April 7, 1942. W. C. EWALDSON ET AL 2,279,115

MATERIAL SERVING APPARATUS

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FIG. 2

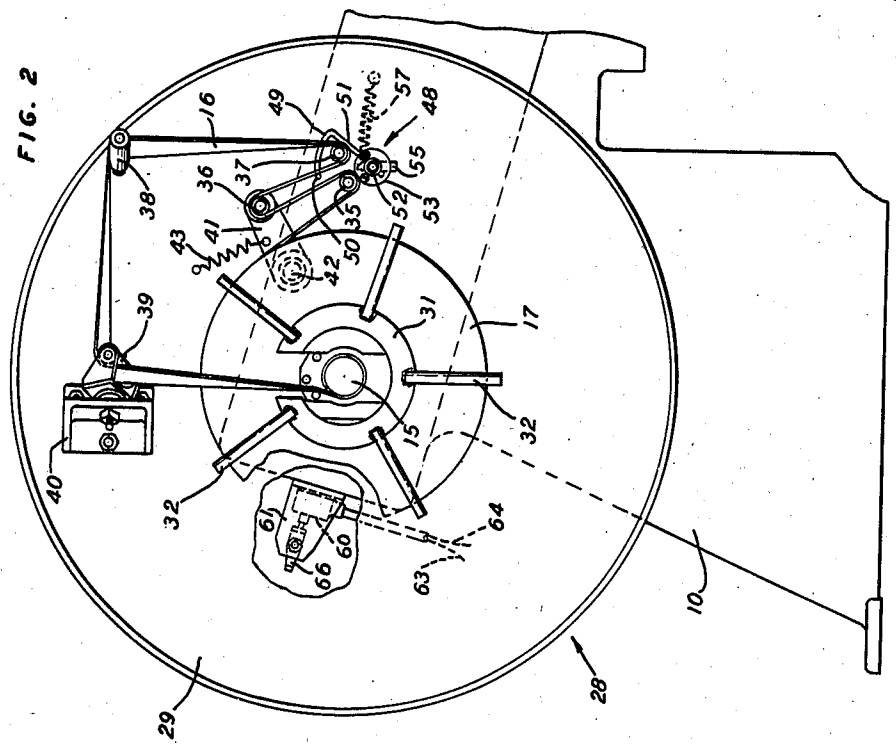
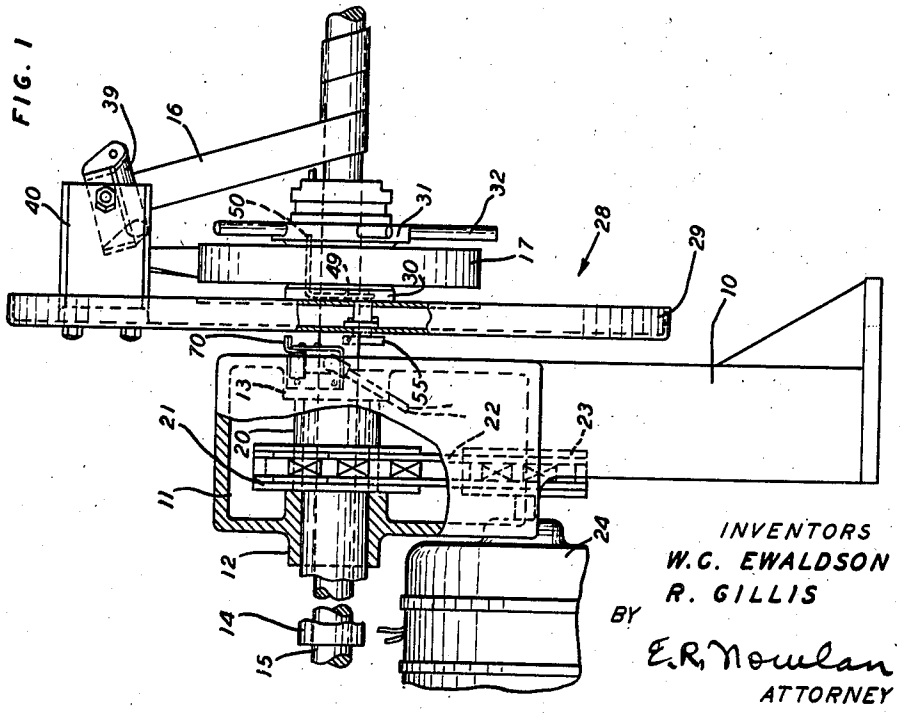


FIG. 1



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FIG. 3

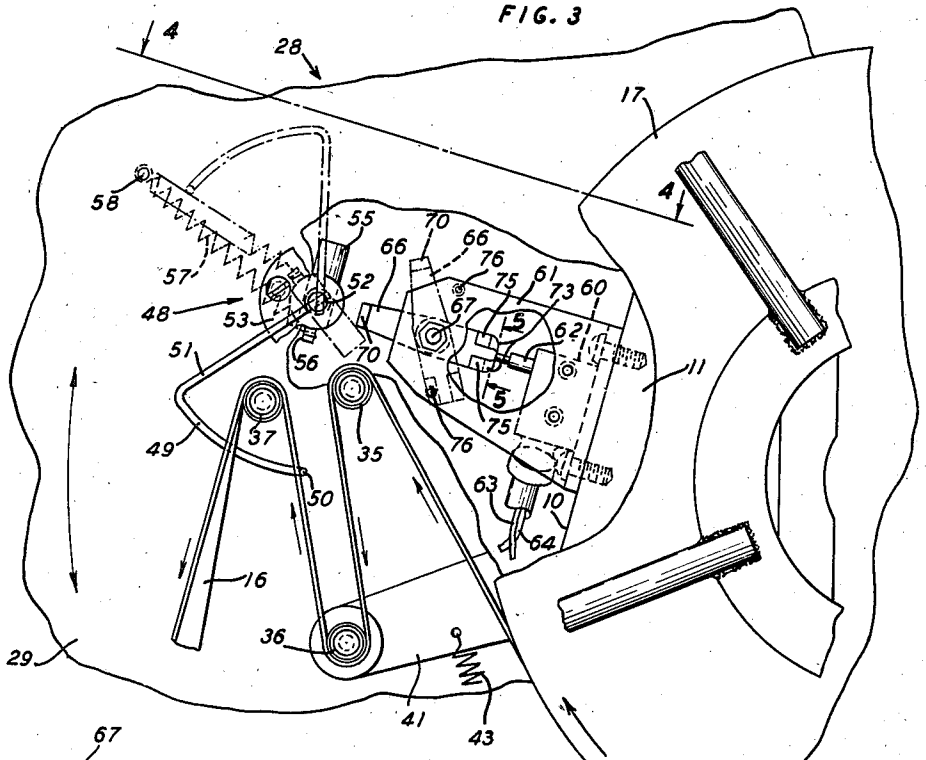


FIG. 5

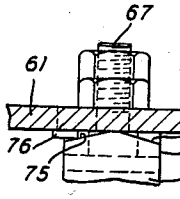


FIG. 4

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2,279,115

MATERIAL SERVING APPARATUS

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Application October 5, 1940, Serial No. 359,876

8 Claims. (Cl. 57—19)

This invention relates to material serving apparatus, and more particularly to apparatus for serving material to an advancing core.

When strand or tape material is served to an advancing core, it is important that the apparatus serving the material be stopped as soon as possible upon breakage of the material. To effectively stop such an apparatus immediately upon breakage of the material, the stopping means should, it is believed, be associated directly with the material. This presents a difficult problem, especially when the material including the supply rotates with a serving head at a rapid rate of speed about the core, to which the material is being served, and the power means for rotating the serving head is an electric motor located remotely therefrom.

An object of the invention is to provide a material serving apparatus effectively controlled by the material served thereby to automatically stop upon breakage of the material.

With this and other objects in view, the invention comprises a serving head driven by power means, such as an electric motor, to wrap material from a supply about an advancing core, the material including the supply being carried by the serving head, and in travelling to the core holds a control element in an inoperative position until the material breaks, at which time the element renders the power means ineffective, for example, by opening an electric circuit to a driving motor.

Other objects and advantages will be apparent from the following detailed description when taken in conjunction with the accompanying drawings, wherein—

Fig. 1 is a front elevational view of the apparatus, portions thereof being broken away;

Fig. 2 is a side elevational view of the apparatus, a portion thereof being broken away;

Fig. 3 is an enlarged fragmentary side elevational view of a portion of the apparatus;

Fig. 4 is a fragmentary sectional view taken substantially along the line 4—4 of Fig. 3, and

Fig. 5 is a fragmentary detailed view taken along the line 5—5 of Fig. 3.

Referring now to the drawings, particularly Figs. 1 and 2, numeral 10 designates a supporting housing having an upper hollow portion 11 with spaced aligned bearings 12 and 13 in which a hollow shaft 14 is rotatably disposed.

A core 15 which is to be served with material 16 from a pad or supply 17, is advanced longitudinally through the shaft 14. A sleeve 20 is disposed concentric with the shaft 14 between the bearings 12 and 13 and is keyed to the shaft for positive connection therewith. A sprocket wheel 21 is mounted upon the sleeve 20 and fixed thereto, a chain 22 operatively connecting the sprocket wheel 21 with a sprocket wheel 23 driven by power means such as an electric motor 24.

A serving head, indicated generally at 28, includes a disk-like member 29 mounted upon the shaft 14 for rotation therewith. The shaft 14 extends forwardly or to the right (Fig. 1) a sufficient distance to support cone heads 30 and 31, the former being fixed to the shaft and the latter being removably mounted thereon through a threaded connection therewith. Radially projecting pins or members 32 of the cone head 31 enable the operator to cause relative rotation of the cone head 31 and the shaft 14 to remove the cone head for the positioning of a new pad of material 17 concentric with the shaft and between the cone heads 30 and 31, where the pad is held with sufficient frictional contact to apply a desired tension on the material being drawn therefrom. The material 16 in passing from the supply 17 to the core 15 passes successively around rollers 35, 36, 37, 38 and 39. The rollers 35, 37 and 38 are rotatably carried by the member 29, the roller 39 being mounted for adjustment on a bracket 40 supported by the member 29. The material in passing from the roller 37 to the roller 38, passes over the roller 36, which may be termed a tension roller, mounted upon a tension arm 41. The tension arm 41 is pivotally supported at 42 upon the member 29 and may be operatively associated with any suitable brake means (not shown) to apply additional tension to the supply if so desired. In the present instance the tension arm 41 is normally urged counterclockwise by suitable means such as a spring 43.

A control unit is indicated generally at 48 and consists of a bent arm 49 of the contour shown in Figs. 3 and 4 extending from its free end 50 in engagement with the material 16 near the tension roller 36. From the free end 50 the arm extends between the material and the member 29 to a portion 51 which extends through and is secured in an aperture of a pivot member or shaft 52. The shaft 52 is journalled in a bearing 53 mounted upon the member 29 (Fig. 4) and has an actuating arm or member 55 fixed to the other end therof. The arm 55 projects outwardly in one direction from the shaft 52 as shown in Fig. 3, and provides a connection 56 extending in the opposite direction for connection with one end of a spring 57, the other end of

the spring being fixed at 58 to the member 29. The spring 57 has sufficient force to rotate the shaft 52 with its arms 49 and 55 but will not interfere with the travel of the material past the end portion 50 of the arm 49. Furthermore, the size and weight of the arm 49 as compared to the size and weight of the arm 55 are such that centrifugal force, acting on the arm 49, is sufficient to overbalance the force acting on the arm 55 and reduce the force required of the spring 57 to the extent that the spring may, if desired, be eliminated.

A switch 60 of a spring actuated type is mounted upon a bracket 61 which in turn is mounted upon the portion 11 of the housing 10. A plunger 62 is conditioned to complete an electric circuit through conductors 63 and 64 to the motor 24 by closing the switch 60 when moved inwardly against the tension of a spring (not shown). A switch lever 66 pivoted at 67 upon the bracket 61, is conditioned to hold the plunger 62 in closed position as long as the material 16 remains unbroken. The switch lever 66 is of the general contour shown in Figs. 3 and 4, one end 70 of the lever extending in one direction free of the arm 55 when the arm is in the solid line position but in the path of the arm when the arm is in the dotted line position. The other end 71 of the lever 66 extends in a direction opposite the end 70 and over the plunger 62 to hold the switch 60 closed. The end 71 of the lever has rounded edges 73 (Fig. 3) to facilitate relative movement of the lever and the plunger by the operator upon conditioning the apparatus for operation.

It should be understood that another or main control switch will be included in the circuit to the motor for operation by the operator after the switch 60 has been closed. The main purpose of the switch 60 and the control means is to stop the motor immediately upon breakage of the material and is not used alone in starting the motor.

In order that the lever 66 will not be rotated farther than necessary and will be held out of further engagement with the arm 55 when once released from its plunger thereby, tapered cam-like surfaces 75 (Figs. 3 and 4) are formed for engagement with spaced stop pins 76 carried by the bracket 61.

During the operation of the apparatus, the motor 24 drives the shaft 14 in either direction, the shaft being driven clockwise in the present instance. The rotation of the shaft 14 in this direction also causes the rotation of the serving head in the same direction, wrapping the material 16 spirally about the core while the latter advances longitudinally through the shaft. Therefore, the entire material, including the supply 17, until it is served to the core, rotates with the serving head. During the travel of the material from the supply to the core, a desired tension is applied to the material to cause the material to lie evenly on the core. If this tension should vary or if other causes might arise to break the material, the arm 49, which is held in an inoperative position by the material, will be released, allowing the spring 57 to move the control unit 48 into its operative position. The spring 57, therefore, rotates the shaft 52 (Figs. 2 and 3), moving the arm 55 from the solid line position shown in Fig. 3 to a position in the path including the end portion 70 of the switch lever 66. It is important to bear in mind that the switch 60 and its switch lever 66 remain stationary on the bracket 61, while the control unit rotates with the serving head. Let it be assumed, therefore, that the material breaks while the control unit is in the position shown in Fig. 2. The arm 55 will immediately be moved by its spring 57 and/or centrifugal force on the arm 49 to a position where it will project toward the center of rotation of the serving head and when in this position it will engage the end portion 70 of the switch lever 66 when its rotary movement with the serving head brings it to that position. The lever 66 will, therefore, be moved about its pivot when struck by the arm 55, moving the end portion 71 thereof free of the plunger 62, causing opening of the circuits to the motor and thus stopping operation of the apparatus for rotation of the serving head. Movement of the lever 66 will be rapid and with sufficient force to cause one of the cam surfaces 75 to ride on its respective projection 76 to hold the lever against further movement.

As stated in the foregoing description of the operation, the motor 24 may drive the shaft 14 in either direction. In doing this the serving head may be driven in either direction. Therefore, if the serving head should be rotated counter-clockwise, the same result will be accomplished if the material should break, the arm 55 of the control unit being moved into the path including the portion 70 of the switch lever regardless of which direction the serving head is located.

One of the important features of the invention which permits rotation of the serving head in either direction is the mounting of the switch on a stationary support free of the serving head. This also eliminates complicated structures and possible frequent trouble in effectiveness of operation should the switch be carried by the serving head.

The embodiment of the invention herein disclosed is illustrative and may be widely modified and departed from in various ways without departing from the spirit and scope of the invention as pointed out in and limited solely by the appended claims.

What is claimed is:

1. A material serving apparatus comprising a rotatable serving head, an electric motor to cause rotation of the serving head relative to a longitudinally advancing core, an electrical switch included in an electrical circuit with the motor, material carried by the serving head and directed to the core, and a control unit held in a position free of the switch by the material and movable to actuate the switch to open the circuit to the motor upon breakage of the material.

2. A material serving apparatus comprising a rotatable serving head, an electric motor to cause rotation of the serving head relative to a longitudinally advancing core, an electrical switch included in an electrical circuit with the motor, material carried by the serving head and directed to the core, an arm movable with the serving head and held free of the switch by the material, and means to move the arm in a position to cause actuation of the switch to open the circuit to the motor upon breakage of the material.

3. A material serving apparatus comprising a rotatable serving head, an electric motor to cause rotation of the serving head relative to a longitudinally advancing core, an electrical switch included in an electrical circuit with the motor, an element movable into operative and inoperative positions to respectively effect actuation of the switch to close and open the circuit, mate-

rial carried by the serving head and directed to the core, and a control unit held in a position free of the element by the material and movable to move the element into its inoperative position upon breakage of the material.

4. A material serving apparatus comprising a rotatable serving head, an electric motor to cause rotation of the serving head relative to a longitudinally advancing core, an electrical switch included in an electrical circuit with the motor, an element movable into operative and inoperative positions to respectively effect actuation of the switch to close and open the circuit, material carried by the serving head and directed to the core, a control unit held in a position free of the element by the material and movable to move the element into its inoperative position upon breakage of the material, and means to hold the element in its inoperative position.

5. A material serving apparatus comprising a rotatable serving head, an electric motor to cause rotation of the serving head relative to a longitudinally advancing core, an electrical switch included in an electrical circuit with the motor, an element having a tapered surface and movable into operative and inoperative positions to respectively effect actuation of the switch to close and open the circuit, material carried by the serving head and directed to the core, a control unit held in a position free of the element by the material and movable to move the element into its inoperative position upon breakage of the material, and means cooperating with the said tapered surface to hold the element in its inoperative position.

6. A material serving apparatus comprising a rotatable serving head, an electric motor to cause rotation of the serving head relative to a longitudinally advancing core, an electrical switch mounted on a stationary support free of the serving head and included in an electrical circuit with the motor, material carried by the serving head and directed to the core, and a control unit held in a position free of the switch by the material and movable to actuate the switch to open the circuit to the motor upon breakage of the material.

7. A material serving apparatus comprising a rotatable serving head, electrically operated power means to rotate the serving head relative to a longitudinally advancing core to be served, an electrical switch to control an electrical circuit including the power means and mounted against rotation with the serving head an element positionable to cause closing of the switch, material carried by the serving head and directed to the core, a movable member rotatable with the serving head and held free of the element by the material, and means to move the member into a path to engage the element upon breakage of the material to cause the element to effect opening of the switch.

8. A material serving apparatus comprising a rotatable serving head, material carried by the serving head and directed to a longitudinally advancing core, an electrical motor adapted to rotate the serving head in either direction to serve the material in either direction to the core, an electrical switch included in an electrical circuit with the motor, and a control unit held in a position free of the switch by the material and movable in either direction with the serving head to actuate the switch to open the circuit to the motor upon breakage of the material.

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