Sept. 26, 1939. W. F. KNEBUSCH ET AL 2,173,847

TRANSFER MECHANISM

Filed July 11, 1936

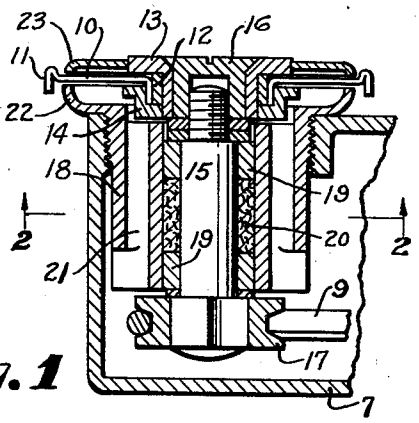


Fig. 1

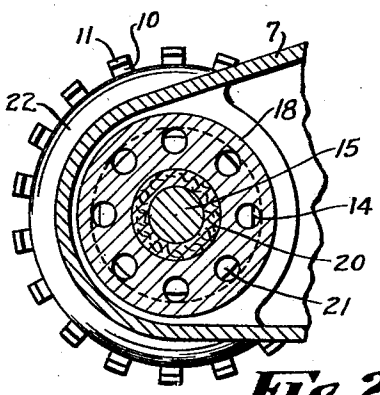


Fig. 2

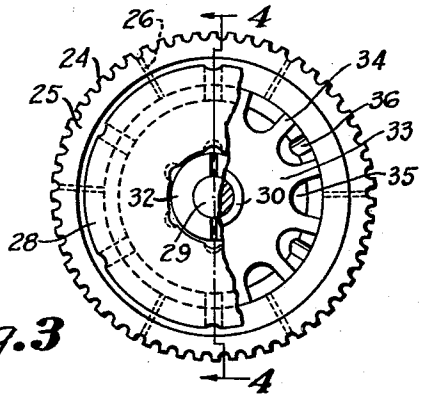


Fig. 3

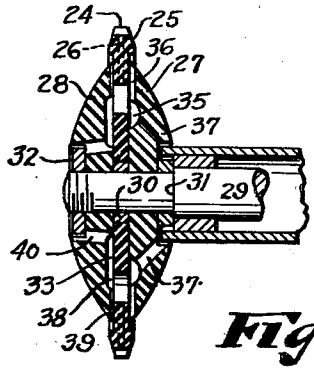


Fig. 4

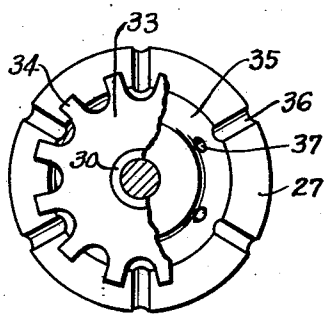


Fig. 5

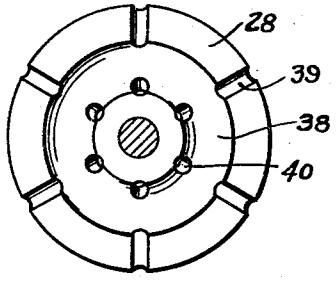


Fig. 6

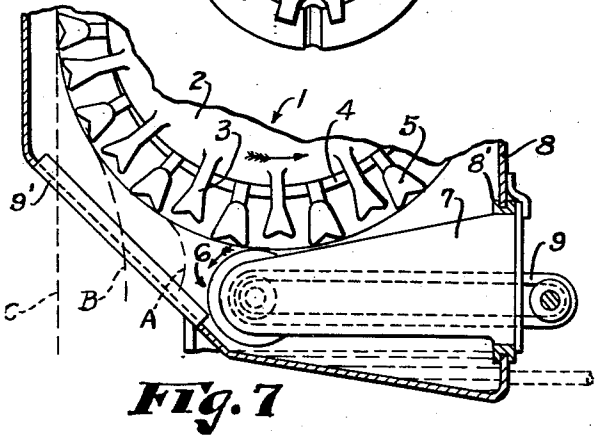


Fig. 7

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TRANSFER MECHANISM

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Application July 11, 1936, Serial No. 90,222

10 Claims. (Cl. 18—8)

This invention relates to a transfer mechanism.

This application is in part a continuation of copending application Serial No. 47,884, filed November 1, 1935, itself a division of Patent No. 2,067,881, and in part a continuation of copending application Serial No. 78,000, filed May 5, 1936. In these prior applications are disclosed rotary transfer mechanisms embodying radially extending elements adapted to engage thread or the like which is being wound on a rotating cylindrical surface. By engaging with the thread or the like, these elements form a new leading end lending itself to removal from the rotating cylindrical surface for transfer, if desired, to another rotating cylindrical surface. The present invention provides means serving to deliver a current of air to these thread-engaging elements to assist in the removal and transfer of the new leading end.

As in these prior applications, the transfer mechanism of the present invention is disclosed in association with reels which operate to advance thread or the like in the form of a succession of helical turns. A reel of this general character is disclosed in prior application Serial No. 652,089, filed January 16, 1933, and, as there shown, may comprise two cage members made up of axially extending interdigitating bars, the cage members being mounted for rotation about axes both offset and canted or askew with respect to each other. As the bars of the respective cage members move relatively to each other in consequence of this offset relation of the axes, the turns of threads or the like are alternately picked up and dropped by each set of bars, the turns due to the canted relation of the axes being dropped onto the bars slightly forward of the position which they last occupied. This results in travel of the thread or the like lengthwise of the reel until the thread or the like has come to the end thereof and is ready to be transferred to another similar reel.

Reels of this character may be used to advantage in the production of artificial filaments, as, for example, artificial silk thread, by processes such as the cuprammonium, cellulose acetate, cellulose nitrate and viscose processes, each of which employs a number of separate treatment steps. Thus in the viscose process of making artificial silk thread, the thread may be washed, desulphurized, bleached, etc., each operation being performed while the thread is passing over a separate reel. The method is continuous in that the thread winds automatically in approximately helical form along a given reel, runs from this reel onto the next reel, travels along the second reel in the same manner and so on until the finished thread is taken up on a packaging device. While the transfer mechanism of the present invention is especially valuable in connection with methods for the continuous production of artificial silk thread from viscose in which reels of this character are employed and will be more particularly described hereinafter in this relation, no limitation is thereby implied.

In the accompanying drawing, which illustrates two related embodiments of the invention, Figure 1 is a sectional plan of one of said embodiments, and Figure 2 is a sectional elevation from the line 2—2 of Figure 1. Figure 3 is a side elevation of the second embodiment of the invention with parts broken away; Figure 4 is a vertical section on line 4—4 of Figure 3, partly in elevation; Figure 5 is a side elevation corresponding generally to Figure 3 with certain of the elements thereof removed and a portion of one of the remaining elements broken away; Figure 6 is an elevation of the inner face of the member 27 of Figures 3 and 4; and Figure 7 is a fragmentary elevation of a transfer mechanism constructed in accordance with the invention mounted in operative relation to a thread-processing reel.

Referring first to Figure 7 of the drawing, reel 1 consists of a cylindrical cage member 2, carrying longitudinally extending bars 3, and a cylindrical cage member 4, carrying bars 5, the bars of the two sets moving relatively to each other due to the lateral offsetting of their respective axes of rotation. As the turns of thread reach the end of the reel, they encounter transfer wheel 6, illustrated as of the type shown in Figures 1 and 2, mounted on bracket 7. This bracket is mounted in reel housing 8 by means of a rubber gasket 3' and may be adjustable with respect to the reel. A belt 9 drives the transfer wheel from a suitable source of power (not shown). The transfer wheel 6 is rotated in the same angular direction as the reel 1 in order that the thread-engaging elements may move in the opposite direction to the bars 3 and 5 at the point of contact to effect severance of the thread and detachment of the severed end from the reel. The newly formed leading end drops through the opening 9' in the reel housing 8 to contact with the surface of another reel therebelow or otherwise disposed in proximity to reel 1.

Referring first to Figures 1 and 2 of the drawing, the thread-engaging means of the transfer mechanism are formed at the outer ends of blades 10 by bending or coining the blade so as

to form heads 11 extending axially of the transfer mechanism. The inner ends of these blades are mounted upon a yielding annular member 12, preferably of rubber, carried between annular members 13 and 14. This provides a resilient mounting for the blades 10 while retaining them in assembled relation. To secure the annular members 13 and 14 to the shaft 15, they are mounted upon a nut 16 screw-threaded upon one end of the shaft. This shaft is rotated by the belt 9 which passes over a pulley 17 secured to the opposite end of the shaft. Shaft 15 is rotatably mounted in a bearing block 18 which may be detachably connected to the bracket 7 by means of the screw threads shown. To reduce friction, the shaft may turn within bushings 19 positioned on opposite sides of a felt oil retainer 20.

Through bearing block 18 are formed a plurality of axially extending passageways 21 which open into the interior of the bracket 7. Projecting outwardly from the bearing block 18 is a shroud member 22 the periphery of which extends to a point close to the blades 10. A similar shroud member 23 is attached to the annular member 13 to be rotated therewith. These two shrouds coact to deliver air adjacent the heads 11 constituting the thread-engaging means and, due to the recessed formation of the shrouds, adequate passage for air is thereby provided.

In operation, contact of the heads 11 against the bars of reel 1 sever the thread thereon so as to form a new thread end. Because of the presence of the resilient member 12, only a slight shock occurs upon these bars and wear upon the bars is minimized. Rotation of the blades 10 sets up considerable windage, the shrouds 22 and 23 confining and directing the resulting current of air. The newly formed thread end is to a certain extent blown away from the reel and also away from the transfer mechanism, passing through the successive stages indicated generally by the broken lines A, B and C. If the current of air which is created by the blades 10 alone is not sufficient to remove the thread end, air under pressure may be supplied to the interior of bracket 7. This air will pass through the openings 21 directly to the space between the shrouds 22 and 23 to be delivered to the thread-engaging means.

Referring to Figures 3 to 6, inclusive, the thread transfer mechanism therein shown consists of a transfer wheel having thread-engaging elements 24 formed upon the periphery of an annular member 25 by means of spaced notches extending transversely of the same. If desired, the outer portion of the annular member 25 may be somewhat enlarged, as shown in Figure 4, for strengthening purposes and for the purpose of providing wider thread-engaging surfaces upon the elements 24. Extending radially from the inner to the outer peripheral faces of the annular member 25 are ducts 26 for the passage of air.

Annular member 25 is preferably disposed between an outer disk-like member 27 and a similar inner disk-like member 28 carried upon the projecting end of a shaft 29. Disposed between these disk-like members 27 and 28 is a washer 30 which serves to separate the disk-like members a sufficient distance to allow free movement of annular member 25. To urge disk-like members 27 and 28 and washer 30 toward the shoulder 31 of the shaft and thereby clamp them in place, a nut 32 is screw-threaded upon the end of the shaft.

Positioned between disk-like members 27 and 28 and extending from washer 30 to the inner peripheral face of the annular member 25 is a stelliform body 33 of resilient material. Transverse notches are formed in the outer periphery thereof in order to provide spaced projections 34 which bear against annular member 25, thereby serving as a yielding support therefor and tending to maintain the same in concentric relation to shaft 29. It has been found that ordinary vulcanized rubber, because of its elastic qualities, is well adapted for the material of stelliform body 33.

To deliver a current of air adjacent the thread-contacting elements, the inner face of disk-like member 27 is formed with an annular channel 35 from which lead radially extending grooves 36. Openings 37 extending from the inner to the outer face of disk-like member 27 communicate with annular channel 35. Disk-like member 28 is similarly formed with an annular channel 38, radial grooves 39, and openings 40. In operation, openings 37 and 40 supply air to the channels 35 and 38, from which it is distributed to grooves 36 and 39, and by them to the spaces between the projections 34 of stelliform body 33. Since ducts 26 in annular member 25 open into these spaces, air from these spaces passes directly through ducts 26 to thread-engaging elements 24. Air passing through grooves 36 and 39 is caused to escape adjacent the thread-engaging elements 24. The current of air so developed tends to blow the thread away from the transfer wheel in the manner described, facilitating the transfer of the thread.

Numerous changes may of course be made in the construction of these devices without in any way departing from the spirit of the invention. In this respect it is apparent that an element disclosed in one embodiment of the invention may be substituted for a corresponding element in the other embodiment; for example, instead of the shroud 23 in Figure 1, a shroud similar to 28 in Figure 6 may be employed. In such a construction the space between shrouds 22 and 23 of Figure 1 would communicate with the atmosphere directly through openings corresponding to 40 in shroud 28. Various other arrangements of air passages may be employed, with or without means for furnishing air under pressure, as, for example, to the interior of bracket 7 in the construction illustrated in Figures 1, 2 and 7.

It is intended that the patent shall cover, by suitable expression in the appended claims, whatever features of patentable novelty reside in the invention.

What is claimed is:

1. A rotatable thread transfer mechanism comprising a series of thread-engaging means, and, associated therewith, means for directing a current of air toward said thread-engaging means.

2. A rotatable thread transfer mechanism comprising a carrier member and, carried thereby, a series of thread-engaging means, said carrier member having means to direct a current of air toward said thread-engaging means.

3. A rotatable thread transfer mechanism comprising a disc-shaped carrier member, and, disposed about the periphery of said member, a series of thread-engaging means, said disc-shaped carrier member serving to conduct a current of air to said thread-engaging means.

4. A rotatable thread transfer mechanism having a series of circumferentially disposed thread-engaging means, and, associated therewith, radial air passages opening adjacent said thread-engaging means.

5. A rotatable thread transfer mechanism comprising a series of spaced thread-engaging means having air passages between adjacent thread-engaging means.

6. A rotatable thread transfer mechanism comprising a wheel having peripherally disposed thread-engaging means, said wheel being of hollow construction and having passageways to conduct a current of air to said thread-engaging means.

7. A rotatable thread transfer mechanism comprising an annular member the periphery of which is serrated to provide thread-engaging means, said annular member having passageways therethrough which open at the periphery thereof to deliver air to said thread-engaging means.

8. A rotatable thread transfer mechanism comprising a series of thread-engaging means, a plurality of separate radial elements supporting said thread-engaging means in circumferential relation, and means serving to direct a current of air to the spaces between said elements for delivery to said thread-engaging means.

9. A rotatable thread transfer mechanism comprising a shaft, a bearing block rotatably supporting said shaft, a plurality of thread-engaging means mounted upon said shaft adjacent the bearing block, said bearing block having apertures serving to conduct a current of air for delivery to said thread-engaging means.

10. A rotatable thread transfer mechanism comprising a shaft, a bearing block rotatably supporting said shaft, a carrier member mounted upon said shaft adjacent the bearing block, and a plurality of thread-engaging means carried by said carrier member, said bearing block having apertures serving to conduct air to said carrier member and said carrier member having passageways therethrough for receiving air from said apertures and directing the same to said thread-engaging means.

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