove all wax and dirt.

Before placing the mercury in the glass jars, always polish the inside of the jars. Care should be taken not to create bubbles when pouring. There are several ways to avoid this condition. One way is to pour slowly against the side of the jar. The most satisfactory method is to insert a piece of paper, coiled to a cylindrical form, into the jar so that it touches all points except the bottom.

Make a funnel of another piece of paper and pour the mercury through slowly, keeping the orifice of the funnel below the surface of the mercury. When the cylindrical paper is removed, all bubbles that have formed will also be removed.

If any mercury is lost, it is permissible to even it up from the other jar, providing it is impossible to secure any from another source. Always replace mercury to correct height as soon as possible.

CONNECTING MASTER CLOCK

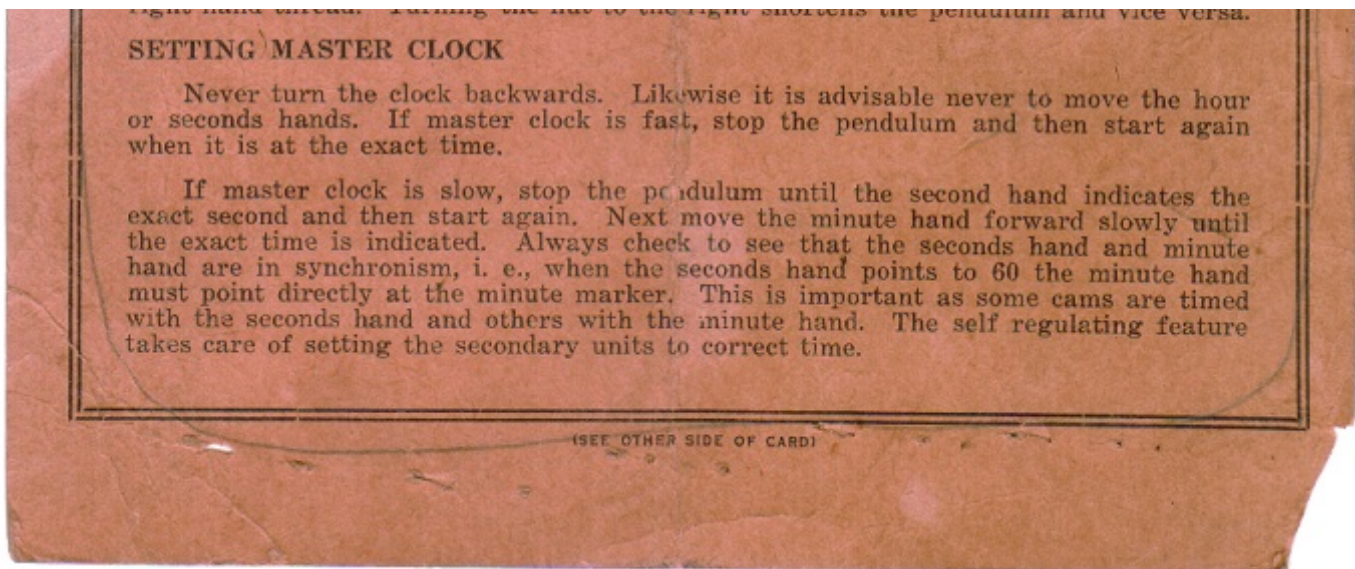
The master clock must be connected to the system according to the wiring diagram which is attached. If it is weight driven, a motor is used for winding and commercial power must be supplied. This power may be either A.C. or D.C. as the motor is of the universal type. The clock should be closely watched when winding the first time to see that the top of the weights do not rise above the lower screw holes in the back frame or casting. This insures that the weight cords are wound properly on the drum. If they go higher cut off the power and investigate.

STARTING SYSTEM IN OPERATION.

When the master clock is equipped with an impulse accumulator all that is necessary to start the system in operation is to install and connect the various units, not changing the time. After all units are installed and the power is turned on set the master clock to the exact time, and start the pendulum swinging. The impulse accumulator will set all units to correct time. Always check all recording units to see that they are set to proper day and meridian. If the master clock is not equipped with an impulse accumulator the double pole double throw switch should be thrown to the "advance" position until the secondaries reach the correct time and then returned to the "run" position.

REGULATING

The regulation of the master clock is obtained by lengthening or shortening the pendulum. The longer the pendulum the slower the clock will run and vice versa. One complete turn of the nut which supports the pendulum bob will cause a variation of approximately one minute in 24 hours. The screw on the pendulum rod has a standard right hand thread. Turning the nut to the right shortens the pendulum and vice versa.



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