Nov. 16, 1948. H. FLATER ET AL 2,453,789

TWINE MAKING MACHINE

Original Filed June 15, 1946 2 Sheets-Sheet 1

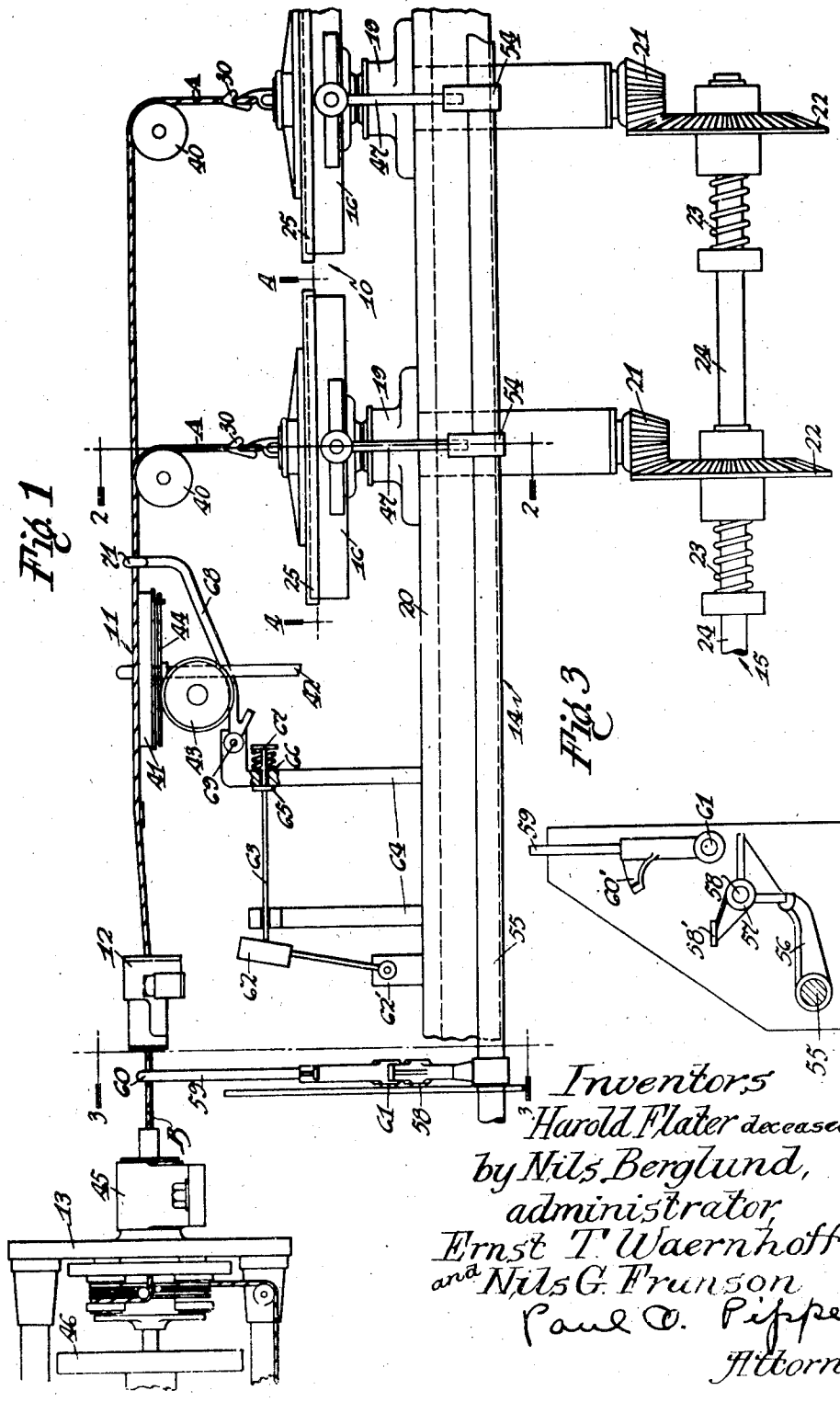

Fig. 1

Fig. 3

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Fig. 1

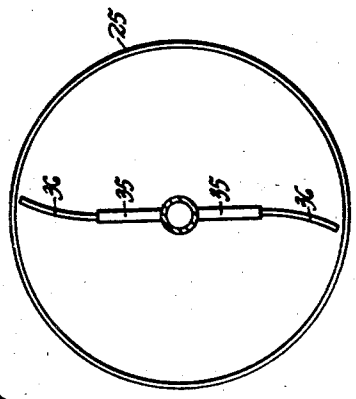

Fig. 2

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2,453,789

TWINEMAKING MACHINE

Harold Flater, deceased, late of Norrkoping, Sweden, by Nils Berglund, administrator, Djursholm, Sweden, and Ernst Teodor Waernhoff and Nils Gunnar Franson, Norrkoping, Sweden; said Harold Flater and said Ernst Teodor Waernhoff and Nils Gunnar Franson, assignors to International Harvester Company, a corporation of New Jersey

Original application June 15, 1946, Serial No. 677,020. Divided and this application December 9, 1947, Serial No. 790,644. In Sweden June 25, 1945

12 Claims. (Cl. 57—31)

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This application is a division of our co-pending application Serial No. 677,020, filed June 15, 1946, now Patent No. 2,450,947, October 12, 1948.

This invention relates to an improvement for a twine making machine and more particularly to an improved apparatus for making multiple strand twine. More specifically, it relates to an improved spinning disc construction for a multiple strand twine making machine. The prime object of this invention is to provide an improved spinning disc for twisting paper twine, said disc including a novel former for guiding paper strip to a twisting finger.

Another object is to provide an improved spinning disc for twisting paper twine, said spinning disc including a hinged cover stationarily positioned with respect to said disc and supporting a twisting finger rotatably mounted thereon.

A still further object is to provide an improved spinning disc for twisting paper twine, said spinning disc including a twisting finger and improved means for rotating said twisting finger.

Still another object is to provide an improved spinning disc for twisting paper twine, said spinning disc including a twisting finger rotatably mounted above a rotatable receptacle, and resilient means between said receptacle and the twisting finger whereby the twisting finger may be rotated upon rotation of the receptacle.

Other objects will become more readily apparent from the embodiment of the invention which is illustrated in the following description and shown in the accompanying drawings, wherein:

Figure 1 is a side elevational view of a twine-making machine.

Figure 2 is a sectional view taken along the line 2—2 of Figure 1.

Figure 3 is an elevational view of a portion of a braking means for a twine-making machine, said view being taken along the line 3—3 of Figure 1.

Figure 4 is a sectional view taken along the line 4—4 of Figure 1, showing a cover member for a spinning disk.

Referring particularly to Figure 1, a twine-making machine generally consists of a plurality of spinning disks 10 for individually twisting paper strip into paper strands. The twisted strands are guided over a rotating impregnating disk generally indicated by the reference character 11. From the impregnating disks the strands are carried to a twisting guide means 12 where they come together and are subsequently twisted into multiple strand twine by a twisting flyer 13. A braking or cutting-off mechanism for the individual spinning disks 10, is generally indicated by the reference character 14. A drive mechanism 15 is operatively connected to the disks for rotating the same.

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Each of the spinning disks 10 consists of an annular receptacle 16 which is mounted for rotation on a spindle 17. The spindle 17 is journaled in a bearing 18 mounted on a casing 19 which is carried on a support 20. The lowermost portion of the spindle 17 is keyed to a driven member 21 which operatively engages a driving member 22. The driving member 22 is resiliently held against the driven member 21 by means of a spring 23 and is keyed to a longitudinal drive shaft 24.

A stationary cover or closure member 25 is positioned above the receptacle and is connected to a bracket 25'. The bracket 25' is pivoted at 26 to a support 27. A former 28 is centrally positioned on the cover member 25 and is journaled with respect thereto in a bearing 29 mounted in the bracket 25'. A twisting finger 30 is screwed to the former 28 for rotation therewith. A cap plate 31 is connected to the bracket 25' for fastening the former 28 and the bearing 29 to the cover 25.

The former 28 includes a vertical bore 32 in axial alinement with a slot 33 of the twisting finger 30. The bore 32 is in communication with a cup-shaped socket 34 formed at the lowermost portion of the former 28.

A pair of radially extending arms 35 are rigidly connected to the former 28 and include radially extending resilient members 36, said members preferably consisting of a spring-like material. The resilient members 36 are adapted to engage the inner periphery 37 of the receptacle 16 when the cover 25 is in the closed position shown in Figure 2. The spindle 17 is provided at its uppermost end with a conical portion 38 which extends into the receptacle 16 and substantially projects into or mates with the cup-shaped portion 34 of the former 28. A support 39 is mounted on the bracket 25' and has journaled thereon a pulley or guide wheel 40.

The impregnating means 11 consists of a rotating disk 41 mounted for rotation about a vertical axis on a shaft 42. A drive means 43 is mounted for rotation about a transverse axis and is adapted to engage the clutch plate 44 thereby imparting rotating movement to the disk 41.

The twisting flyer 13, of conventional design, is supported at one end by a bracket 45. A bobbin or reel 46 is associated with the flyer 13 for collecting the twisted twine.

The braking or cut-off mechanism 14 is best shown in Figures 1 and 2 and consists of a brake shoe 46' adapted to engage the outer periphery of the receptacle 16. A bell-crank 47 is mounted for pivotal movement on a support 48. The upper end of the bell-crank 47 is pivotally connected to a rod 49 which is slidably connected to the brake shoe 46'. A collar 50 having a slot 51 is formed integrally with the brake shoe 46 and is adapted to slide along the rod 49. A spring 52 is adapted to normally compress the brake shoe 46 against the external periphery of the receptacle 16. The amount of compression exerted by the spring 52 is adjustable by means of a threaded member 53. The lower portion of the bell-crank 47 is in operative connection with a cam 54 keyed to a longitudinal shaft 55.

Referring to Figures 1 and 3, it can be seen that the longitudinal shaft 55 is keyed to a crank arm 56. The crank arm 56 is in operative connection with a rotating stop 57 which is pivoted about a transversely extending shaft 58. The stop 57 includes a contact element 58'. A drop arm 59 has at its uppermost portion a loop 60 and is provided with a contact member 60'. The multiple strand twine extends through the loop 60 and holds the drop arm 59 in the upright position indicated in Figure 1. Upon breaking of the twine, the drop arm 59 is adapted to rotate about a transverse shaft 61.

A weighted arm 62 is pivotally connected to a bracket 62'. The weighted arm 61 is held in an over-center position by means of a rod 63 slidably carried in supports 64. A shoulder 65 limits the sliding movement of the rod in one direction. A spring 66 encircles one end of the rod 63, said spring being in abutment with one of the supports 64 and a contact member 67 formed at the end of the rod 63. A drop arm 68 is pivotally connected about a transverse axis as indicated at 69, said arm being provided with a loop 71 through which the twisted strands of twine may be guided.

Referring particularly to the operation of applicants' machine, a plurality of spinning disks 10 are driven by the longitudinal drive shaft 24. As shown in Figure 2, the paper strip is unraveled from the spool, and by virtue of the conical portion 38 of the spindle 17, is guided into the cup-shaped socket 34 of the former 28. The pointed end of the spindle partially forms or shapes the paper before it enters into the cup shaped socket 34. The paper is then further formed in the bore 32 and is thereupon twisted by the twisting finger 30 into individual twisted strands. Movement of the former and twisting finger is accomplished by the resilient members 36. As can be seen in Figure 2, these resilient members grip the internal periphery of the receptacle 16 when the cover 25 is in the closed position. Thus rotary movement of the receptacle 16 is imparted to the twisting finger and the former. In view of the contact between the resilient members 36 and the receptacle 16, the twisting finger and former can be positively driven. If during the operation the paper becomes slightly distorted or wedged in the twisting finger or former, the resilient member 36 will slip with respect to the receptacle 19. Thus the twisting finger may stop rotation and there is therefore less possibility of the paper strip tearing or breaking whenever these slight distortions occur. Breaking or tearing of the paper is an infrequent occurrence in applicants' machine.

Each twisted strand is guided over a pulley 40 and over the impregnating disk 41. The impregnating disk is suitably driven about a vertical axis. A dry lubricant or other moisture resisting material such as wax is carried by the impregnating disk, and as the strands A pass over this disk, the peripheral surface of each strand is adequately and efficiently impregnated. The strands A then are carried to the guide means 12 where they are brought together and subsequently twisted into a finished multiple strand twine B by the flyer 13 as best indicated in Figure 1.

The spring 52 normally tends to lock the brake shoe 46 against the outer periphery of the receptacle. The brake shoe is held away from the spinning disks by means of the stop member 57 which locks the crank arm 56 and the longitudinal shaft 55 against counter-clockwise movement. It is desirable to immediately stop rotation of the spinning disks if at any time the strands A or the twine B should become severed or broken. Provided the strand A is severed, the drop arm 68 will rotate and engage the member 67, pushing said member longitudinally to effect dropping movement of the weight 62. The weight 62 thereupon drops upon the contact element 58' of the stop 57. This causes the stop 57 to rotate thereupon releasing the crank arm 56 and the longitudinal shaft 55 for counter-clockwise movement. The spring 52 thereupon is free to force the brake shoe against the receptacle. Should the multiple strand twine B be broken, the drop arm 60 will be free to rotate from its vertical position and the contact element 60' will engage the contact element 58' to rotate the stop 57, thus disengaging the stop member from the crank arm 56.

It can thus be seen that the objects of the invention have been fully achieved in the embodiment disclosed, and it must be understood that various modifications may be made which do not depart from the spirit of the invention as disclosed nor as defined in the appended claims.

What is claimed is:

1. A spinning disk comprising a rotatable receptacle adapted to rotatably support a spool of strip material, a spindle connected to rotate said receptacle, and a stationary cover hingedly connected to close said receptacle, said cover including a former rotatably carried thereon, said former being provided with a narrow annular bore in junction with an enlarged cup-shaped opening in communication with the interior of the receptacle.

2. A spinning disk comprising a rotatable receptacle adapted to rotatably support a spool of strip material, a spindle connected to rotate said receptacle, and a stationary cover hingedly connected to close said receptacle, said cover including a former rotatably carried thereon, said former being provided with a narrow annular bore in junction with an enlarged cup-shaped opening, said cup-shaped opening being in communication with the interior of the receptacle and adapted to initially form the strip material.

3. A spinning disk comprising a rotatable receptacle adapted to rotatably support a spool of strip material, a spindle connected to rotate said receptacle, a stationary cover for said receptacle, said cover including a former rotatably carried thereon, said former being formed with a narrow annular bore in junction with an enlarged cup-shaped opening, said cup-shaped opening being in communication with the interior of the receptacle and adapted to initially form the strip material, and a twisting finger connected to the former and constructed and arranged to rotate

with respect to said cover and to twist said strip material into a twisted strand.

4. A spinning disk comprising a rotatable annular receptacle adapted to rotatably support a spool of strip material, a spindle connected to rotate said receptacle, a stationary cover for said receptacle, said cover including a former mounted for rotation thereon and having means through which the strip material may be drawn including a cup-shaped opening in communication with said receptacle and a substantially narrow bore in junction with said opening, said opening and said bore providing means for initially forming and guiding said strip material, and means rotatable with respect to said cover for twisting said material into a twisted strand.

5. A spinning disk comprising a rotatable annular receptacle adapted to rotatably support a spool of strip material, a former rotatably associated with said receptacle and having means through which said strips may be drawn including a cup-shaped opening in communication with the receptacle and in junction with a substantially narrow bore, said opening and said bore providing means for initially forming said strip material, and means for twisting said material into a twisted strand, a cylindrical pointed rotatable member positioned axially of said cup-shaped opening and having a portion projecting substantially upwardly therein, and means for twisting said strip material into a twisted strand.

6. A spinning disk comprising a rotatable annular receptacle arranged to rotatably support a spool of strip material, twisting means arranged above said receptacle, means for rotatably supporting said twisting means independently of said receptacle, a former arranged to rotate with said twisting means, said former having a cup-shaped opening in communication with the receptacle and with a relatively narrow bore, said opening and said bore providing means for initially forming said strip material, and a cylindrical rotatable member positioned axially of said cup-shaped opening, said member having a conical pointed end extending substantially upwardly into said opening, and means arranged to rotate said receptacle and said twisting means.

7. A spinning disk comprising a rotatable receptacle adapted to rotatably support a spool of strip material, means for rotating said receptacle, a cover member for said receptacle, a former rotatably connected to said cover, said former including a bore through which the strip material may be drawn, and means for imparting rotating movement to said former including resilient members associated with said former and adapted to engage portions of the rotatable receptacle.

8. A spinning disk comprising a rotatable receptacle adapted to rotatably support a spool of strip material, means for rotating said receptacle, a cover member for said receptacle, a former rotatably connected to said cover, said former including a twisting finger and a bore through which the strip material may be drawn, and means for imparting rotating movement to said former and said twisting finger including resilient members associated with said former and adapted to frictionally engage portions of the rotatable receptacle.

9. A spinning disk comprising a rotatable receptacle adapted to support a spool of strip material, means for rotating said receptacle, a former positioned for rotation axially of said receptacle, said former including a twisting finger and a bore through which the strip material may be drawn, and means for imparting rotating movement to said former including resilient members connected to said former for frictionally engaging said receptacle.

10. A spinning disk comprising a rotatable receptacle adapted to support a spool of strip material, means for rotating said receptacle, a former positioned for axial rotation with said receptacle, said former including a twisting finger and a bore through which the strip material may be drawn, and means for imparting rotating movement to said former including a plurality of radially extending members connected to said former and adapted to engage portions of the receptacle.

11. A spinning disk comprising a rotatable receptacle having an annular chamber adapted to support a spool of strip material, means for rotating said receptacle, a cover member for said receptacle, said cover member being hingedly connected to be swung from an open to a closed position, a former rotatably connected to said cover, a twisting finger on said former, said former including a bore through which the strip material may be drawn, and means for imparting rotating movement to said former including a plurality of resilient members connected to said former and extending radially thereof, said members being constructed and arranged to frictionally engage the inner periphery of said receptacle upon the closed position of said cover member.

12. A spinning disk comprising a rotatable receptacle for supporting a spool of strip material, means for rotating said receptacle, a twisting finger positioned for axial rotation with respect to said receptacle, and resilient means between said twisting finger and said receptacle, said resilient means being arranged to impart the rotating movement of said receptacle to said twisting finger.

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No references cited.