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DEVOTED EXCLUSIVELY TO

AMATEUR RADIO

Published by The American Radio Relay League



MAY
1925

*Sending Pictures by
Amateur Radio*

25¢

Visible Radio Communication

By Dan C. Wilkerson*

IT is a rare thing that anybody does anything for the transmitting branch of the American radio amateur fraternity. The transmitting man has had a hard row to hoe. He has met everything from the complaints of his younger brother and the broadcast listener to the complete dismantling of his station during the war.

But he is not kicking. On the contrary he is solving the problems of the radio industry two years ahead of the industry itself.

A notable example of this is in the matter of short waves. Before the commercial interests had gone very far in this direction many amateurs were—and are—doing pioneer work.

This brings us to our subject—somebody is going to do something for the transmitting branch of the house. That somebody is C. Francis Jenkins and what he proposes is to add *visible radio* to our old friend *audible radio*. This is how he proposes to do it.

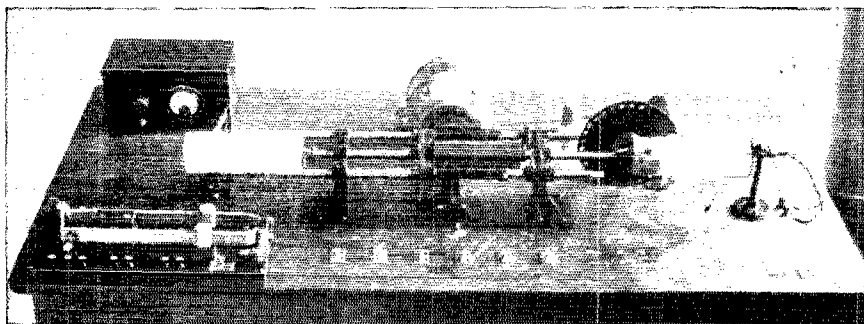
He plans to build small compact auto-

compete with any commercial company which will handle radio photo news.

The Visible Radio Transmitters

Mr. Jenkins has worked out four or five different models of his automatic facsimile machine. The cheapest one will sell for \$45 according to present plans. It will consist of a framework below which projects a shaft carrying a friction roller. The whole machine can be set on any phonograph of the disc variety with the friction roller against the turntable of the phonograph. The Jenkins machine is then driven by the friction roller and shaft. Since the photograph has an excellent governor this will provide a good steady drive. The Jenkins machine is *both* a sending and a receiving device.

A somewhat better model will be equipped with an electric motor. This will permit very easy adjustment of the speed to agree exactly with that of a distant machine of the same sort. This machine will probably sell for about \$160.



THE JENKINS DUPLEX PHOTOGRAM MACHINE

Which simultaneously sends and receives, by radio or by wire, photographic copies of messages, letters, sketches, maps, pictures, etc.

matic send-and-receive picture machines to be sold at a price within the reach of the average amateur's pocketbook. He does not expect to make a big profit—in fact he will be surprised if he accidentally makes any at all. He *does* want to get the sending radio amateur to experiment with the operation of photo-transmission machinery.

To make the purpose of the machines perfectly clear they will be issued with the restriction that they cannot be used for profit and that they must not be used to

The models we have been talking about are of the drum variety, the picture to be sent being wrapped around the drum at the sending end and the reproduction at the receiving end being made on a similar drum.

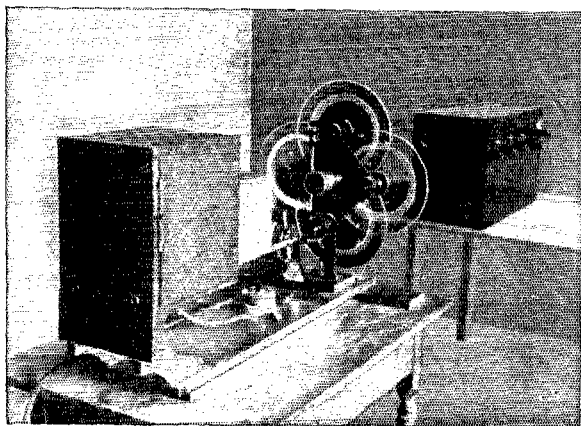
In the higher types a continuous strip of photo paper is fed into the receiving machine and it will reproduce press dispatches at high speed until the paper runs out. This model will be more costly than the two described above because the continuous-strip method of operation requires an optical method of light-intensity reproduc-

* Jenkins Laboratories, Washington, D. C.

tion. This optical method has been attempted in many ways but the most satisfactory and speediest is that of the double rotating prism devised by Jenkins. These large glass prisms are expensive and must be carefully ground by expert optical hands. Mr. Jenkins stated to the writer that he

sage traffic is not as high as it was.

Something new is needed and Mr. Jenkins has presented his proposition at an opportune moment. The transmission of handwriting, line drawings and typewritten pages will certainly add greatly to the zest of amateur transmission.



The Jenkins high-speed photo-transmitting machine. Lamp-house at left illuminates picture. The four rotating prismatic discs move the picture over the light-sensitive cell in the box at the right. This cell modulates the out-going energy. Time for picture, 3 minutes.

thought this type of machine could be sold for about \$250.

Where We Come In

What has all this to do with the sending amateur?

Here is the real point. The American amateur is an expert at short-wave transmission. He has had a running start on the large industrial and research laboratories. This has been partly a matter of necessity because he has been assigned wavebands within which he must work—even though these bands were picked out at his own suggestion.

Now radio photographs lend themselves readily to short-wave transmission by dark or daylight. They can be sent with transmitters using C.W., modulated C.W., I.C.W. and with modified spark and arc.¹

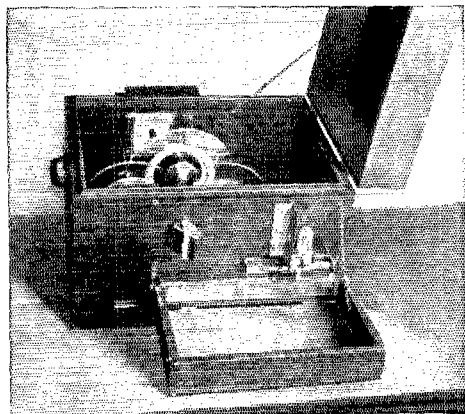
Right now the amateur transmitter is up against it for something to send. Most of the clan are now working on short-wave apparatus because they have been told to outlaw the usual routine of "Hope you are well, sigs FB 73 OM CU AGN". The development work has its advantages but mes-

Can you picture the new enthusiasm of a President-Governors' relay in which the message went in the handwriting of the Governors? Would there not be a great thrill in delivering at Washington a message in the hand of the Governor of California?

The Jenkins machine will automatically send and receive at the same time.² The speed at which traffic can be forwarded depends only on the skill of the operator.

Operation

The greatest problem to face the amateur who is equipped with one of these machines is that of synchronization. Mr. Jenkins has built one type of machine which gets its driving action from the turntable of the ordinary talking machine. There is a talking machine in practically every home today. Nearly all of the better class of talking machines have a means for regulating



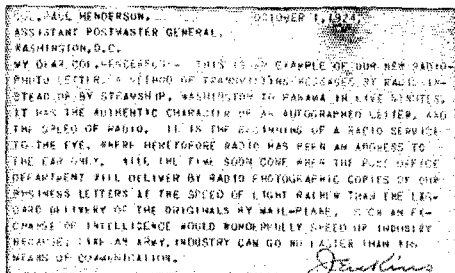
HIGH-SPEED RECEIVING CAMERA

Light from the lamp in front, which is controlled by received energy, passes thru the prismatic discs to plate-holder at rear.

¹ Let's see: "C.W." means 9EK, "modulated C.W." means all the rest of us, "ICW" would be 8VQ; but where, oh where, is the old-fashioned hardshell that still has a SPARK?

² We can then send out "No. 2" while "No. 3" is arriving. It is just one step further until we can make the whole thing purely automatic.

speed, and some of them have visible-reading dial pointers which tell the speed of the turntable in revolutions per minute.



If there be a need for sending the first facsimile on to another station, Parks at Washington can take his received facsimile message, and place it on the transmitting drum, and send it along while he is getting another facsimile from Hartford.

This dual transmission and reception will require a separation of transmission and reception equipment so that the radiated impulses from the transmitter will not interfere with the reception.

The beam transmitter idea coupled with the short wave will prove a fruitful field for experiment here.

One proposition now being finally worked out by Mr. Jenkins is the matter of methods of reproduction. He has one machine set up with an electrical stylus, and his paper coated with an electro-sensitive paper. When the current impulse varies, the stylus inscribes a variable continuous line, thicker, thinner, open white or heavy black, in keeping with the character of the received signal.

Another machine uses a dark box, a tiny slit through which the light beam falls on sensitive paper, and a shutter action. This is not



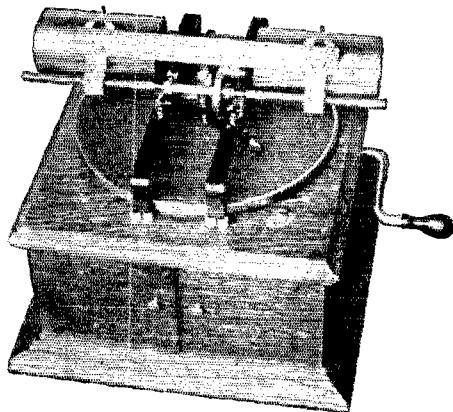
Examples of the work of the Jenkins System

It will not be difficult for amateurs to synchronize their talking machine motors at an even speed by ordinary code, and no doubt a constant speed of 78 or 72 per minute will be adopted for this work.

Stopping to visualize for a moment just how the amateur will handle this equipment,—here goes. Let's say that Kruse of the Hartford office wishes to send a facsimile letter to Parks at Washington. Kruse gets into communication with Washington and he asks Parks what his turntable speed is. Parks will signal back 78 or whatever it is. Kruse will verify his own turntable speed and after checking it over for several moments, he will signal Parks OK.

The next job will be to get both machines in step. A small contact stud placed in the drum of the transmitter will serve to give a constant-speed impulse. This can also be done by an original vertical guide line which will be repeated as a dot coming at even intervals. This will show the receiver at once whether or not he is properly synchronized.

With synchronism established the facsimile reproduction is begun.

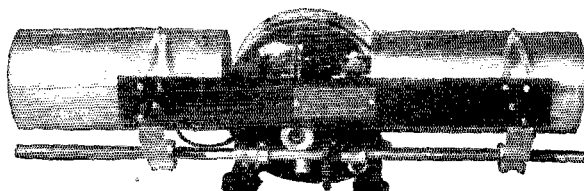


Jenkins duplex machine for home use, driven by table of ordinary phonograph.

such a rough-and-ready method as the stylus system.

There are two transmission ideas involved here also. One is the direct contact stylus

giving a variable current from the resistance of the pencil line, which is carbon; and the other, a simple photo-electric means where the emitted pencil of light, varied by the light and dark spots on the transmission negative, is projected on a light-sensitive cell which in turn is put into the modulator or control circuit of the radio transmitter.



Jenkins Motor-driven duplex machine

The giving of this idea to the amateur at low cost will open the field of experiment for the radio amateur immeasurably. It will without question hasten the arrival of the day of the perfect radio transmission of vision. Mr. Jenkins already has given laboratory demonstrations of radio-vision transmission, and he stated in a recent interview that he proposed to stage a large

public demonstration just as soon as the equipment now being built in his laboratory is completed.

It is unusual to find an inventor of the degree of success of Mr. Jenkins willing to donate a part of his wonderful work to the much-maligned sending amateur.

The present radio transmission patent situation would seem to preclude any immediate commercial development in radio photo transmission, unless a more generous policy is developed by the firms holding essential equipment and patents. The art of radio-photography is yet in its infancy, and the amateur thus far hasn't done a great deal with it, if anything at all.

Mr. Jenkins has asked this writer what he thought of the proposition to place these picture transmitters in the hands of the amateur and this writer is passing the query along to the amateur himself for answer. Does the amateur want it? Will it add to our radio knowledge and interest? Will it make radio more worthwhile for the amateur? Will it be the means of further discovery and enlarging of the amateur field of activity?

I leave the answer in more capable hands.

Award Announcement for Radio Suggestions

By C. Francis Jenkins

RECOGNIZING that it was the amateur who developed audible radio, and desiring to see radio pictures developed in the same quick order, I am offering cash prizes for suggestions (1) for a medium in which pictures, handwriting, sketches, etc., can be put on cylinders from which to send them by radio or by wire; and (2) for a medium to be put on a similar cylinder on which to receive these pictures, handwriting, etc.

There is a first prize of \$100; a second prize of \$50; and a third prize of \$25, to be awarded every sixty days, for the best three suggestions submitted during the respective periods, and to be repeated until the offer is withdrawn.

The gentlemen who have consented to act as judges are Mr. Kenneth B. Warner, Secretary, American Radio Relay League; Dr. A. Hoyt Taylor, Physicist, Bellevue Naval Research Laboratories; and Major J. O.

Mauborgne, Signal Corps, U. S. Army. Their decision will be accepted by me as binding.

Equal weight will be given the following: (1) simplicity of preparation; (2) availability of materials; (3) low materials cost; (4) simplicity of operation; and (5) simplicity of mechanism to be used therewith.

If no "best" of both sending and receiving medium is sent in by the same party, the awards will be equally divided between the best suggested sending and the best suggested receiving medium.

There is but one condition, namely, the scheme proposed must be one not disclosed in my book, "Radio Vision and Radio Pictures". (I would hardly want to pay for my own suggestions.) The book mentions picture transparencies, etched zincs, swelled gelatine, etc., for sending mediums; and photo paper, electrolytic paper, inked surfaces, etc., for receiving mediums.