

United States Patent [19] Ramsdale

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[54] REEL FOR PHOTOGRAPHIC SHEET MATERIAL

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242/77.1

[51] Int. Cl. **G03d 3/00**

[58] Field of Search **95/93, 100, 90.5, 98, 89;**
242/77.1

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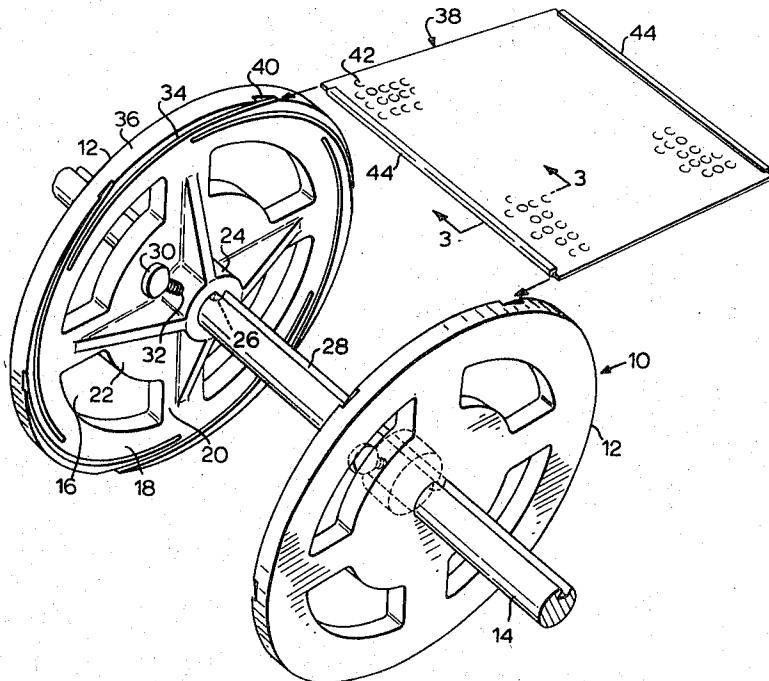
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Attorney, Agent, or Firm—Westell & Hanky

[57] ABSTRACT

A reel for use in processing photographic sheet material, in which a pair of discs are axially mounted on a shaft. The discs have a plurality of opposed, convolute slots which receive the opposed edges of a flexible carrier on which the photographic material may be mounted.

6 Claims, 3 Drawing Figures



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SHEET 1 OF 2

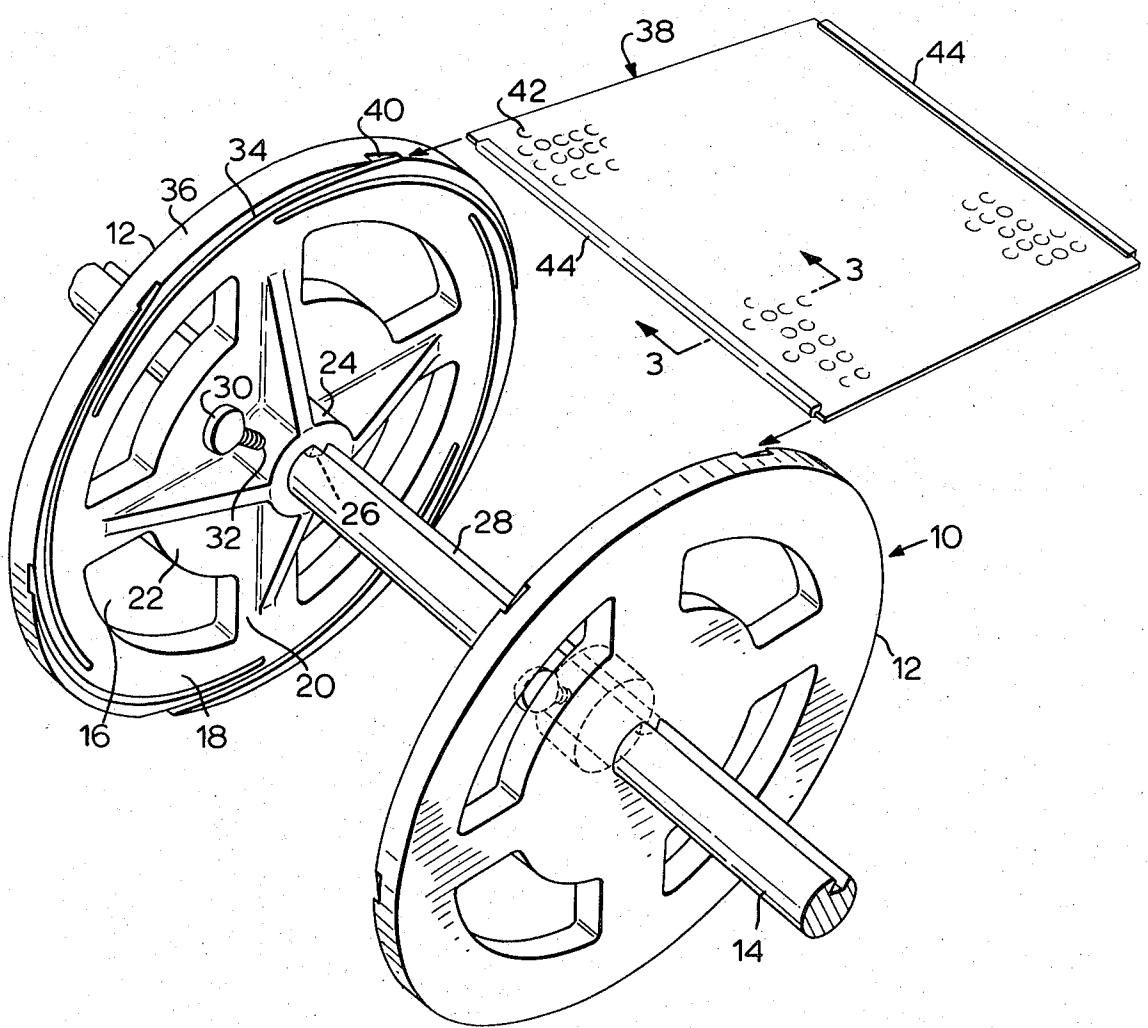


FIG. 1

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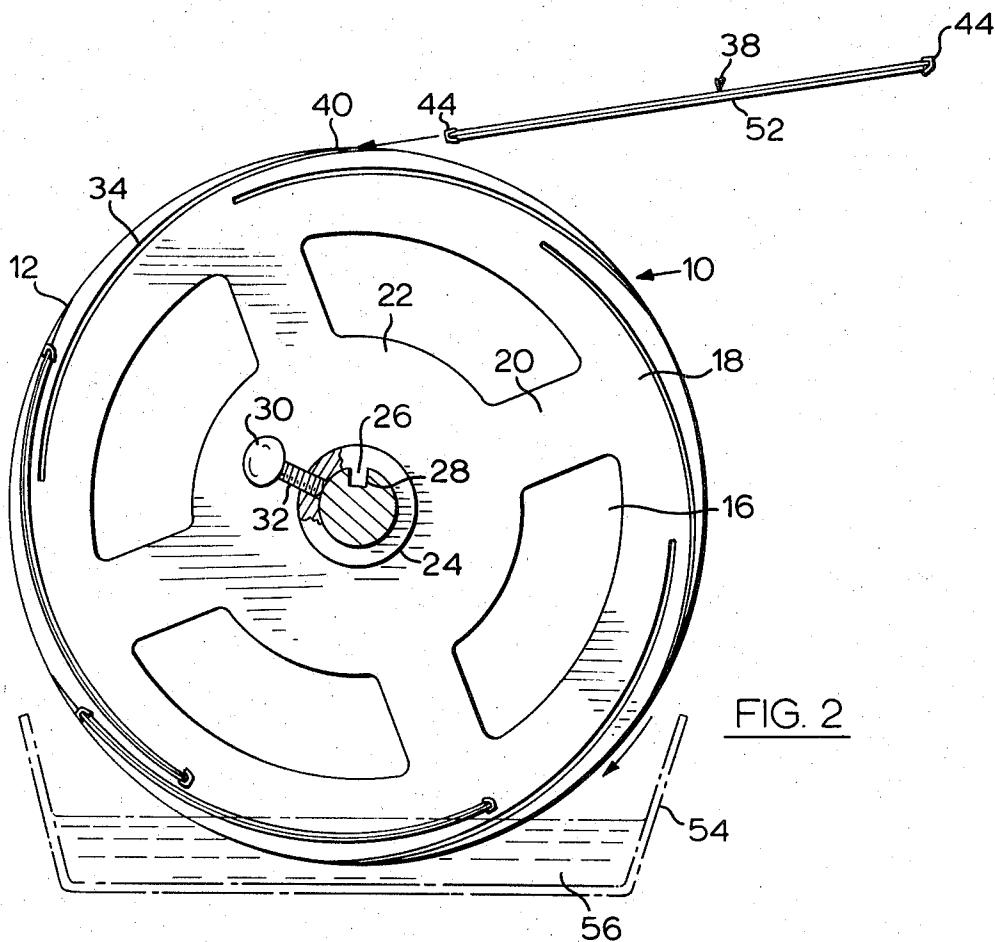


FIG. 2

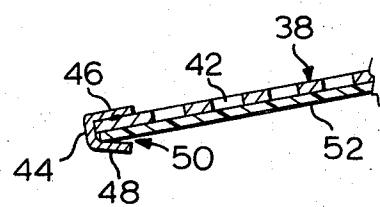


FIG. 3

REEL FOR PHOTOGRAPHIC SHEET MATERIAL

The present invention relates to a reel for use in processing photographic sheet material.

Reels for processing photographic sheet material are used in processing tanks where the sheet material is mounted peripherally on a drum and the drum is mounted co-axially on a shaft whereby the sheet material passes through liquid chemical lying in the bottom portion of the drum as the shaft is rotated. An example of this type of reel is seen in U.S. Pat. No. 3,359,880 issued Dec. 26, 1967 in the name of H. Huss. Another device accomplishing a similar purpose but using a squirrel-cage type of reel is shown in pending U.S. Pat. application No. 292,094 filed Sept. 25, 1972 which is a continuation of abandoned application No. 80,836 filed Oct. 15, 1970 in the name of Raymond J. Masygan, assignor to Alex L. Clark Limited. Both these reels are expensive to manufacture.

It is an object of the present invention to provide a reel for use in processing photographic sheet material which is simplified in construction.

An example embodiment of the invention is shown in the accompanying drawings, in which:

FIG. 1 is a perspective view of a reel for use in processing photographic sheet material, and a carrier for mounting on the reel;

FIG. 2 is an inner side view of one disc of the reel of FIG. 1, including a charged carrier; and

FIG. 3 is a fragmentary cross-sectional view of the charged carrier taken along line 3—3 of FIG. 2.

The example embodiment shown in the drawings consists of reel 10 comprising a pair of flat, circular plates or discs 12 in the form of support members mounted on a co-axial shaft 14. Each disc 12 has a plurality of arcuate gaps 16 which define an outer ring 18, radial spokes 20, and a central portion 22 carrying a hub 24 which has a key 26 slidable in a slot 28 in shaft 14. A thumbscrew 30 engaged in a threaded radial bore 32 in hub 24 releasably clamps each disc 12 to shaft 14. The inner face of each ring 18 (i.e. that face opposing the other disc 12) carries a series of spaced arcuate slots 34 following a convolute path from outer edge 36 of the ring inwardly along a path of predetermined distance which is substantially the length of a rectangular carrier 38 to be inserted in the slot. Preferably slots 34 overlap one another. Each slot 34 terminates at outer edge 36 of ring 18 in an opening 40. Opposing slots 34 in discs 12 are aligned one with the other and the discs are spaced apart on shaft 14 a distance substantially equal to the width of carrier 38 less the combined depths of a pair of opposing, aligned slots 34.

Carrier 38 consists of a plate-like sheet of form-retaining, flexible material such as polyvinylchloride which is perforated over its surface with a plurality of apertures 42. Each end of carrier 38 is inserted in a channel 44 with one leg 46 of the channel fixed to the carrier and the other leg 48 angled outwardly to form a slot 50 between the leg and the carrier. The length of each channel 44 is slightly less than the distance between discs 12.

In the operation of the described embodiment a sheet 52 of photographic material having a length substantially equal to the length of carrier 38 and a width no greater than the length of each channel 44 is inserted into slots 50 formed at each end of the carrier by the channels, with the back of the sheet resting against the

carrier. With sheet 52 facing inwardly towards shaft 14, carrier 38 is mounted on discs 12 by fitting the corners of one end of the carrier into openings 40 of a pair of aligned slots 34 in discs 12 and sliding the carrier into the slots to abut their inner ends. In following the path of slots 34, carrier 38 is bowed and the tendency of the carrier to return to its flat configuration retains the carrier in the slots.

Reel 10, thus loaded with one or more spaced sheets 52 of photographic material, may be set into a processing tank 54 having a pool 56 of processing liquid in its bottom portion. On rotation of shaft 14, each carrier 38 and its mounted sheet 52 passes evenly through the liquid with little or no turbulence. Aperture 42 ensure contact of the liquid with the back of sheet 52.

By overlapping slots 34 on outer ring 18 a greater number of carriers 38 may be loaded onto reel 10.

It will be appreciated that the reel of this invention enables carrier 38 to be withdrawn in order to re-expose film 52 without having to take the film off the carrier, which saves handling time.

I claim:

1. A reel assembly for processing photographic sheet material, comprising:
 - a horizontally disposed rotatable shaft,
 - a pair of opposed laterally spaced film carrier support members axially mounted on the shaft,
 - the support members each having a corresponding generally annular-shaped film carrier area disposed adjacent to the outer periphery of the film carrier support members,
 - the annular-shaped film carrier area at its inner limit being spaced a substantial radial distance from the shaft axis,
 - a plurality of spaced sets of film carrier mounting means on the opposed surfaces of the film carrier support members and disposed within the generally annular-shaped film carrier area,
 - a plate-like film carrier member on which photographic film can be mounted which is disposed on each set of film carrier mounting means and extends between the film carrier support members in a generally circumferential direction and between the corresponding generally annular-shaped film carrier areas,
 - the outer edge of each film carrier being disposed adjacent to the outer periphery of the generally annular-shaped film carrier areas,
 - the surface of the plate-like film carrier members being disposed at a small angle with respect to the outer periphery of the generally annular-shaped film carrier areas so that the inner and rearward edge thereof is displaced a slight distance radially inward from the outer periphery of the generally annular-shaped area and adjacent to the inner limit of said area, and
 - i. the film carrier members being spaced from each other to permit developer fluid to slip between them with little or no turbulence when the reel assembly is rotated.
2. The reel assembly for processing photographic sheet material as set forth in claim 1, wherein:
 - the film carrier includes a sheet of readily removable plastic material, and
 - the film carrier has fastening means for holding the film to the film carrier.

3. The reel assembly for processing photographic sheet material, as set forth in claim 2, wherein:

a. the film carrier members have means for permitting increased developer contact with the photographic film.

4. The reel assembly for processing photographic sheet material, as set forth in claim 1, wherein:

a. adjacent film carrier members overlap and are radially spaced from each other.

5. The reel assembly for processing photographic sheet material as set forth in claim 1, wherein:

a. the film carrier support members are circular discs,

b. the sets of film carrier mounting means include an arcuate opposed continuous groove in each support member which is open at the outer end thereof adjacent the periphery of the discs and extend at a small angle inwardly to a point adjacent the inner limit of the annular-shaped film carrier area of each disc.

6. The reel assembly for processing photographic sheet material as set forth in claim 1, wherein:

a. gaps are provided through the mounting means between the shaft and inner limit of the annular-shaped film carrier means.

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