First color receiver, CBS-Columbia console, left, will also catch black-and-white telecasts.

Here Is What You'll Find

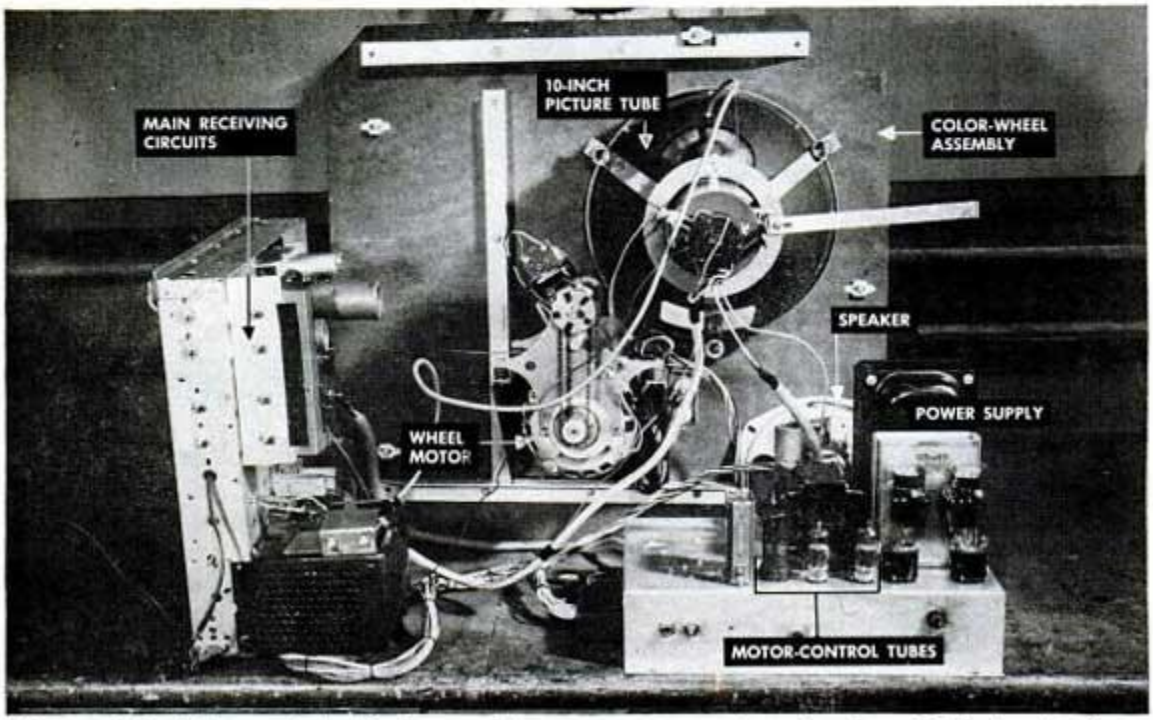
Inside the New Color TV Sets

By Robert Gorman

"COLOR receivers are simple and should be within the economic reach of the great mass of the purchasing public," declared the Federal Communications Commission when it okayed the Columbia Broadcasting System's proposals for color television.

One way to make a color receiver is to build onto a present black-and-white set. CBS colorcasts can be received in black-and-white on any set if an *adapter* is added to it. Colors can be seen by adding a *converter* with color wheel to an adapted set. Or a *slave unit* consisting of a separate picture tube and color wheel can be connected up to an ordinary TV set to bring in color pictures.

But manufacturers are rushing now to



Pilot model of the works inside the console at top of page. Chassis is little different from present receivers, but has added circuit to keep color wheel synchronized with transmitter.

produce *combination sets* that will receive either colorcasts or black-and-white on the same screen. One of the first of these to be disclosed is the CBS-Columbia console (in some places also trade-named "Air King"), shown on this and the facing page. It is made by a subsidiary of the color-championing Columbia Broadcasting System.

How it works. When a color picture is televised in the studio, filters at the camera separate the picture's red, blue and green components. These individual color "fields" are transmitted as a rapid succession of black-and-white images. They are sent out at a rate of 144 a second.

To put this picture together in the receiver, a spinning color wheel passes over these black-and-white pictures at exactly the same rate. In Air King receivers, the wheel is driven by a motor that's linked to the wheel shaft with a toothed belt.

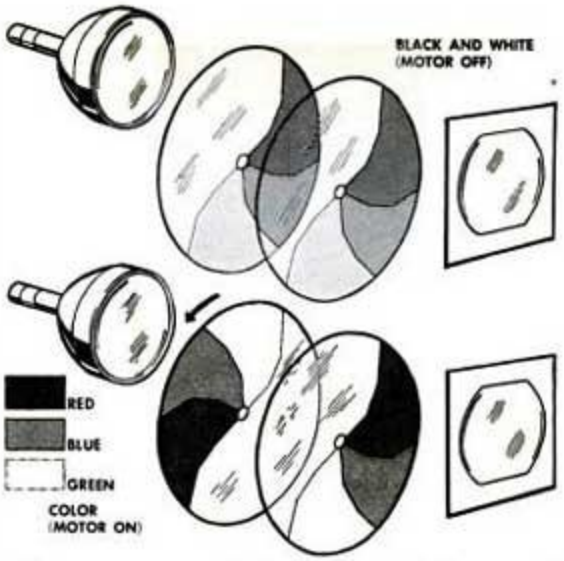
This specially designed induction motor can hold to a fairly constant speed. By itself, though, it probably wouldn't stay for long in exact step with the transmitter. To keep it locked in, the receiver uses an ingenious comparison circuit that gets its timing orders from the incoming pictures.

Wheel-speed control. A small segmented disk called an alternator is attached to the color-wheel shaft. As it turns, it cuts through the magnetic field of a tone generator. It interrupts the field at about 144 times a second.

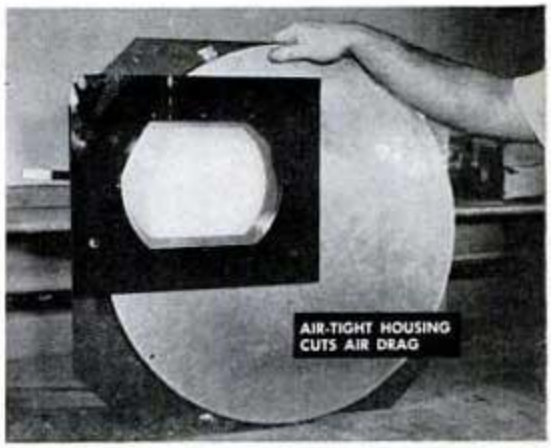
This, together with the incoming picture pulses, gives two sets of 144-cycle tones. Both are fed to a control circuit and electronically compared. So long as they are the same, nothing happens. But any difference between them results in a voltage that is fed to a special transformer called a saturable reactor. The reactor immediately responds by modifying the power that drives the motor, speeding or slowing the wheel until it keeps exact pace with the incoming picture.

Wheel-phase control. Like a rookie who marches at the same pace as his squad but out of step, the color disk in a receiver can still be wrong. It can spot the green segment in front of the picture tube when the red one should be there. When you turn the set on, the wheel may join the parade at the right speed—but out of phase.

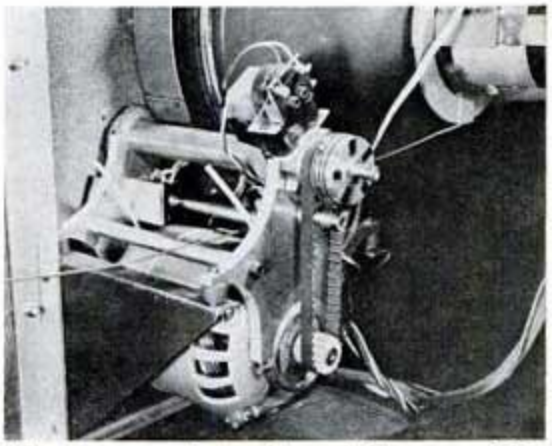
The answer to this is comparatively simple. When a green-haired singer shows up, you just touch the phasing switch on the control panel. This causes the color



Clear segments of wheels line up before panel window when motor is off (top above). When wheels spin for colorcasts, one lags half a turn behind other, giving full color wheel (bottom).



Twin wheels make it possible to see black-and-white shows without moving them aside (above). The 10-in. screen magnified to 12½-in. is as big as can be used easily with disks.



Wheel motor, its speed precisely governed by transmitter pulses, turns color-wheel shaft by a toothed belt. This gives a positive, nonslip drive, like a car's timing chain.

drive to skip a beat, bringing the right color segment into place at the right moment. (Since there are three colors involved, the singer may look even queerer the first time you touch the switch. But just keep at it and she'll turn the right color).

Two wheels used. Having succeeded in coloring the picture, the designers of the combination receiver were faced with a poser: what do you do with the color wheel when you want to watch a regular black-and-white program? Pivoting mounts to swing the whole rig out of the way would be bulky and cumbersome.

They licked this problem by using two wheels. Half of each one is clear plastic. The other half is divided into color segments. Each wheel turns on the same shaft, secured to it by hubs that use a clever centrifugal locking device. When the wheels spin, they are locked 180 degrees apart so the colored part of one masks the clear part of the other. In this state they amount to a single, complete color wheel. But when they stop, the centrifugal hubs and a brake bring the wheels to rest with the clear sections lined up in front of the tube face for black-and-white viewing.

This combination receiver uses a 10-inch tube, magnified by a built-in lens to 12½ inches. It'll retail for about $500, with a companion model in a plainer cabinet going for around $400.

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