



## TV Color 'Sampler' Costs Only \$8

**Until I'd seen TV color, I didn't know how good it can be. This simple rig—using only scrap-box parts—brings color to a TV set.**

**By Herbert Pfister**

**W**ERE already enjoying the color shows at my house, and I've only spent \$8 for these previews of the future.

I'll want a better color TV set some day, but this rig has the great merit of simplicity. It's strictly mechanical, be-

cause I'm in the kindergarten when it comes to electronics.

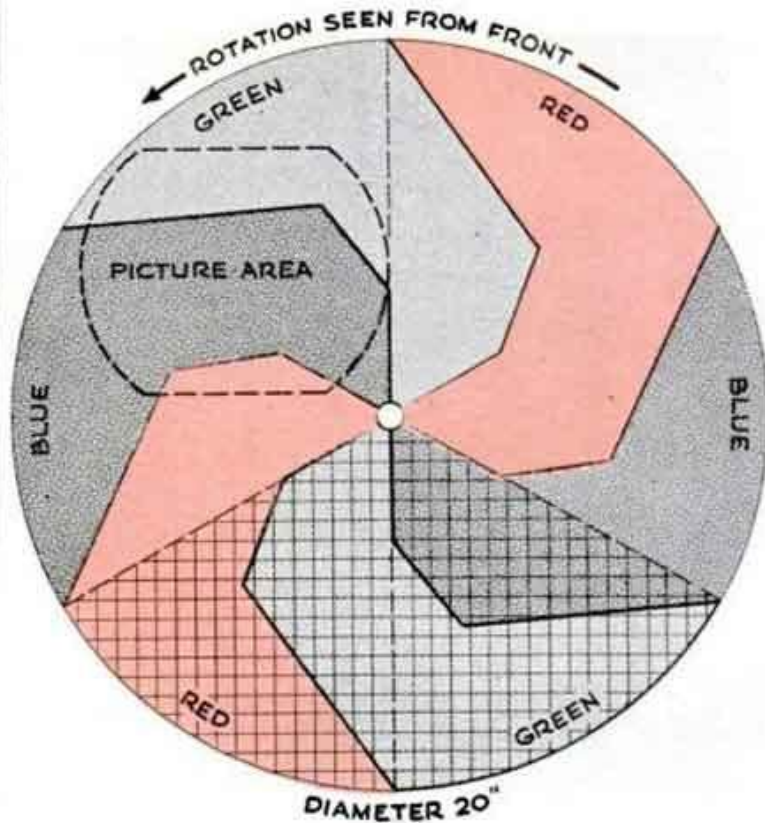
So POPULAR SCIENCE's editors asked me to tell you how to build one like it.

Your wife will probably object to having the setup in your living room permanently, but she'll be as delighted as you are with the color pictures.

The synchronism isn't automatic—



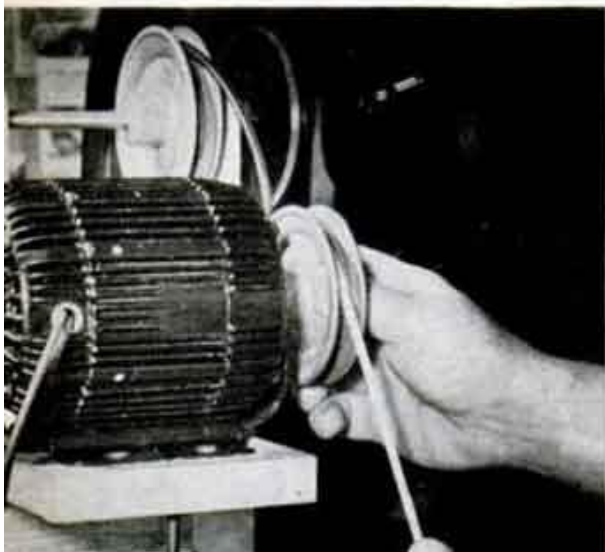
**Making the wheel.** I started with a 21" square of Lucite 1/16" thick. After sawing it to a rough circle, I centered it on the threaded shaft, clamping it between washers and nuts. Then I cut it to a true circle by holding a chisel to the edge while it ran. Cut-outs of colored cellophane, taped to the plastic, completed the wheel.



you hold a flexible-cable speed control, touching it whenever the picture is about to drift out of "sync." This isn't hard; with the wheel speed set right initially, it will stay on the nose for many seconds, and a touch of the hand control brings it back.

Building an automatically synchronized wheel is tougher. That calls for a tone gen-

**Adjusting speed.** You can bring the ratio between motor pulley and shaft pulley to just about the right speed by padding the pulleys with strips of masking tape. Building up the motor pulley turns the wheel faster. Adding to the shaft pulley slows down the wheel.



erator, a fistful of tubes, a saturable reactor and some special circuitry.

**What you need.** First off, your receiver must be color-adapted—modified so you can switch to the special scanning rates used in color broadcasts (see PS, Dec. '50, p. 121 and July '51, p. 97). You'll also need a constant-speed motor, a homemade or commercial color wheel, and some pulleys, shafting, belts and scrap-box findings.

**Wheel.** Factory-made 20" color wheels (suitable for use with a 10" receiver) are currently available for about \$18. I made my own, taping colored cellophane to a 1/16" clear-plastic disk. The drawing shows the hook shape and color sequence required for present transmitting standards. I laid out a cardboard cutting pattern to help me trim uniform, properly shaped color segments. If you have trouble finding cellophane sheets of the right hue and saturation, theatrical floodlight filters or photographic filters are okay. Or you can buy filters made expressly for color TV by Eastman Kodak.

**Motor.** Profit by my experience and steer clear of AC-DC motors—brush sparking will make your picture go bloeoy. Use a split-phase or repulsion-induction motor, preferably 1/10-hp. or better because the belt, pulleys and big disk soak up plenty of



power. A ¼-h.p., 1,750-r.p.m. shop motor will do, though it's a bit big.

**Mounting.** This will depend on your TV set. With the color sequence and rotation shown, the viewing area is the upper left quadrant as seen from the front. I put the wheel support and motor on a separate platform out front, but they could be located above or under the set.

The wheel shaft turns in ball bearings that are a light press fit in counterbored holes of wooden arms. One end of the shaft is threaded for clamping nuts that hold the wheel between two plastic washers. The wheel must turn freely and run dead true.

**Speed.** Color fields are transmitted at the rate of 144 per second. Multiplied by 60 seconds and divided by 6—the number of segments in the wheel—this gives you 1,440 r.p.m. as the necessary wheel speed. Choose motor and shaft pulleys to drive the disk at this speed. (Pulley diameters should have the same ratio to each other as exists between motor speed and 1,440 r.p.m.).

The motor I used ran at 1,550. Standard V-belt pulleys don't come in the right sizes to belt this speed down to exactly 1,440. I used an approximate ratio, a 3½" pulley on the motor and a 4" one on the shaft, and then adjusted it by adding strips of masking tape in the pulley grooves.

I use an endless sewing-machine belt of

**Braking the wheel.** Adjust the spring-loaded brake so it applies just a little more pressure than you need. Then only a little thumb pressure is required to make the wheel run at the right speed. The brake cable is an auto choke cable fitted with a wooden pistol grip.



round cross section, having found that even a small V belt added too much extra load. A round rubber vacuum-cleaner belt is another possibility.

**Brake.** I get best results by belting the wheel to turn a bit over 1,440 r.p.m. and then applying light brake pressure to pull it down to "sync." A loop of leather riding in an extra pulley on the wheel shaft is tightened by an auto choke cable fitted with a wooden pistol grip. The cable is spring-loaded to apply more braking pressure than you need, so that a light touch of your thumb holds the wheel in "sync."

Adjust the pulleys with tape to run the wheel a little fast, and adjust the brake to drag the wheel down a little too slow in the hand's-off condition.

With some practice you'll find it isn't hard to hold the synchronism and color phasing pretty reliably. END

### Color Unit Can Be Bolted to Housing of Small Set

MY LITTLE girl was so delighted with color TV in our living room that she wanted more of the same on the 7" set in her room. The one I built for her is like the big unit, except the brake is a little different. This brake is hinged at one end.

A piece of leather is cemented to the other end. The leather rides against a wooden disk mounted on the shaft behind the wheel. A piece of cord with a spring on one end provides wheel-speed control.—Herbert Pfister, New York City.

