

# The Todd-AO Projector For Both 70- and 35-mm Film

**L**AATEST ENTRY in the wide-screen sweepstakes is the Todd-AO process details of which have until recently been shrouded in secrecy. In early February this veil of secrecy was rent and permitted the seeping through of those facets of the projection process which are appended.

The Todd-AO system is unique among the current wide screen processes in that it utilizes 70-mm film for both photography and projection. The advantages of such a film size in terms of fine grain structure and additional screen light are obvious. Another feature of the system is that the projector can utilize both 35- and 70-mm film, this being accomplished by dual sprockets and the simple insertion of a different gate for 35-mm

## 25 Roadshow Openings

The Todd-AO projectors were made by the well-known Philips organization in Eindhoven, Holland, the original order being for 50 which would serve for 25 roadshow openings in major cities in the U. S. A. The premiere public showing of the process will occur early in May in New York City when the Todd-AO film "Oklahoma" bows. All 70-mm films will be produced by the Todd outfit itself.

Precise technical data anent this new 70-mm projector are lacking, thus the information presented here, which emanated from the Todd people, must be considered as exploratory in nature.

## Claims for Versatility

Todd-AO avers that the new projector, designated the DP70, is suitable for:

1. 70-mm film with any number of magnetic sound tracks.
2. 7-mm film with separate sound film.
3. CinemaScope film with four magnetic sound tracks.
4. CinemaScope film with optical sound track or Perspecta sound.
5. Wide-screen films of any size, provided with either magnetic or optical sound tracks.
6. Standard 35-mm film.
7. 3-D films according to the single-film system.

8. 3-D films according to the twin-film system.

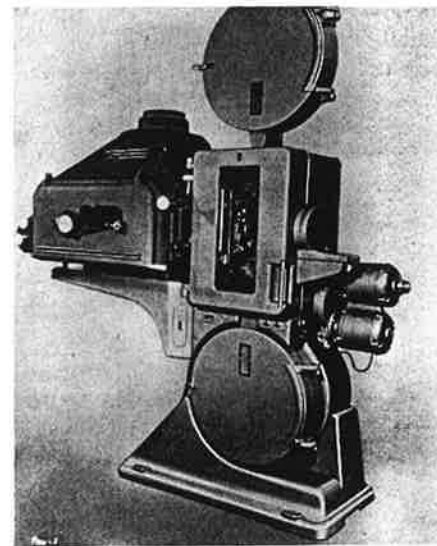
Such versatility sounds like a large order, but actually the switchover from one type of film to the other is easily accomplished by the use of the supplementary parts supplied by Todd-AO. For example, it is not necessary to change any sprockets for the changeover since all sprockets have two sets of teeth to accommodate both 35- and 70-mm film. The 35-mm sprocket teeth are slightly recessed in relation to the outer 70-mm sprockets so as not to interfere with the wider film.

## Sound Reproduction Facilities

The outer flange of the intermittent sprocket has 20 teeth; the inner flange has 16 teeth. All sprockets are universal, as are the firetrap rollers, and need not be replaced when switching from 70- to 35-mm projection. Incidentally, this switchover is said to require only ten minutes, with the mask for 35-mm film being inserted in a few seconds.

Sound reproduction facilities have been mentioned previously. The Todd 70-mm film will have six sound tracks; and adaptation for other mediums of sound reproduction may be easily accomplished.

The soundhead for the scanning of magnetic sound tracks is located on



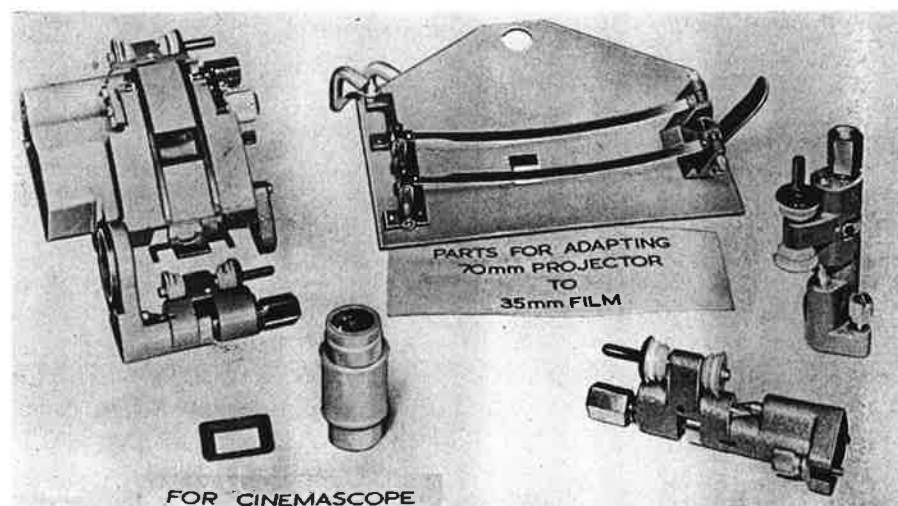
Full view of the Todd-AO all-purpose projector which will handle normal 35-mm film, 70-mm film, single- and double-film 3-D systems, and any number of sound tracks.

the top part of the projector. Either a scanning head for 70-mm film or a scanning head for CinemaScope film can be placed on two guide pins at the top of two rotating sound drums. The guide rollers of the soundhead and all other guide and pad rollers that are in contact with the magnetic soundtrack are made of nylon. The soundhead may be removed as one unit by simply loosening four screws.

## Drive, Dual Sprockets, Speed

The driving mechanism is housed in an oil-tight casing, sealed hermetically by means of a large cover to protect it against dust. The cover is fixed with five screws which may

Parts which have to be suited or added for projection of other than Todd-AO 70-mm film. Modification requires only 10 minutes. The mask of the gate for 35-mm film projection can be replaced in a few seconds for CinemaScope or other wide-screen ratios.



be easily removed for inspection of the mechanism.

All sprockets, the intermittent mechanism, the shutter and the take-up, are driven by a vertical main shaft. This shaft in turn is driven by a horizontal shaft, which also drives the spur-gear oil pump located at the bottom of the projector housing. All of the gear-wheel transmissions and bearings are lubricated by an oil conduit with tappings.

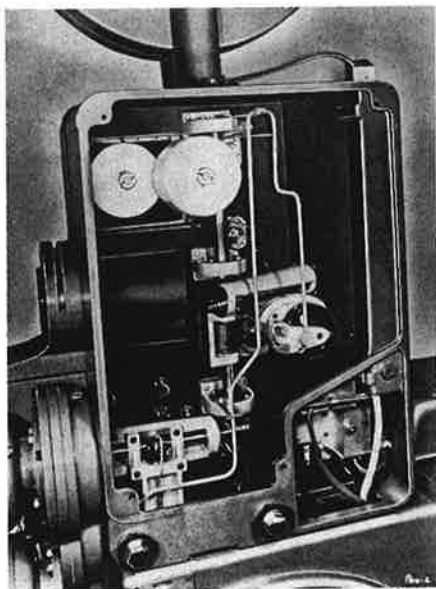
The projector provides for two different film speeds. The horizontal driving shaft of the projector is coupled directly to a driving motor for a speed of 30 frames per second when 70-mm film is running. This same driving shaft can be coupled by a gear-wheel transmission to another motor for the standard speed of 24 frames per second for 35-mm film. Two separate drive motors are used rather than a speed-change gear box because they permit a simpler system of construction.

### Gate and Screen Curved

Todd-AO presentations will, of course, utilize a screen with a center depth curve of 15 feet. Overall picture size is expected to approximate 25 feet high by 51 feet wide, a 2/1 ratio.

A curved projector gate will be used in order to minimize the tendency of the much wider 70-mm film to bend and thus get radically out of focus. Standard pressure pads have

Driving mechanism of the projector, housed in oil-tight casing which is closed hermetically by means of a large cover. Cover is fixed by five screws, easily removed for inspection.



been replaced by thin strips which are attached to a hinged plate. Pressure in the gate can be adjusted by tightening or slackening these strips.

The hinged plate faces the shutter and must be pushed aside for threading the film. The problem of the positioning of the shutter just behind the gate was overcome by providing that the knob for pushing aside the plate can be operated only when the shutter is in such a position that the plate can pass freely. It is impossible to start the projector when the plate has been pushed aside.

A single-blade conical shutter of very large diameter is used. At a film speed of 30 frames per second the shutter rotates at 3600 r.p.m.; while at a speed of 24 frames per second its speed is 2800 r.p.m.

### Cooling Means, Magazines

Water and air cooling of the projector gate and the film are utilized. Todd feels that water cooling is insufficient, and may even have a negative effect, because of the difference in temperature between the image area and the edges of the film frame, thus inducing buckling. The shutter is relied upon to suck in cool air and blow it upon the film.

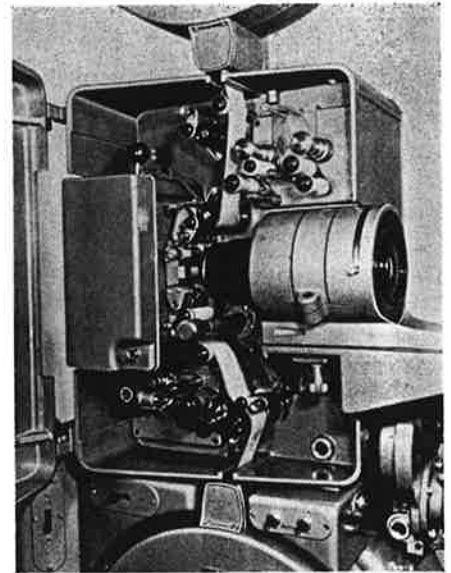
Sleeves with different inner diameters can be mounted in the lens holder to accommodate various projection lenses. For 35-mm projection the optical axis is shifted to proper position by means of a small knob in the slit of the lens holder.

The film magazines accommodate 3,100 feet of 70-mm film, thus allowing an interval of 22 minutes between changeovers. Magazine shafts are 1/2 inch in diameter. Both magazines have adjustable friction devices, with the upper magazine being illuminated and having running-time scales relating to both 70- and 35-mm film.

The structure of both the mechanism and the base are said to enable the use of any arclamp provided its optical characteristics are suitable for the Todd film image. It has been bruited around in the trade that at all private showings of the Todd process to date 280 amps was the current level.

### One Informed Opinion

One nationally-known projection supervisor who witnessed such a showing discounted this talk and said he saw no reason why 180 amps at the



For purpose of achieving perfect definition, the distance between film in the gate and projector lens does not vary. Projector is equipped with curved runner plate. The slight bend in longitudinal direction gives film greater stiffness in transverse direction.

most shouldn't suffice. He pointed to the double-frame showings at the Radio City Music Hall (N. Y.) as "proof of the pudding." Supplementary comment on the Todd showing by this same personage ran as follows.

"The quality of the picture was very good—and why shouldn't it be under such favorable conditions? The images were sharp, bright and steady. But, as with all curved screens, there inevitably was distortion of the screen image.

"The nature and extent of this distortion depends upon one's seating location. I was seated at the right. Players entering the scene from the left appeared to me to be stout; as they approached the center of the scene their figures appeared normal; as they continued toward the right side they grew thin.

"To a person seated at the left of the theatre the effect would have been just the reverse. The same fault is apparant in any curved screen, with the degree of distortion depending upon the depth of the screen curvature. This may not be objectionable to the general public, since they don't beef about the same fault in Cinerama. Of great benefit to Todd-AO was the fact that the picture was in sharp focus over the entire screen area.

"My personal opinion is that the Todd system represents essentially just another wide-screen process and that like all other screen presentations the vital factor lies not so much in the

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# World-Wide Concern About Technological Standards

**B** RITISH FILM circles are also seriously concerned about the lack of technological standards anent the screen image aspect ratio. This concern was rather forcibly expressed at a recent meeting of the British Kinematograph Society (Theatre Division) which, not surprisingly, was well attended by engineers and projectionists but fell dismally short in terms of exhibitor attendance.

Presiding over the conclave was an old and valued friend, R. E. Pulman, a practical projectionist (Circuits Management Assoc., Ltd.) who is remembered affectionately by the many friends he made upon the occasions of his several visits to the U. S. and Canada.

Through the medium of *The Ideal Kinema*, British trade journal, IP is privileged to present the following summary of the discussion.

THE FORUM was opened by Dr. Leslie Knopp, who stated that the philosophical aspects were not outside the scope of the discussion. With the 3-D picture, he continued, the idea was to bring the picture into the audience, while with wide-screen presentations it might be said that the idea was to bring the audience into the picture.

## No Proper Aspect Ratio?

Dr. Knopp said that in the matter of screen shape and size, the industry was like Stephen Leacock's hero, who mounted his horse and dashed off in all directions. Some months ago he had taken steps towards a standardization of aspect ratio, but had been told by every section of the trade that standardization was premature.

However, he put forward the proposal that two ratios should be established—at 1.75 and 2.55/1, a proposal which met with general support.

G. E. Fielding, chief engineer of Associated British Cinemas, pointed

out that in America a number of producers were shooting only in CinemaScope, with the idea that non-anamorphic prints might later be made. A ratio of 1.85/1 would result in cropping about 12% of the picture, and he recommended this, rather than the lower figure.

S. B. Swingler, engineering controller of Circuits Management Assoc., took the opposite view, pointing out that a majority of films were still being photographed on old-type cameras for ratios of 1.6 or 1.66/1 and neither studio nor laboratories wished to make changes at this stage until a new standard was adopted. Foreign films shot for the 1.33/1 ratio and shown with superimposed titles could not be cropped.

## "Letter-Box" Screen Image

J. A. Walters objected to the "letter-box" effect of the CinemaScope picture when seen from the back seats. VistaVision was returning nearer to the old ratio. In the old days the better seats were at the rear, but now the technician was reversing the trend. The tastes of patrons, he thought, must eventually decide the question of ratio.

Walter Lassally, supporting this view, suggested that the high aspect ratio had been adopted as a result of the low overhanging balconies of many American theatres, which prevented the screen being increased in height. He urged that the BKS should recommend the retention of the old standards of 1.33/1, which had been originally determined as a compromise to suit various types of composition.

J. L. Stableford, the screen maker,

disagreed with this proposal. He considered the old picture size too small. Since the limiting factor in many theatres was the height of the picture, any increase must be in width. But a too large picture suffered from grain trouble. We had had no chance of passing judgment on any ratio between those of CinemaScope and wide-screen, he said, and we must eventually decide whether we were giving the public what they wanted.

## Image Ratio Change Forecast

He suggested that a time might come when wide-screen ratios would go up and CinemaScope ratios come down, so that eventually we should have the one shape of picture and variable screen masking would be a thing of the past. He thought every theatre should show a picture of 1.75/1 ratio.

R. Butler, a Gaumont projectionist, objected that recent developments were proving detrimental to the seats that were most filled at the front and sides.

Martin Beer, joint sales manager, GB-Kalee, said that he was primarily concerned with meeting the requirements of independent exhibitors. One problem was: how was picture ratio going to affect sight lines? The IES regulations fixed the maximum height of picture, and dependent upon that and on the width of the proscenium, he had to consider whether it was possible to get in a CinemaScope picture. Often movable masking was necessary—generally at both top and sides.

An exhibitor might want the 1.33/1 ratio as well as the 1.66/1 and the CinemaScope ratios. He pointed out that the variable anamorphic lens could

(Continued on page 29)

"Tomorrow night we'll sit on the other side of the theatre and see the rest of the show."



Submitted by Norman G. Campbell, Campbelltown, N. S. W., Australia.

## TODD-AO

(Continued from page 12)

form of presentation as in high entertainment content."

Numerous skilled technicians have had a fling at 70-mm film projection, the best remembered probably being the George Spoor 65-mm effort in the 1930's, and the Fox Film whirl with Grandeur during the same period. Whether Todd-AO has licked the problem remains to be seen; but if their pictures are to be confined to roadshow situations and no 35-mm prints released, the matter is hardly one of industry-shaking consequence.