June 5, 1934. H. N. SMITH 1,961,176

MACHINE FOR MAKING FRICTION ELEMENTS

Filed Nov. 10, 1932

Fig. 1.

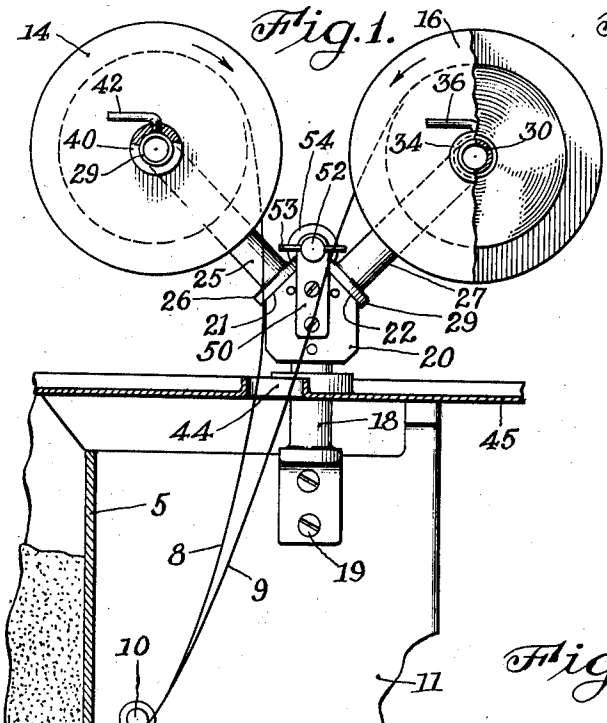


Fig. 2.

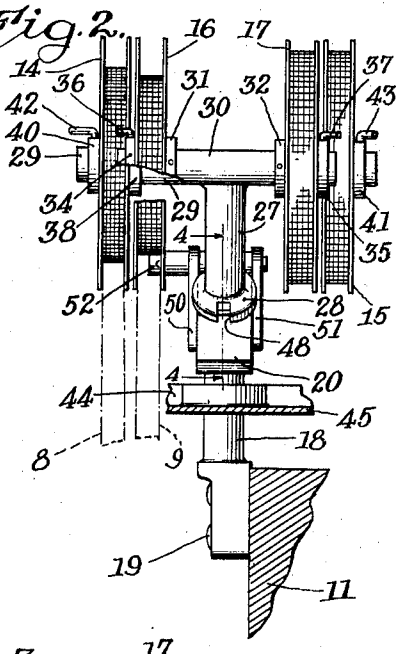


Fig. 3.

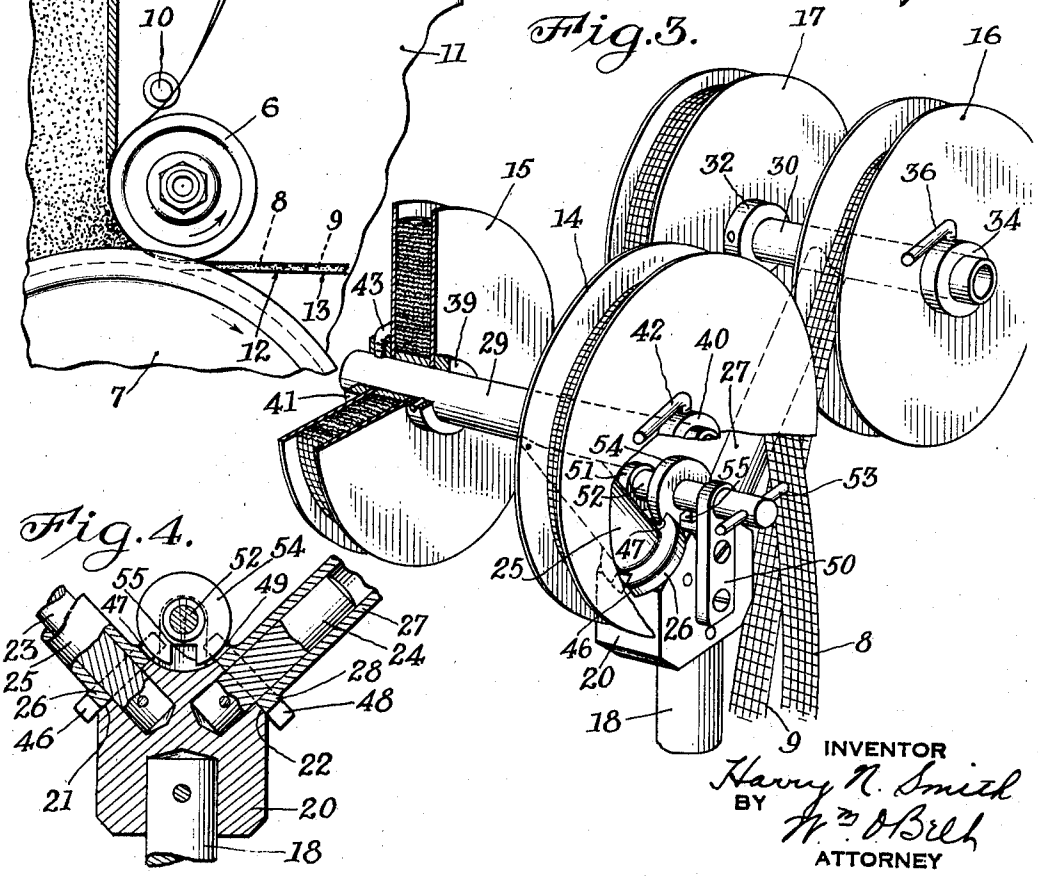


Fig. 4.

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asbestosclaims.law/library/22890/1

Patented June 5, 1934

1,961,176

UNITED STATES PATENT OFFICE

1,961,176

MACHINE FOR MAKING FRICTION ELEMENTS

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Application November 10, 1932, Serial No. 641,952

12 Claims. (Cl. 242—58)

This invention relates to certain novel improvements in machines for making friction elements and the like and particularly to a supporting device adapted for use in such machines.

Machines for making friction elements sometimes embody a hopper from which composition friction material is withdrawn to be passed between forming rolls or the like which compact and unite the material with a reenforcing backing that passes to the rolls in the form of a continuous band to thereby provide a continuous strip of friction material having a reenforcing backing and which may be divided into sections to provide friction elements. The backing is wound on spools or the like and an object of this invention is to so support a supply spool (that is, a spool in operative position in the machine and from which the backing is being withdrawn in the operation of the machine) and a reserve spool in the machine that the reserve spool may be quickly moved into operative position when all of the backing is withdrawn from the supply spool to substitute the reserve spool for the supply spool so that the tail end of the backing passing from the supply spool may be connected to the front end of the backing on the reserve spool to thereby provide a continuous band of backing without interrupting operation of the machine.

The machines may be so constructed that two or more separate strips of friction material are made simultaneously and another object of the invention is to provide a novel common support for independent spools from which backings are withdrawn for the separate strips of friction material. An ancillary object is to provide a common support for two or more sets of supply and reserve spools wherein the reserve spool in one set may be substituted for the supply spool in that set independently of the substitution of the reserve spool in another set for the supply spool therein.

Further objects are to lock the spools in operative position in a novel manner; to expedite the installation and removal of the spools; and to provide a novel spool support simple and economical in construction and rapid and positive in operation.

A selected embodiment of the invention is illustrated in the accompanying drawing wherein

Fig. 1 is a side view partly in elevation and partly in section of a machine including my novel spool support;

Fig. 2 is an end view looking in at the right hand end of Fig. 1;

Fig. 3 is a perspective view of the upper portion of the spool support looking in from the forward upper left hand corner of Fig. 1; and

Fig. 4 is a sectional detail view taken substantially on the line 4—4 on Fig. 2.

Machines of the kind used in the making of friction elements and with which my invention is adapted for use are shown, for example, in my co-pending applications Serial No. 402,100, filed October 24, 1929, now Patent No. 1,907,600, granted May 9, 1933, and Serial No. 491,375, filed October 27, 1930, now Patent No. 1,920,023, granted July 25, 1933. Machines of this kind include a hopper 5 and, where more than one strip of friction material is to be made simultaneously, cooperating pairs of forming rolls 6 and 7 are arranged in side by side relation. Suitable composition friction material passes from the hopper to the forming rolls wherein it is compacted and united with a reenforcing backing usually made in the form of a wire mesh band and herein, where two strips of friction material are made simultaneously, such backings are indicated by 8 and 9. These backings are directed to the forming rolls 6 by a guide pin 10 extending outwardly from the frame 11 of the machine and as the rolls 6 and 7 rotate in the direction of the arrows shown in Fig. 1, the composition material is compacted and forced into the interstices in the backings 8 and 9 to thereby provide reenforced strips of friction material 12 and 13. The rotation of the rolls 6 effects feeding of the backings 8 and 9.

The backings 8 and 9 are preferably wound onto spools such as 14, 15, 16 and 17. The spools containing the backing are carried in the machine above the forming rolls and in the present machine wherein two strips of friction material are made simultaneously, a common support having independent supporting members mounted thereon is provided for the spools from which backings are withdrawn for the separate strips of friction material 12 and 13. The common support includes a stud 18 fast to the upper end of the frame 11 by screws 19 or the like. A block 20 has a socket in which the upper end of the stud 18 is pinned or otherwise fastened. In the present instance the block includes oppositely disposed tapered faces 21 and 22. A pin or stud 23 extends from the block 20 medially of, and perpendicularly to, the face 21 and is pinned or otherwise fastened in the block. A pin or stud 24 extends from the block 20 medially of, and perpendicularly to, the face 22 and is pinned or otherwise fastened in the block. A sleeve 25 embraces the pin 23 and has a flange 26 at the inner end thereof which rests on the face 21.

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A sleeve 27 embraces the pin 24 and has a flange 28 at the inner end thereof which rests on the face 22. A horizontally extending shaft 29 is mounted at the outer end of the sleeve 25, and due to the angular extent of the sleeve, this shaft is positioned out of vertical alignment with the block 20. A horizontally extending shaft 30 is mounted at the outer end of the sleeve 27 and this shaft, like the shaft 29, is arranged out of vertical alignment with the block 20. The angular extent of the sleeves 25 and 27 is such that the shafts 29 and 30 are so positioned that spools may be mounted on each of these shafts with the adjacent portions of the peripheries thereof spaced apart. Furthermore, these shafts are so spaced from each other that when one shaft is turned end for end upon rotation of the sleeve connected thereto about the pin extended into the sleeve, the spools on the turned shaft clear the peripheries of spools mounted on the other shaft.

As best illustrated in Fig. 2, the shaft 30 is shorter than the shaft 29. Collars 31 and 32 are respectively secured on the shaft 30 intermediate the opposite ends thereof and the sleeve 27. The spools 16 and 17 are mounted on the shaft 30 to abut the collars 31 and 32 respectively and these spools are held against displacement by collars 34 and 35 removably secured to the shaft by set screws 36 and 37 which are provided with handles to facilitate tightening and loosening thereof. The collars 34 and 35 are so positioned on the shaft 30 that the spools 16 and 17 are held against displacement from, but are freely rotatable on, the shaft. A pair of collars 38 and 39 are respectively secured on the shaft 29 intermediate the ends thereof and the sleeve 25. The collars 38 and 39 are spaced outwardly from the sleeve 25 more than the collars 31 and 32 are spaced outwardly from the sleeve 27 so that spools abutted against these collars 38 and 39 are positioned on the shaft 29 out of alignment with the spools mounted on the shaft 30, the amount the spools on the shaft 29 are disposed out of alignment with the spools on the shaft 30 being determined by the spacing between the pairs of forming rolls making the respective strips of friction material 12 and 13. Collars 40 and 41, removably secured on the shaft 30 by the set screws 42 and 43, are respectively positioned outwardly of the spools engaged with the collars 38 and 39 to prevent displacement of these spools but to permit free rotation thereof. The set screws 42 and 43 include handles to facilitate tightening and loosening thereof.

The backings 8 and 9 are withdrawn from the supply spools 14 and 16 and are directed through an opening 44 in the frame plate 45. The spools 15 and 17 are the reserve spools. When all of the backing has been withdrawn, for example, from the spool 14, the shaft 29 and the sleeve 25 are rotated about the pin 23 so that the spool 15 is moved into position in which the spool 14 is shown in the drawing. As soon as the spool 15 is in this position, the tail end of the backing 8 is connected to the front end of the backing wound on the spool 15 which then serves as the supply spool. It is immaterial whether or not the spool rotates on the shaft 29 or whether the backing rotates on the hub of the spool but nevertheless the spools are mounted so as to be rotatable.

In order to retain the supply spool 14 in its operative position, it is necessary that some locking means be provided and to this end I provide diametrically opposed notches 46 and 47 in the flange 26, similar notches 48 and 49 being provided in the flange 28 to serve as a part of the locking means for the spools 16 and 17. Plates 50 and 51 are secured to opposite faces of the block 20 and project thereabout and provide bearings for the shaft 52 having a handle 53 thereon. A disc 54 is fast on the shaft 53 intermediate the plates 50 and 51 and has a notch 55 therein. The disc 54 is so positioned and the diameter thereof is sufficient that normally this disc passes through notches in both the flange 26 and the flange 28, this disc being shown extending through the notches 47 and 49 in the present instance to hold the spools 14 and 16 in operative position. When, however, it is desired to substitute a reserve spool for a supply spool, as when the spool 15 is to be substituted for the spool 14, the notch 55 is moved into alignment with the notch 47 and then the sleeve 25 may be rotated for the flange 26 freely passes through the notch 55 and at the time the spool 15 is located in operative position the notch 46 is aligned with the notch 55 and then by rotating the shaft 52 the notch 55 is moved from alignment with the notch 46 and therefore the flange 26 and sleeve 25 are again held against rotative movement. By aligning either the notch 48 or the notch 49 with the notch 55, the flange 28 and shaft 30 may be similarly rotated and when either the notch 48 or the notch 49 is aligned with the notch 55, the disc 54 may be rotated into locking position to retain the sleeve 27 and therefore the shaft 30 in position. It is apparent that the sleeves 25 and 27 are independently rotatable and therefore should the backing be exhausted from one of the supply spools prior to being exhausted from the other it is possible to move the reserve spool for the exhausted spool into operative position independently of the other supply and reserve spools. In the illustrated embodiment of the invention the spool 14 contains a greater amount of the backing than the spool 16 and it is therefore obvious that the spool 16 will be exhausted prior to the spool 14 and therefore the reserve spool 17 will be moved into operative position before the reserve spool 15 is so moved. After an exhausted spool has been moved from operative position into reserve position the set screw securing the removable collar outwardly thereof is loosened and removed from the shaft whereupon the exhausted spool may be removed from the shaft and a fresh spool may be substituted therefor after which the removable collar is replaced and the set screw tightened and this newly installed spool serves as the reserve spool and will be moved into operative position as soon as the strip is exhausted from the supply spool on the same shaft. Since the set screws are provided with handles, it is apparent that installation and removal of the spools is facilitated.

It is manifest from the foregoing description that I have provided a common support for spools of backing being fed to operative position in a machine for making friction elements. Moreover, I have associated a reserve spool with each supply spool in such a way that the reserve spool may be quickly moved into operative position when the end of the backing passes from the supply spool. Further, I have so arranged the device that backing from spools carried by the common support may be used independently and I have so arranged the device that either supply of the backing may be expeditiously replenished when exhausted and also, so that this may be done independently. In addition, I have set forth an arrangement wherein two backings are with-

drawn from supply spools but it is to be understood that a greater or less number of backings may be withdrawn from supply spools carried by the support and while I have shown a specific locking device and other details of construction, it is to be understood that I do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations as fall within the purview of the following claims:

I claim:

1. In a supporting device, independent movable supporting members each having supply and reserve spools thereon, and means including a part common to said supporting members for locking said supporting members against movement to hold said supply spools in operative position, the locking means including registerable portions adapted to be registered to afford independent movement of said supporting members to permit substitution of the reserve spool on one of said members for the supply spool thereon.

2. In a supporting device, a rotatably mounted supporting member having supply and reserve spools mounted thereon, a flange on said member and having notches therein, and a locking disc selectively engageable in said notches to hold said member against movement to hold said supply spool or said reserve spool in operative position, said disc having a notch therein adapted to be aligned with the flange to permit movement of the member and substitution of the reserve spool for the supply spool.

3. In a supporting device, rotatably mounted supporting members each having supply and reserve spools mounted thereon, flanges on each of said members having notches therein, and locking means engageable in said notches for holding said members against movement to hold said supply spools in operative position, said locking means having a notch therein registerable with said flanges to afford independent movement of said supporting members to permit substitution of the reserve spool on one of said members for the supply spool on said member.

4. In a supporting device, a block, supporting members, means movably connecting said supporting members to the block in angular relation with each other and said block, said supporting members including shafts, the shafts on opposite of said supporting members being arranged in parallel relation with each other and carrying spools with the peripheries of the spools on the parallel shafts spaced apart whereby said shafts may be moved relatively without interference of the spools on one shaft with those on the other.

5. In a supporting device, a block, substantially T-shaped supporting members, means movably connecting said supporting members to the block with the stems thereof extending in angular relation with each other and said block, said supporting members having spools mounted on the branches thereof with the spools on one support spaced from the spools on the other whereby said supports may be moved relatively without interference of the spools on one support with those on the other.

6. In a supporting device, a block, substantially T-shaped supporting members, means movably connecting said supporting members to the block with the stems thereof extending in angular relation with each other and said block, said supporting members having spools mounted on the branches thereof with the spools on one support spaced from the spools on the other whereby said supports may be moved relatively without interference of the spools on one support with those on the other, and means carried by said block for preventing relative movement of said supports.

7. In a supporting device, a block having opposite angularly extending faces, substantially T-shaped supporting members, means connecting the free ends of the stems of said T-shaped supporting members to said block whereby said stems extend substantially at right angles to said angularly extending faces, said supporting members having spools mounted on the branches thereof with the spools on one support spaced from the spools on the other whereby said supports may be moved relatively without interference of the spools on one support with those on the other.

8. In a supporting device, a block having opposite angularly extending faces, substantially T-shaped supporting members, means connecting the free ends of the stems of said T-shaped supporting members to said block whereby said stems extend substantially at right angles to said angularly extending faces, said supporting members having spools mounted on the branches thereof with the spools on one support spaced from the spools on the other whereby said supports may be moved relatively without interference of the spools on one support with those on the other, and means carried by said block for preventing relative movement of said supports.

9. In a supporting device, a block having opposite angularly extending faces, substantially T-shaped supporting members, means connecting the free ends of the stems of said T-shaped supporting members to said block whereby said stems extend substantially at right angles to said angularly extending faces, said supporting members having spools mounted on the branches thereof with the spools on one support spaced from the spools on the other whereby said supports may be moved relatively without interference of the spools on one support with those on the other, said supports embodying flanges thereon having notches therein, and means carried by said block and engageable in said notches for preventing relative movement of said supports.

10. In a supporting device, a block having opposite angularly extending faces, substantially T-shaped supporting members, means connecting the free ends of the stems of said T-shaped supporting members to said block whereby said stems extend substantially at right angles to said angularly extending faces, said supporting members having spools mounted on the branches thereof with the spools on one support spaced from the spools on the other whereby said supports may be moved relatively without interference of the spools on one support with those on the other, said supports embodying flanges thereon having notches therein, and means carried by said block and engageable in said notches for preventing relative movement of said supports, said last-named means having a notch therein registerable with said flanges to permit rotation of one of said supports independently of the other of said supports.

11. In a supporting device, a substantially vertically extending stud, a block on said stud, pins mounted in said block and extending outwardly from said stud at an acute angle to a horizontal plane extending at right angles to the vertical

extent of said stud, supporting members mounted on said pins and having shafts at the outer ends thereof adapted to receive spools, the angular extent of said pins and the disposition of the supporting members thereon and the length of said supporting members being sufficient to space said spools apart in an amount great enough to allow said supporting members to be turned independently on said pins without the spools on one of said members engaging the spools on the other of said members.

12. In a supporting device, a substantially vertically extending stud, a block on said stud, pins mounted in said block and extending outwardly from said stud at an acute angle to a horizontal plane extending at right angles to the vertical extent of said stud, supporting members mounted on said pins and having shafts at the outer ends thereof, said shafts having collars fast thereon adjacent the ends thereof and having other collars removably mounted thereon outwardly of the fast collars, the removable collars being adapted to be removed to permit installation of spools on said shafts in engagement with the fast collars whereby said spools are held against displacement upon installation of said removable collars, the angular relation of said supporting members and the length thereof being sufficient to space said spools apart in an amount great enough to allow said supporting members to be turned independently on said pins without the spools on one of said members engaging the spools on the other of said members.

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