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MASTER CLOCK KAA 1031 U2

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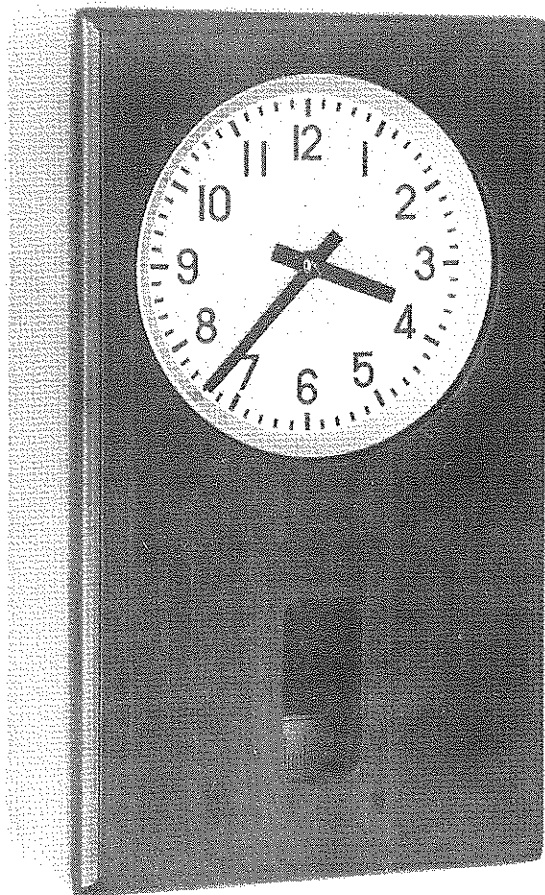


Fig. 1

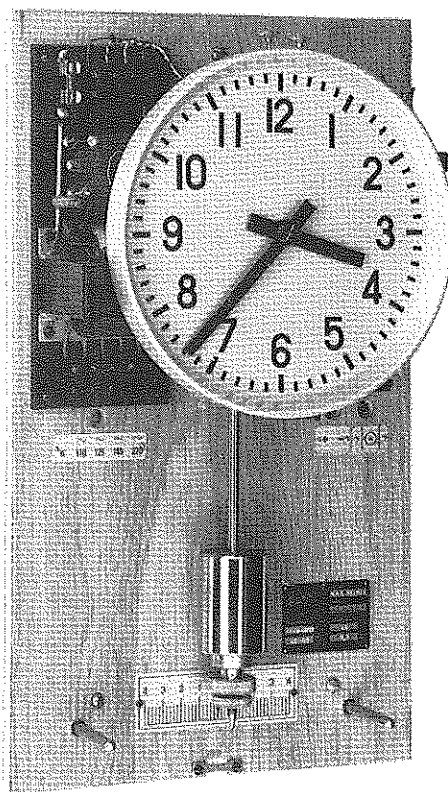


Fig. 2

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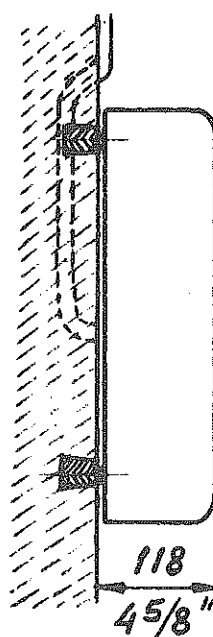
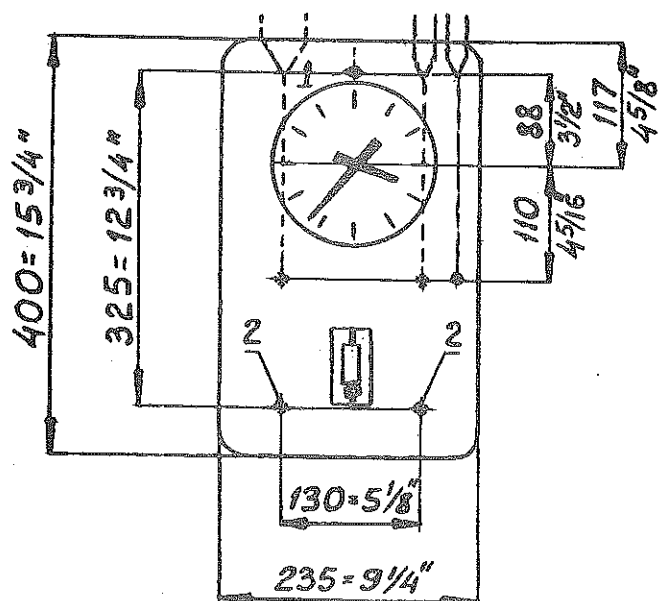


Fig. 3

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MASTER CLOCK KAA 1031 U2

Description

KAA 1031 U2 is an all mains master clock and consists of a spring driven precision clock movement with Graham escapement and automatically driven winding mechanism, 1/2 sec. temperature compensated pendulum with coarse and fine rating nuts, detachable 160 mm (6 5/16") dial with hour numerals and a wooden veneered cabinet.

The clock transmits reversed D.C. impulses each minute for a slave clock and time recorder system and includes mains transformer, rectifier and fuse. The clock mechanism contains a device, which in case of mains failure stores the impulses from the master clock. When the mains voltage is restored the slave clocks and time recorders are corrected in accordance with the master clock movement. The clock also contains a rectifier bridge quenching the back E.M.F. from the time recorders. A terminal block for D.C. voltage is provided supplying the required voltage for sound signal devices. Consequently no batteries are required.

Dimensions

Height 400 mm (15 3/4")
Width 235 mm (9 1/4")
Depth 118 mm (4 5/8")

Weight

4.5 kg (10 lbs)

Installation

Site and position

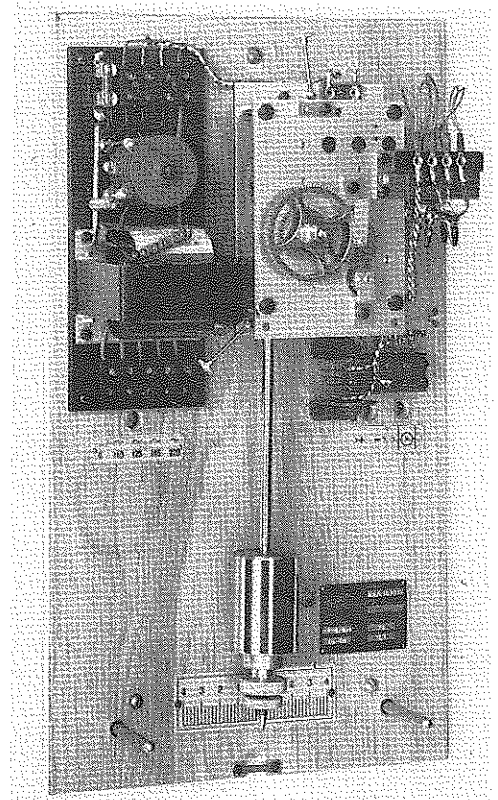
The master clock should be mounted on a wall free from vibrations. The room should have a uniform temperature all the year round. Avoid positions near doors and radiators or positions exposed to sun. Structural walls are preferable although outside walls should be avoided.

Preparations

Mark and drill fixing holes 1 and 2 on the wall according to fig. 3, brick or concrete walls being plugged. If the wall is not plumb, compensate by means of spacers between the wall and the clock.

Draw mains, permanent D.C. and slave clock cables 4, 5 and 6 according to fig. 5.

Fig. 4



Data

Mains voltage
tappings for 110/125/145/220 V A.C.
Mains frequency 40-60 cycles
Permissible voltage variation $\pm 20\%$
Power consumption 9VA
Impulses 1/1 min. reversed
Impulsing voltage 24 V
Duration of impulse 1 sec. approx.
Max. simultaneous load 0.3 A
Permanent D.C. voltage 24 V
Fuse 0.5 A 5x20 mm
(3/16"x13/16")
Running reserve 12 hrs approx.
Rating, one division
on the coarse rating
nut equals 3 1/3 secs/24 hrs
Accuracy at correct
rating ± 20 secs/month

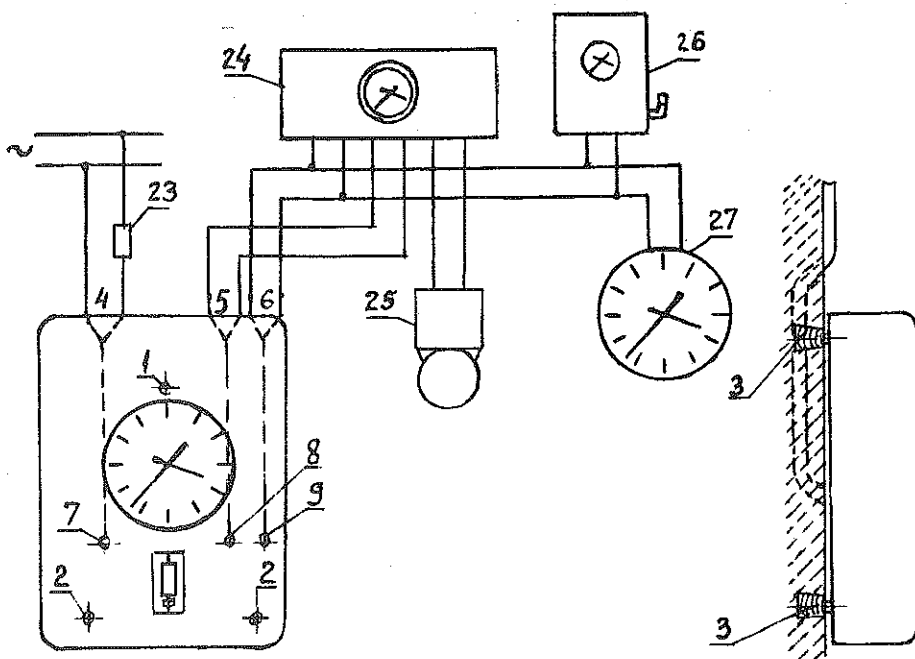


Fig. 5

Unpacking

Remove wrapping from the clock and the pendulum. Do not move the rating nuts as the pendulum is pre-set in an approximate position.

Place the clock horizontally as shown in fig. 6 and remove the case in the following sequence:

- Press button 10,
- Lift the bottom end of the case carefully,
- Push the case upwards,
- Remove the case.

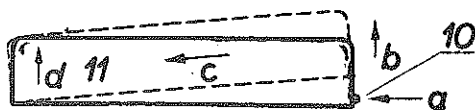


Fig. 6

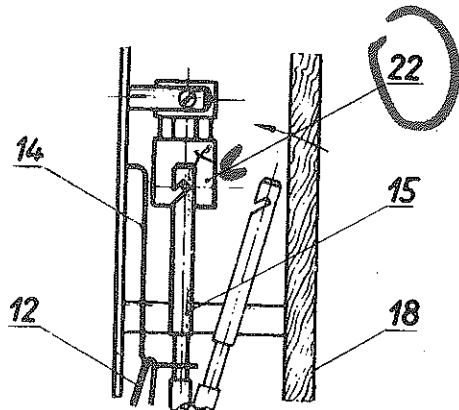


Fig. 7

Notation

- Top fixing hole
- Bottom fixing hole
- Plug
- Mains cable
- 24 V D.C. cable
- Minute impulse cable
- Mains cable entry
- 24 V D.C. cable entry
- Minute impulse cable entry
- Mains fuse
- Programme clock
- Bell
- Time recorder
- Slave clock

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Remove the rubber rings 12 (figs 7 and 9) holding the pendulum crutch and the mercury tubes.

Fitting

Hold the clock steadily and insert the cables through holes 7, 8 and 9 (fig. 5).

Fix the top screw 1. Insert the pendulum 15 (fig. 7) from below and fit the forked end carefully on to the pendulum spring 22. Ascertain that the pendulum enters between the two prongs of the crutch 14.

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The fitting of the pendulum should be carried out with utmost care so as not to distort or damage the pendulum spring. The accuracy of the clock is largely depending on the proper function of this spring.

Adjust the clock sideways so that the pendulum when stationary points to 0 on the scale (fig. 8). Fix the two bottom screws 2 and tighten securely.

Connection

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Cut the cable ends to suitable lengths. Strip and connect the wires to the required terminals.

Operate the mercury tubes 13 (fig. 9) manually until the contact cups 17 are completely filled with mercury.

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Starting

Insert the mains fuse 23 (fig. 5). Set the minute hand to the nearest full hour. The position of the hand should be $1/4$ to $1/2$ min. past the minute division to insure that the impulse is actually transmitted. Ascertain that the synchronous motor has started and that it is operating the mercury tubes. Check that the mercury tube conductors are not fouling the movement. The pendulum should be stationary.

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When the motor has stopped the slave clocks are set in accordance with the master clock time, but prior to this a check should be made on the polarity. It should be born in mind that the minute hand on a slave clock is rigidly connected to the impulse motor (no friction slip) and that an impulse of a certain polarity always brings the minute hand to an even minute position, whereas an impulse of opposite polarity always brings it to an odd minute position.

If the minute hand on a slave clock is on an even minute, it may be set immediately to the time shown on the master clock. If the clock is on an odd minute, however, the conductors to the slave clock should be reversed before setting the clock. Time recorders may be set irrespective of the polarity.

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Set all slave clocks and time recorders to master clock time. Start the master clock by moving the pendulum sideways to a position between divisions 2 and 3 on the pendulum scale.

Turn the minute hand until the master clock shows correct time.

Check that the amplitude of the pendulum is 2-3 on the scale and, when the impulsing motor has stopped, that all slave clocks are in synchronism with the master clock.

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Remount the case on the master clock in the reversed order to that shown in fig. 6.

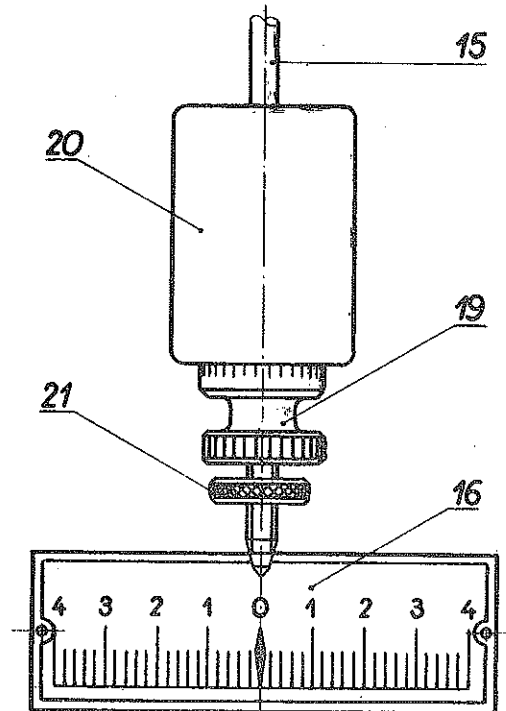


Fig. 8

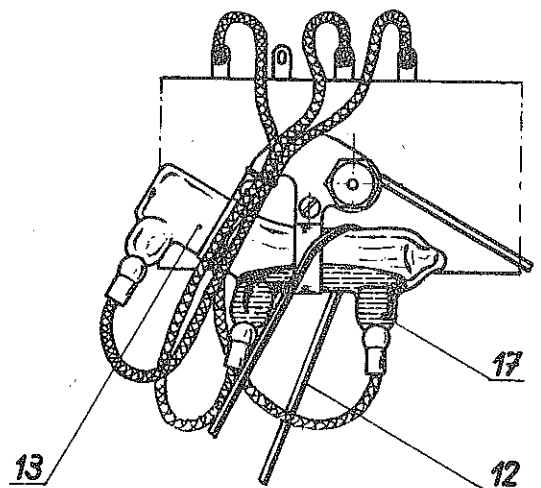


Fig. 9

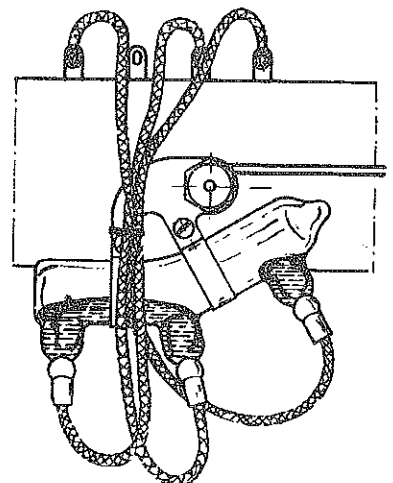


Fig. 10

Rating

Daily rating should be carried out by means of the coarse rating nut 19 (fig. 8) supporting the pendulum bob weight until the daily error is less than 5 secs. This should be followed by weekly rating until the average daily error is less than 2 secs.

If the clock is gaining the rating nut should be screwed downwards and vice versa. One division on the rating nut corresponds to $3 \frac{1}{3}$ sec. per day. For errors less than 2 secs. use the fine rating nut 21 (fig. 8).

The adjustment rate depends on the position of the fine rating nut. Try initially with one or two turns at the time.

Do not twist the pendulum when carrying out rating. Hold the pendulum bob weight 20 with the left hand and turn the rating nuts as required with the right hand. Correct the master clock after rating.

Correction

Turn the minute hand until the master clock shows correct time. The slave clocks and time recorders will be corrected automatically. The main spring in this master clock is wound up only when minute impulses are transmitted to the system. If the mas-

ter clock has stopped after a mains failure of long duration, the main spring has run down completely. When the master clock is restarted and corrected, the main spring will be wound to an amount corresponding to the difference between correct time and the time indicated by the slave clocks. If this difference is small the main spring will only be partly wound and the master clock will stop again after a comparatively short mains failure. For a satisfactory running reserve the difference should be at least 12 hrs.

The following procedure is recommended when starting the master clock after a mains failure. Turn the minute hand clockwise until the master clock shows correct time. Start the pendulum and check that the amplitude is 2-3 on the scale. When slave clocks and time recorders are in synchronism with the master clock turn the master clock minute hand half a revolution anticlockwise. Slave clocks and time recorders will then start again. When they have received about forty impulses, reset the master clock minute hand to correct time. Slave clocks and time recorders will be advanced approximately 12 hrs and consequently the master clock main spring will be fully wound up.

Circuit Diagram

The circuit diagram is shown in fig.11.

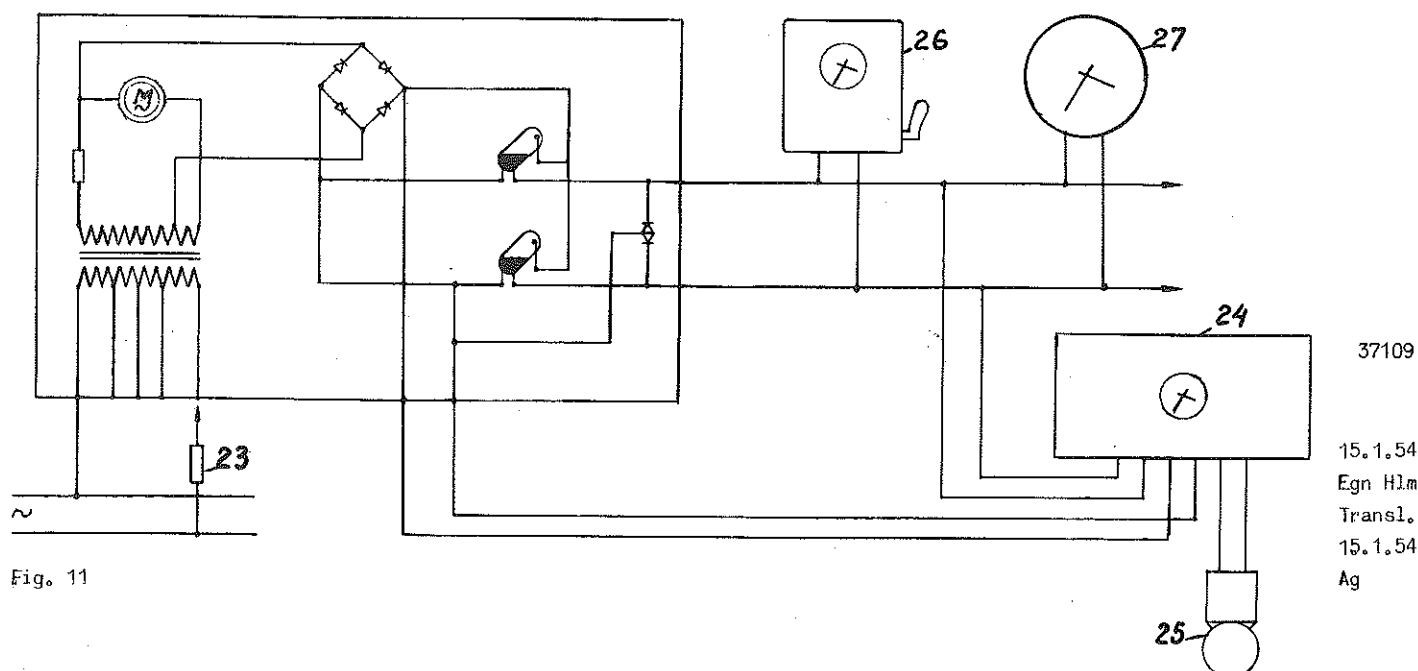


Fig. 11