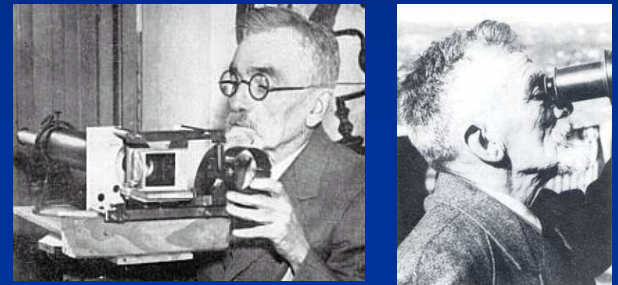


# History of Anamorphic Lenses

- 1926 - Professor Henri Chrétien applied for a patent on the “Hypergonar anamorphic lens system



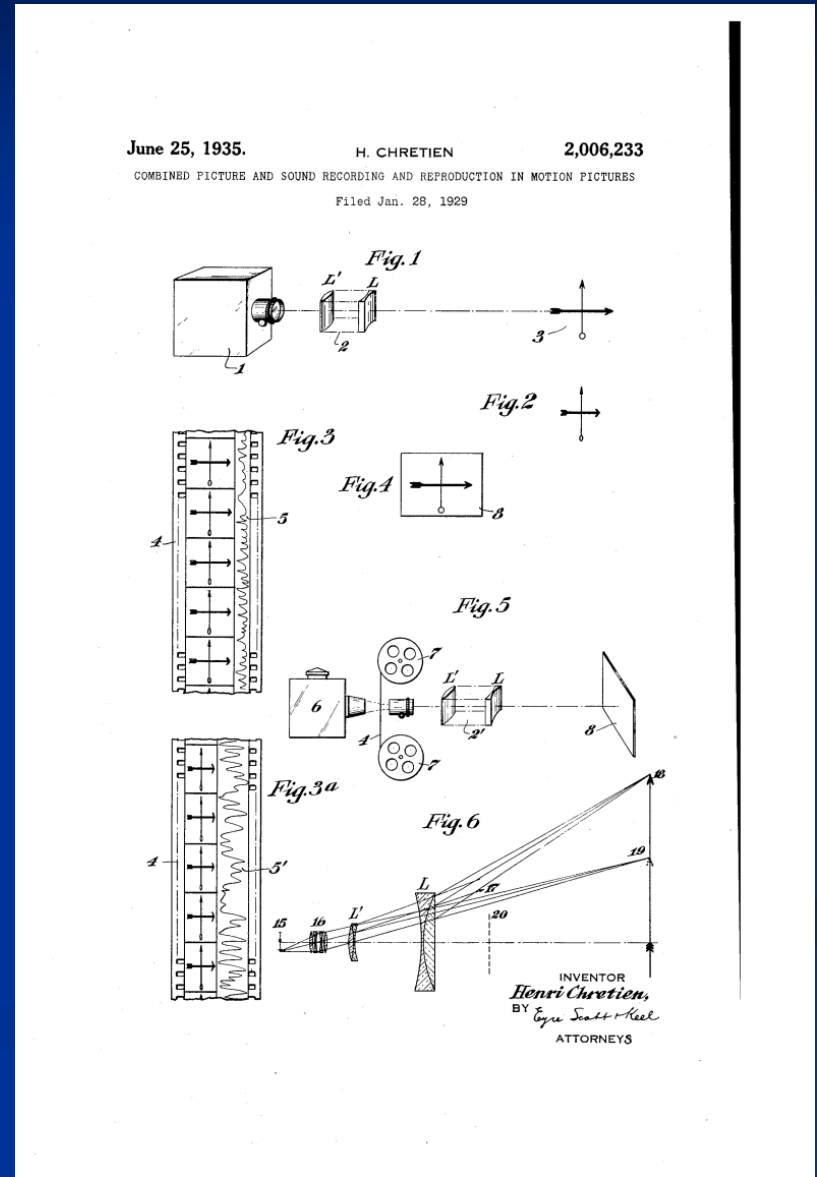
(he had developed the idea for tanks in WW I)

- 1929 - First film was “Construire un feu” The aspect ratio was 2.66:1
- 1937 – He demonstrated it at the Paris World Fair on a 6,500 square foot screen

# The Chretien Patent

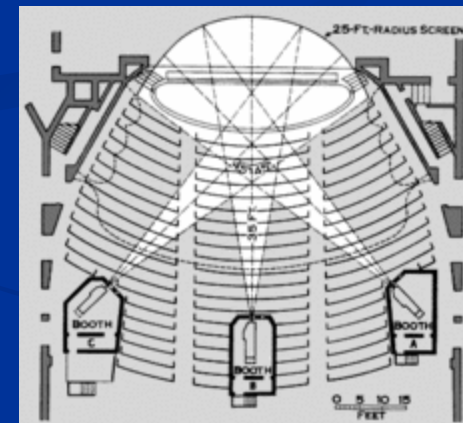
- Patent for:

Combined Picture and Sound Recording and Projection in Motion Pictures



# CINERAMA

- Used three synchronized 35mm projectors
- Deeply curved wide screen image
- 6 track magnetic sound



# Cinemascope

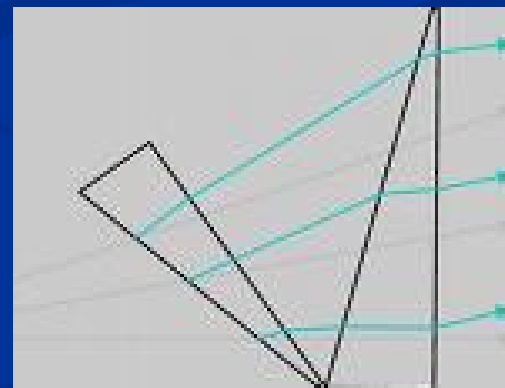
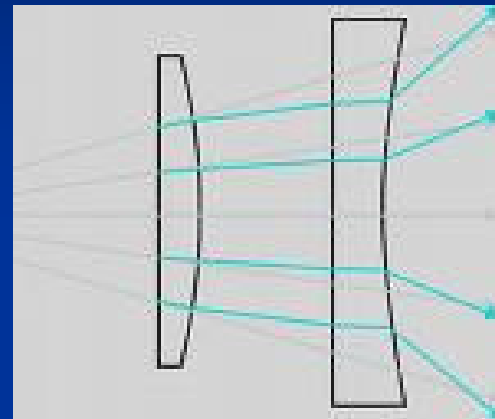
- 1952 – 20<sup>th</sup> Century Fox acquired the patent
- Lenses were made by Bauch & Lomb
- The 20<sup>th</sup> Century Fox process for 35mm film was called “Cinemascope”

# CINEMASCOPE Competitors

- **AgaScope** (a form of CinemaScope from Sweden and Hungary)
- **AgaScope** (a form of CinemaScope from Sweden and Hungary)
- **ArriScope** (a form of CinemaScope from the Arriflex Camera Corp.)
- **ArriVision** (2.35:1 in 3-D)
- **Cinepanoramic** (a form of CinemaScope from France)
- **CinemaScope** (some early titles were 2.66:1 and 2.55:1)
- **CinemaScope 55** (a form of CinemaScope using 55mm film)
- **Cinerama** (2.6:1 to 2.8:1)
- **Cinescope** (a form of CinemaScope from Italy)
- **Colorscope** (various ratios used under this umbrella name)
- **Cromoscope** (a form of Techniscope)
- **Daiescope** (a form of CinemaScope from Japan)
- **Dimension 150** (2.2:1)
- **Duo-Vision** (2.35:1 in split-screen)
- **Dyaliscope** (a form of CinemaScope from France)
- **Euroscope** (a form of CinemaScope)
- **Franscope** (a form of CinemaScope from France)
- **Grandeur** (2:1 approximately)
- **Grandscope** (a form of CinemaScope from Japan)
- **Hammerscope** (a form of CinemaScope from England)
- **J-D-C Scope**
- **Megascope** (a form of CinemaScope from England)
- **Metroscope** (1.66:1 to 2:1)
- **MGM Camera 65** (2.75:1)
- **Natural Vision** (2:1 approximately)
- **Naturama** (a form of CinemaScope)
- **Nikkatsu Scope** (a form of CinemaScope from Japan)
- **Panascop** (2:1)
- **Panavision** (pre-1971: 2.35:1 / post-1971: 2.4:1)
- **Panavision Super 70** (2.35:1 for 35mm prints, 2.2:1 for 70mm)
- **Panoramic(a)** (a form of CinemaScope from Italy)
- **Sc• Realife** (2.1 approximately)
- **Regalscope** (a form of CinemaScope)
- **RKO-Scanoscope** (a form of CinemaScope)
- **Shawscope** (a form of CinemaScope from Hong Kong)
- **Sovscope** (a form of CinemaScope from the U.S.S.R.)
- **Space-Vision** (2.35:1 in 3-D)
- **Spectrascope** (a form of CinemaScope)
- **Superama** (a form of Superscope 235)
- **SuperCinescope** (a form of CinemaScope from Italy)
- **Superpanorama 70** (2.2:1 in 70mm; a form of Todd-AO from Europe)
- **Super Panavision 70** (2.35 for 35mm prints; 2.2:1 for 70mm)
- **Superscope** (2:1)
- **Superscope 235**
- **Super Technirama 70** (2.2:1 in 70mm)
- **Super Techniscope** (1.85:1 to 2.35:1; a variable process - same as Super 35)
- **Super 35** (1.85:1 to 2.35:1; a variable screen-size process)
- **SuperTotalscope** (a form of CinemaScope from Italy)
- **System 35** (1.85:1 to 2.35:1; a variable process - same as Super 35)
- **Technirama**
- **Techniscope**
- **Technovision**
- **Todd-AO** (2.2:1)
- **Todd-AO 35**
- **Toeiscope** (a form of CinemaScope from Japan)
- **Tohoscope** (a form of CinemaScope from Japan)
- **Totalscope** (a form of CinemaScope from Italy)
- **Totalvision** (a form of CinemaScope from Italy)
- **Ultra Panavision 70** (2.75:1)
- **Ultrascope** (a form of CinemaScope from Germany)
- **Vistarama** (a form of CinemaScope)
- **Vistascope** (a form of Superscope)
- **VistaVision** (ranges from 1.66:2 to 2:1; a variable ratio)
- **Vitascope** (2:1 approximately)
- **WarnerScope** (a form of CinemaScope)
- **Warwickscope** (a form of CinemaScope from England)

# Two Types of Anamorphics

- Cylindrical Anamorphic System (Schneider Type)  
Focusable
- Prism Anamorphic System (Panamorph Type)  
Not Focusable



# Cinemascope Camera Lenses

- A 35mm Motion Picture Camera is equipped with a cylindrical lens (anamorphic lens) which squeezes the image horizontally 2 to 1 onto the film. These are often zoom lenses with built in anamorphic sections



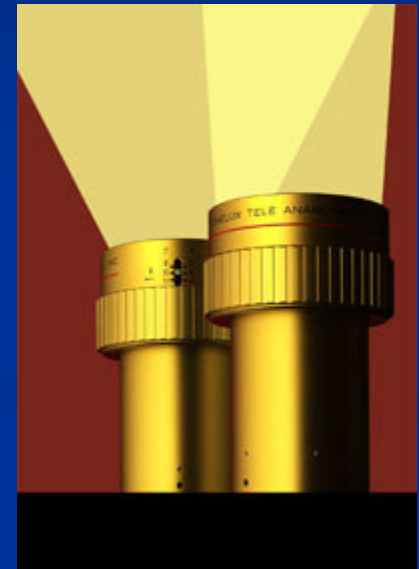
A cylindrical lens element – good anamorphic lenses have at least 4 of these lens elements



Panavision anamorphic camera lenses  
“Filmed in Panavision”

## Anamorphic Projection Lenses for 35mm Film projection

- People are thinner on the film, cars are shorter by 2x.
- A cylindrical lens (anamorphic lens) is used on the 35mm film projector to unsqueeze the image
- The aspect ratio on the screen is 2.39:1  
common usage is 2.35:1 2.4:1 is NOT correct





## Aspect ratio (image)

### From Wikipedia

The **aspect ratio** of an image is its displayed width divided by its height (usually expressed as “ $x:y$ ” or “ $x\times y$ ,” with the joining colon or multiplication symbol articulated as the preposition “by” or sometimes “to”). For instance, the aspect ratio of a traditional television screen is **4:3**, or 1.33:1.

High-definition television and European digital television use an aspect of **16:9**, or about 1.78:1. Aspect ratios of 2.39:1 or 1.85:1 are frequently used in cinematography, while the aspect ratio of a sync-sound 35 mm film frame is 1.37:1 (also known as “Academy Aperture” ratio). Silent films, which used the full frame, were shot in 1.33:1.

1.33:1

4:3

1.78:1

16:9

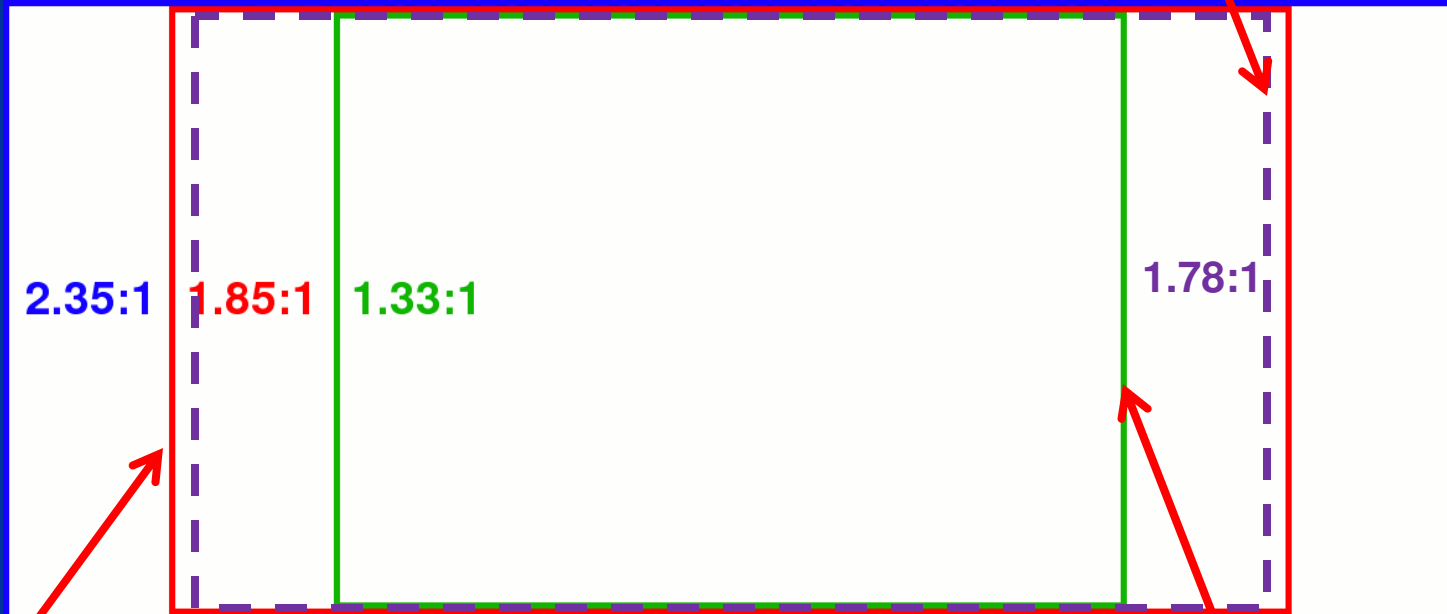
1.85:1

2.39:1

# Common Aspect Ratios

Cinemascope

High Definition 16x9 1.78:1

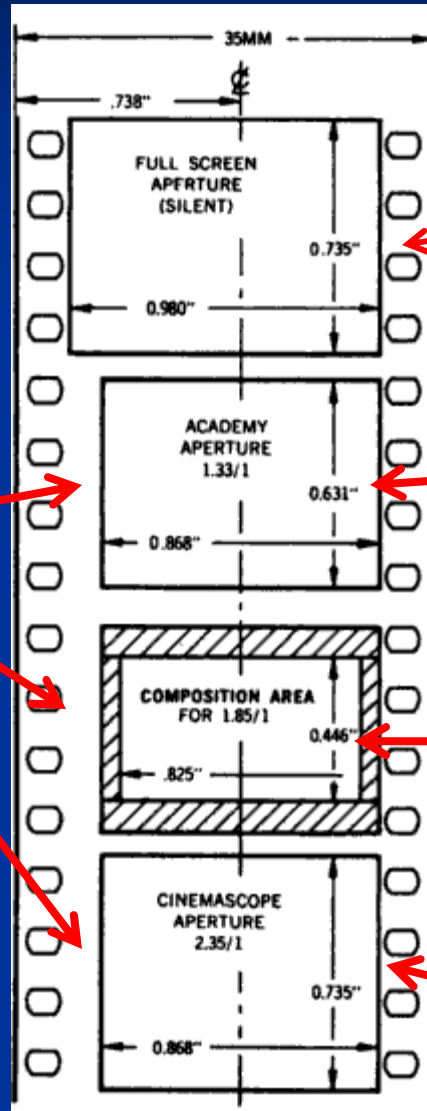


Widescreen 1.85:1 "Flat"

4x3 Standard Def Television

# 35mm Film Formats

Optical  
sound  
track  
goes here



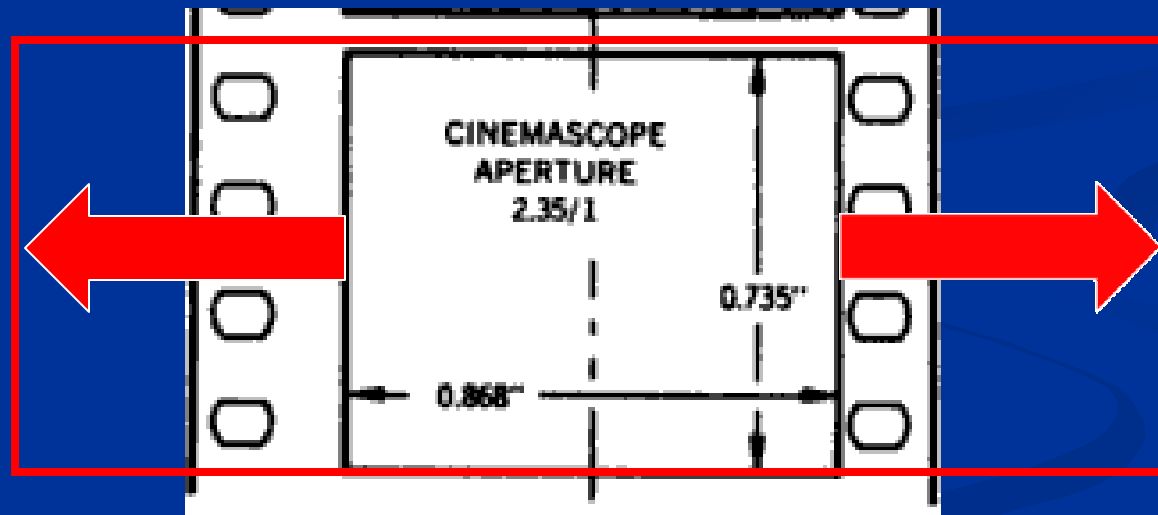
Silent

Academy

1.85 Widescreen

Cinemascope

# 2x Horizontal Expansion of Cinemascope in Projector



## Cinemascope Letterboxed on 16x9 Display Pixel Loss – Wasted Image Area

- 1080p image – 16x9 1.78:1  
 $1080 \times 1920 = 2,073,600$  pixels
- Letterboxed Cinemascope image – 2.35:1  
 $832 \times 1920 = 1,597,440$  pixels
- 33% of the pixels are WASTED!
- 33% of the brightness is wasted