



Fig. 5. Removal of tape base by machine — a studio model.

anism can be, a very elementary model has been made. The cement holder is a 100-ft film can cut from the middle and soldered together. The rollers are ordinary 16mm projector rollers. The arm can be anything as long as it can hold the tape spool.

Another unusual thing about this

process is that the stripe can be applied on either side of the film, emulsion or base, with the same ease and without any special treatment such as taking the emulsion off the film. A different cement should be used for each side. For the base side using Scotch Tape 111, the formula is:

100 parts chloroform  
60 " acetone  
30 " alcohol

For the emulsion side using the same tape, the formula is:

20 parts phenol heated until it melts  
4 " shellac  
5 " thinner

10 parts of the above is then mixed with 8 parts acetone and 20 parts of chloroform.

While the "homemade" device described above is not intended to take the place of more elaborate equipment for professional use, it has been entirely adequate for our purposes. Its very simplicity is its most important quality. Since it does not require special tape or complicated equipment, it can be used by anyone.

#### References

1. Andrew H. Persoon, "Magnetic striping of photographic film by the laminating process," *Jour. SMPTE*, 60: 485-490, April (Pt. II) 1953.
2. U.S. Patent 2,628,929, Feb. 17, 1953, Minnesota Mining & Mfg. Co. (This was special magnetic tape coated on a temporary base, with a layer of heat- or pressure-sensitive adhesive on top to permit transferring the coating to film and stripping off the tape base.)
3. "New laminated soundtrack," *Home Movies*, p. 202, June 1957. (The article cites eight Canadian and U.S.A. film laboratories then equipped to use the laminated tape.)

## Letters to the Editor — Sound-Delay Systems

Dear Sir:

I read with interest the paper on the Disc-O-Sound Delay System (Time-Delay System for Sound-Picture Syncing) by Henry Dussault, in the November 1963, *Journal*.

There is certainly a need for a method of editing single-system sound film and recording the sound opposite the picture does simplify the editing of sound film; however equipping cameras and projectors with special delay units could become cumbersome and it seems to me that a simpler method could be devised. This would involve the adaption of a conventional tape recorder to handle 8mm film. The guides would have to be slightly widened and the heights of the heads varied for centering on the magnetic soundtrack, and an additional playback head (8½ in., i.e., 56 frames) installed ahead of the recording head. The output of this playback head would then be fed to the recording head through the regular amplifier unit.

After the film which was exposed in a conventional single-system magnetic recording camera has been processed in the film laboratory, but before it is cut, using the method suggested here, it is run through the tape recorder, starting at the end of the film. This would move the sound 56 frames forward to a position opposite the corresponding picture material. It then may be cut and edited as in Mr. Dussault's system. After this step, the film would then be run through the tape recorder from the beginning to the end (after shifting the heads to the opposite edge of the film) which would move the soundtrack to its proper position 56 frames ahead of the picture, and the film would then be ready for projection on any conventional sound projector.

The first time the film is passed through the tape recorder

the sound will of course be played back and recorded backwards but this should not present any difficulty as most pre-recorded tapes are made this way. The exact speed that the tape recorder is run is not of any particular importance as long as the frequencies produced do not fall outside of the frequency response of the recording amplifier or the heads as the magnetic soundtrack will be passing both the playback and recording heads at exactly the same speed.

I believe that such a system has certain advantages over the Disc-O-Sound delay system. Using the method I have proposed, any single-system magnetic sound camera or projector can be used without the need of adapters; the dub to move the soundtrack is made under laboratory conditions, not in the field; and only one piece of equipment (the adapted tape recorder) is used to move the track both backward and forward between editing.

December 23, 1963

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Dear Sir:

I found Mr. Wunder's comments on my paper on the Disc-O-Sound system very interesting. I am favorable to critics and appreciate criticism as a stimulus to ideas leading to improvement. I believe, however, that Mr. Wunder has overestimated the disadvantages of bulky equipment and considerably underestimated the real advantages of a system which permits immediate editing, and immediate projection with sequences interchanged as desired.

Obviously, such a system, whether adapted to conventional

or custombuilt equipment calls for a certain increase in size and weight of machines, but its usefulness has been demonstrated. The time-delay system has been designed specifically to eliminate certain disadvantages such as the need for expensive double-system recorders; synchronous motors; re-recording in the laboratory; the sound-picture gap; and the cutting off of "unconcerned" picture or sound in splicing.

The method preferred by Mr. Wunder, which involves the adaption of a tape recorder for film use, requires additional recordings and still leaves the picture-sound staggered on the projection film and does not take care of eventual cuts and splices. Mr. Wunder's idea is good, but it is not a new idea. In fact, similar methods have been in use for almost 30 years, while the time-delay system has been specifically designed to overcome the disadvantages of the double system.

It is my personal opinion that the time-delay-equipped camera can be regarded as its own sound process laboratory able to deliver a ready-to-edit, trouble-free film.

I have been gratified by the response to my paper. So far, I have received six letters from readers of the *SMPTE Journal*. A television station wishes to purchase a set of time-delay adaptors for newsreel work. I appreciate these expressions of interest, and especially I appreciate criticism, such as Mr. Wunder's, for the opportunity it affords to evaluate the time-delay system by comparison with other systems.

December 30, 1963

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Dear Sir:

I have read Mr. Dussault's interesting paper, "Time-Delay System for Sound-Picture Syncing." It seems very similar in many respects to the one developed by me and patented under No. U.S. 2,729,454, January 3, 1956.

The patent "related to sound motion-picture film and projection thereof and in particular motion-picture film wherein each picture frame carried its own soundtrack and wherein a picture and sound relating to the picture are projected simultaneously." The system was designated Simultaneous Sound-Track and Picture System or STAP System. Mr. Dussault's Disc-O-Sound Delay System seems to have basic similarities to the STAP System. In the Disc-O-Sound Delay System the elements of the delaying mechanism are incorporated into the recording camera or projector, while the STAP System uses an independent or additional delayer recorder.

An important advantage of the STAP System is that



there is no need to introduce any modification to present sound recording on film equipment (optical or magnetic). The system has been tested successfully, first with one Cine-Voice camera and later with one Auricon Pro-600 camera, without modifications.

The arrangement provides for quick audio playback to check errors and unwanted sounds after each take and for full recording of all takes for future references or use, should the optical recording spoil by overmodulation, too low contrast developing, burning off of lamp, etc. The original recording on tape still remains. It also permits fast and accurate editing of the track and the picture of the original film. (Once a negative is edited it should be printed in projection sync to obtain release prints.)

The system is ideal for newsreel work and for low cost productions where no background music is to be used. Another advantage is that commercials can be taken off kinescope productions without interfering with the program.

For a good many years I worked on the idea of producing a film such as that obtained through the STAP System. In the early days I tried a disc, a drum and a tape loop, ending up, however, by using a recorder capable of producing both the delaying effect and a recording on tape to permit immediate playback after each take to detect errors or unwanted sounds.

Herewith is an example of one of the early tests made by the author; it's an enlargement of one take with a Cine-Voice camera.

February 17, 1963.

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## Erratum

Rudolf A. Stampfl and William G. Stroud, "Automatic picture transmission TV camera system for meteorological satellites," *Jour. SMPTE*, 73: 130-134, Feb. 1964.

On p. 133, caption for Fig. 8 (due to rearrangement of page make-up for forms at press time, engravings were transposed after clearance by the authors, to cause the cloud photograph reproductions to be wrongly identified):

**For: (left below) reproduced on Muirhead D700 S; (below) reproduced on Fairchild Scan-a-Fax.**

**Read: (left below) reproduced on Fairchild Scan-a-Fax; (below) reproduced on Muirhead D700 S.**

*Addendum:* The following Discussion was omitted from the pages of the February *Journal*:

### Discussion

*LeRoy M. Dearing (L. M. Dearing & Associates):* What could you tell

us about the spectral response of the particular storage vidicon on the APT camera?

*Dr. Stampfl:* The sensitivity of cameras used to televise cloud pictures from outer space is adjusted to reject the blue light and to have maximum sensitivity in the near infrared. This region lies in most cameras at 0.5 microns. This camera carries a filter which rejects the blue and lets the near infrared pass, approximately from 0.5 to 0.75 microns.

## Addendum

J. Robert Mann, Jr., and Norman Leigh, "Electrical installation techniques for a large film production center," *Jour. SMPTE*, 72: 863-868, Nov. 1963.

These acknowledgments and credit were omitted from the paper:

*Acknowledgments:* Architects for the MPO Grand Central Studios were Herbst & Rusciano of New York City who were responsible for the design of the entire project and its many special facilities. Julius Goldfarb was Professional Engineer for the project.