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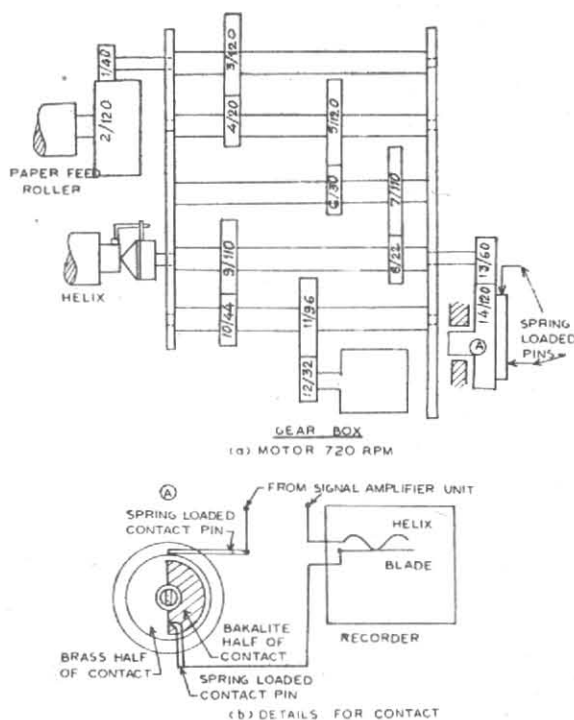
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551.576.2 : 551.508

A MODIFIED SATELLITE CLOUD PICTURE RECORDER FOR RECEPTION OF A.P.T. PICTURES FROM NOAA SATELLITES

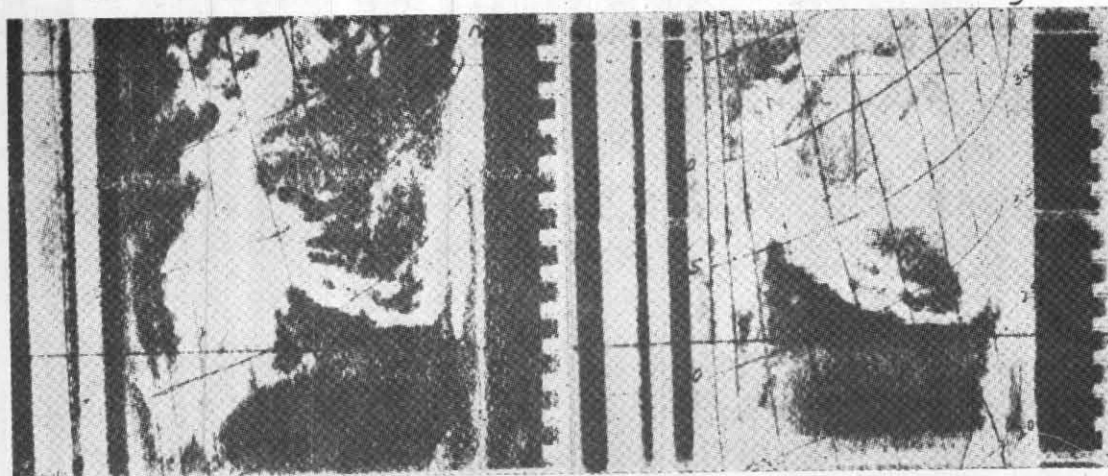
The ESSA series of satellites transmitted cloud cover pictures of the earth taken in the visible light with vidicon cameras at 240 scans per minute. The pictures obtained filled the entire width of the chart producing a picture of 8" width. With the introduction of NOAA series of satellites, cloud pictures in both visible and infra-red regions are being transmitted at 48 scans per minute in the time multiplexed mode. This has resulted in smaller pictures covering only about 1/3rd of the width of the paper. At night when the visible pictures are not available, only part of the useful area of the recorder chart is used. From the operational point of view an enlarged picture is considered desirable. Vossler (1968) accomplished this by doubling the helix speed to 96 RPM and suppressing the alternate lines by an electronic blanking circuit. Agnihotri *et al.* (1975) used a simple mechanical method for obtaining the enlarged pictures. They used a helix speed of 48 RPM and instead of using a 360° helix used a 1/2 helix (*i.e.*, helix of 180° wound on a non-conducting former. This results in a contact between the helix and the blade for half the period of the scan and produces either visible or infra-red picture as required at double the normal size.

2. In the present design the gear box of the recorder described by Agnihotri *et al.* (1975) was modified to get a helix speed of 96 RPM. The details of the gear box are given in Fig. 1. The



Gear No.	No. of teeth	Gear No.	No. of teeth
1	40	8	22
2	120	9	110
3	120	10	44
4	20	11	96
5	120	12	32
6	30	13	60
7	110	14	120

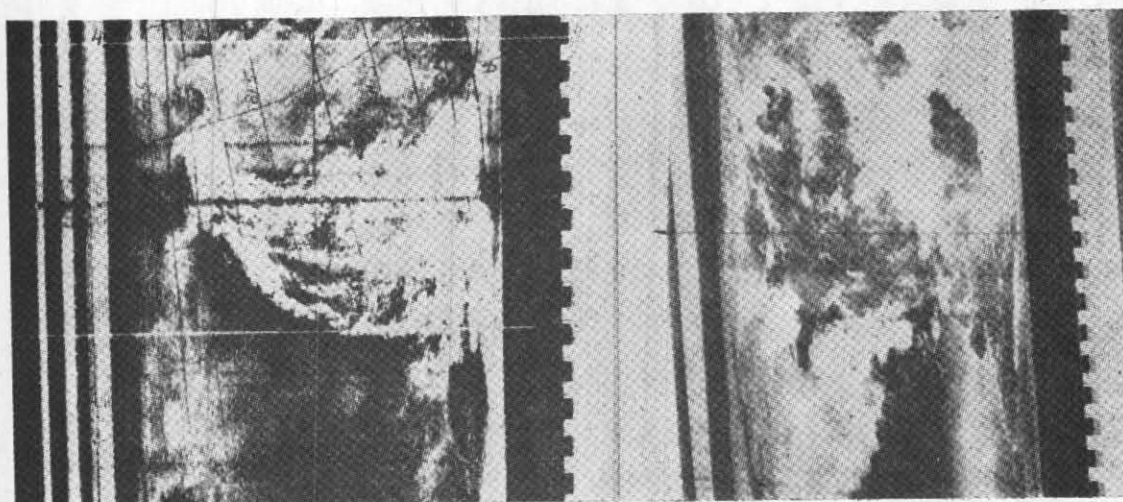
Fig. 1. Schematic diagram of modified gear box



4 April 1976

8 April 1976

Fig. 2 (a). Expanded pictures of NOAA-4



5 May 1976

6 April 1976

Fig. 2 (b). Expanded pictures of NOAA-4 (with improved resolution)

motor speed of 96 RPM was derived from the 720 RPM motor by reduction using two pairs of gears with ratios of $1/3$ and $2/5$. The gear train for the paper pulling roller is changed suitably to get 0.265 RPM for the roller giving a chart speed of 0.96 inch/minute.

The gear box was simplified as a speed of rotation of 240 RPM is no longer required since ESSA-8 has become non-operational. From the shaft rotating at 96 RPM a rotation of 48 RPM is obtained using two gears with a ratio of $1/2$. A bakelite cam with a semi-circular brass plate fixed on it was

mounted on the 48 RPM shaft. Two spring loaded contacts were placed on the metallic portion of the cam in such a way that these are connected for half rotation of the cam. These details are shown in Fig. 1(b). Thus the signal circuit is broken on alternate rotations of the helix thereby blanking the alternate lines. The mechanical method used for blanking the alternate lines has produced the same result as obtained by Auther S. Vossler(1968) by using an electronic circuit. A large condenser is placed across the contact points to suppress transients which may affect other R.F. equipments in use.

3. Fig. 2 (b) shows a set of pictures taken with this recorder. A marked improvement in resolution is seen as compared to the expanded picture received earlier Fig. 2 (a). The seven synchronisation pulses before each scan are clearly discriminated and also at the end of both IR and visible pictures, the voltage calibration steps transmitted by the satellite, are clearly seen. Of the available 5 steps transmitted by the satellite, the present recorder can record four steps. Some further improvement

in resolution is possible if the diameter of the helix is increased from the present 2.0 inches.

4. The modified system is being tried on a regular basis at New Delhi since May 1976 and is working quite satisfactorily.

5. It is pleasure to thank Shri S. Kumar, Director, Satellite Meteorology for his keen interest in this work.

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15 October 1976

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