Nov. 5, 1935. J. L. GORE 2,020,027

STACKING MACHINE

Original Filed Dec. 2, 1929 6 Sheets-Sheet 1

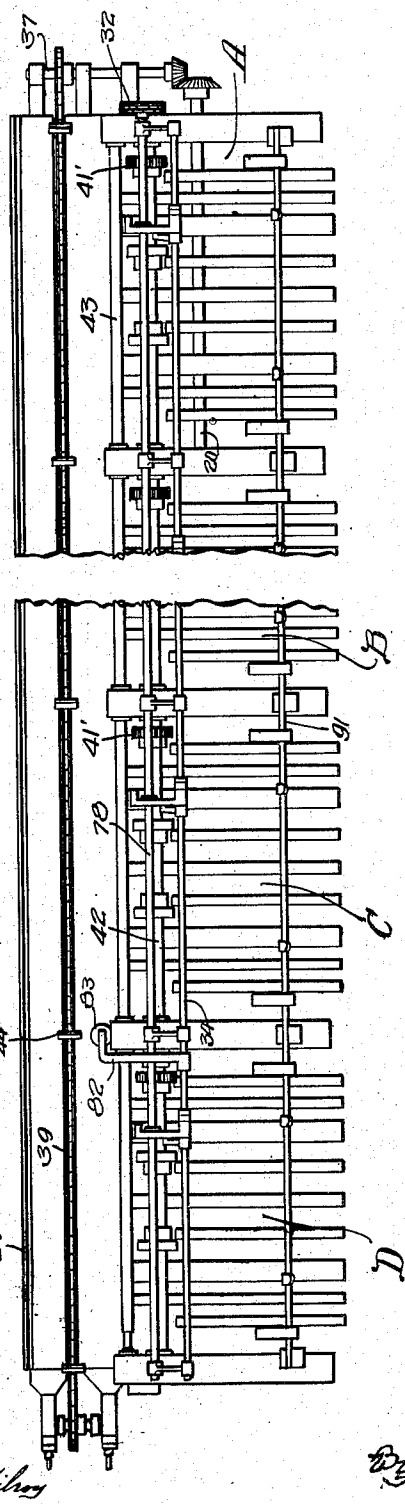


Fig. 1.

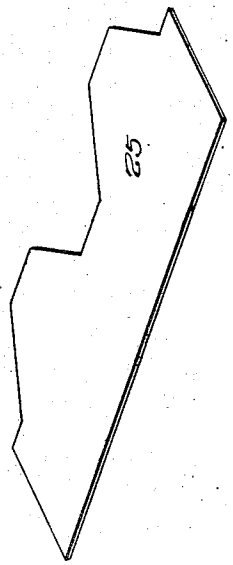


Fig. 8

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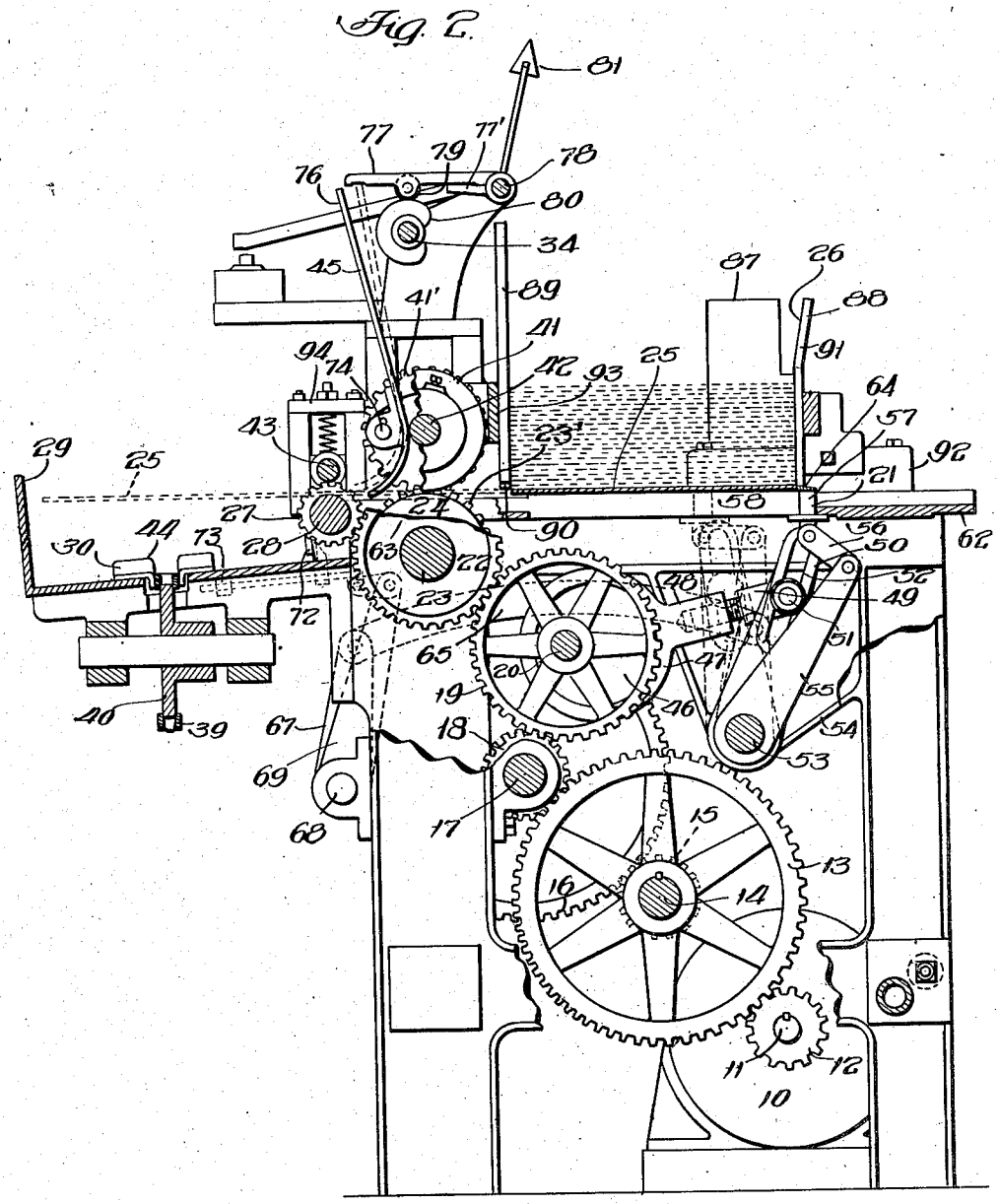
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STACKING MACHINE

Original Filed Dec. 2, 1929 6 Sheets-Sheet 2

Fig. 2.



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Witness
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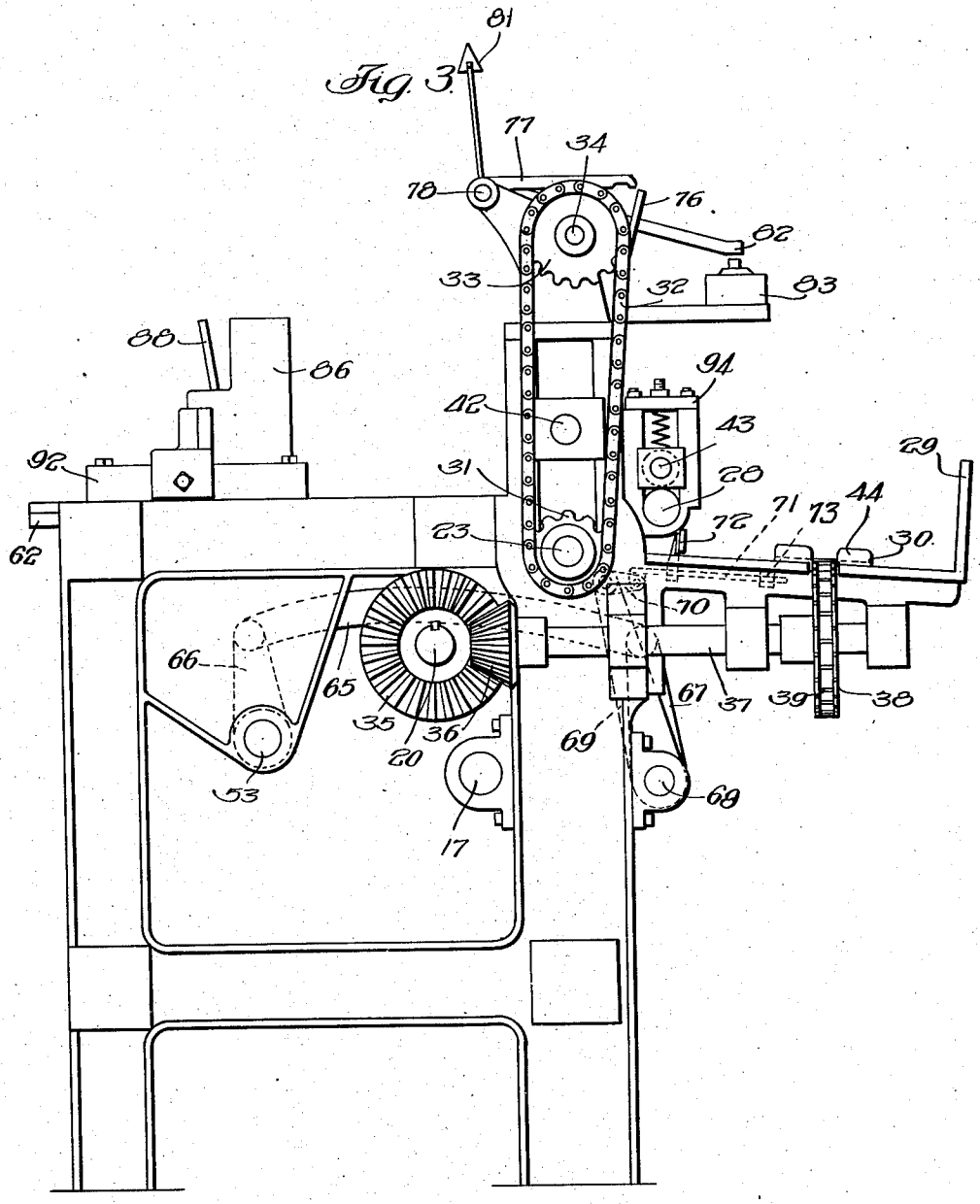
By James L. Gore
Hill & Hill Attys

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STACKING MACHINE

Original Filed Dec. 2, 1929 6 Sheets-Sheet 3

Fig. 3.



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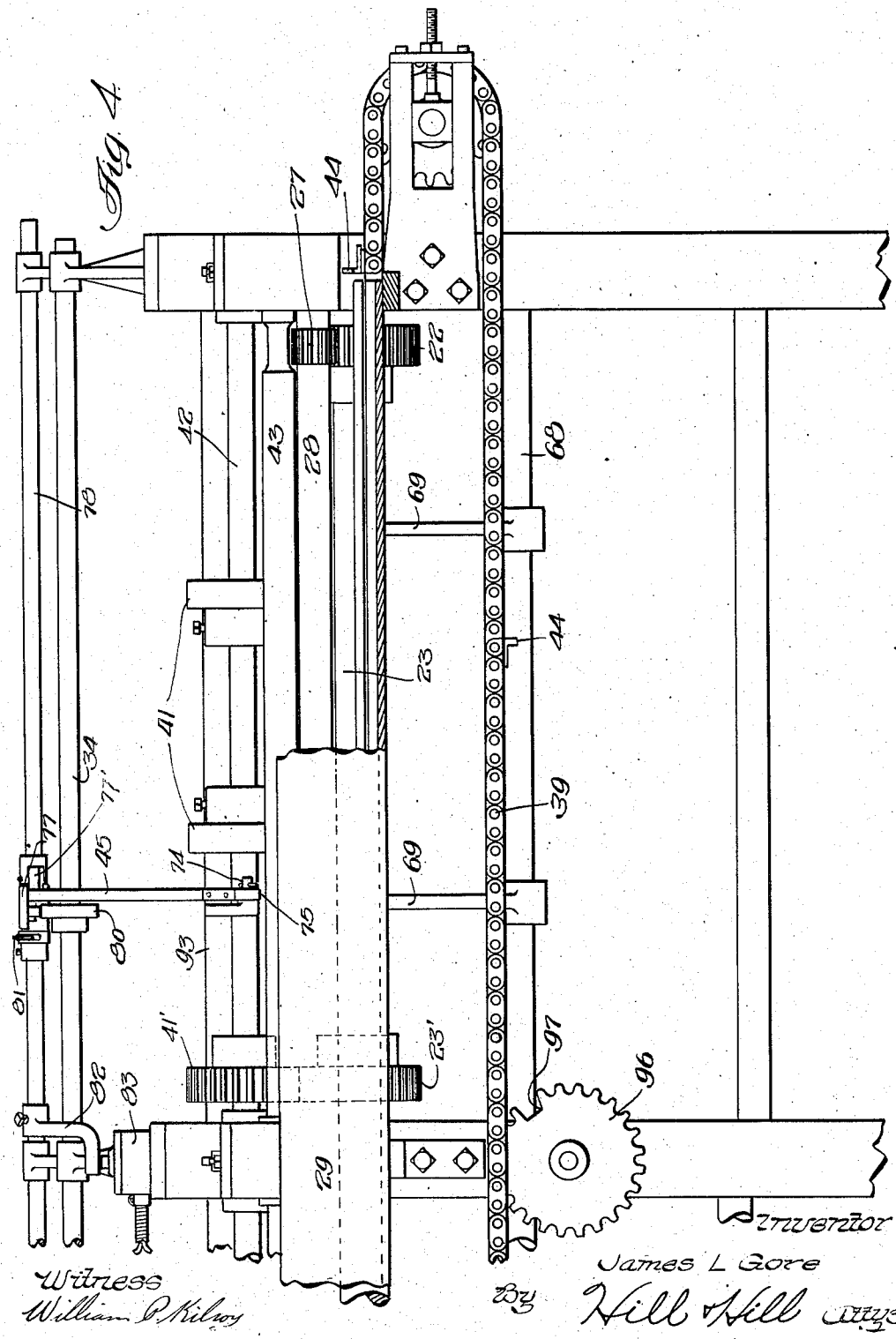
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STACKING MACHINE

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Fig. 4.



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STACKING MACHINE

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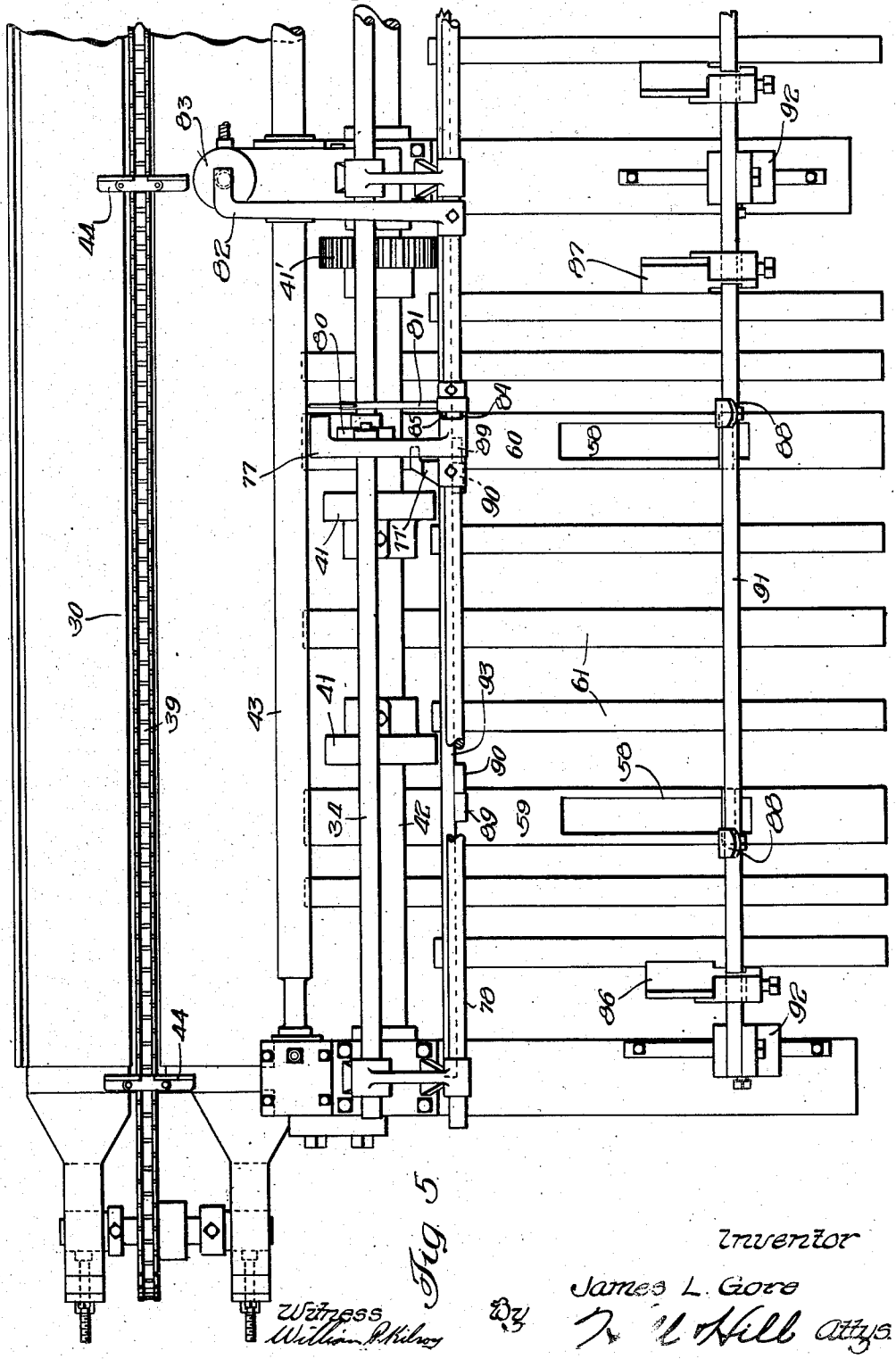


Fig. 5

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STACKING MACHINE

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Fig. 6.

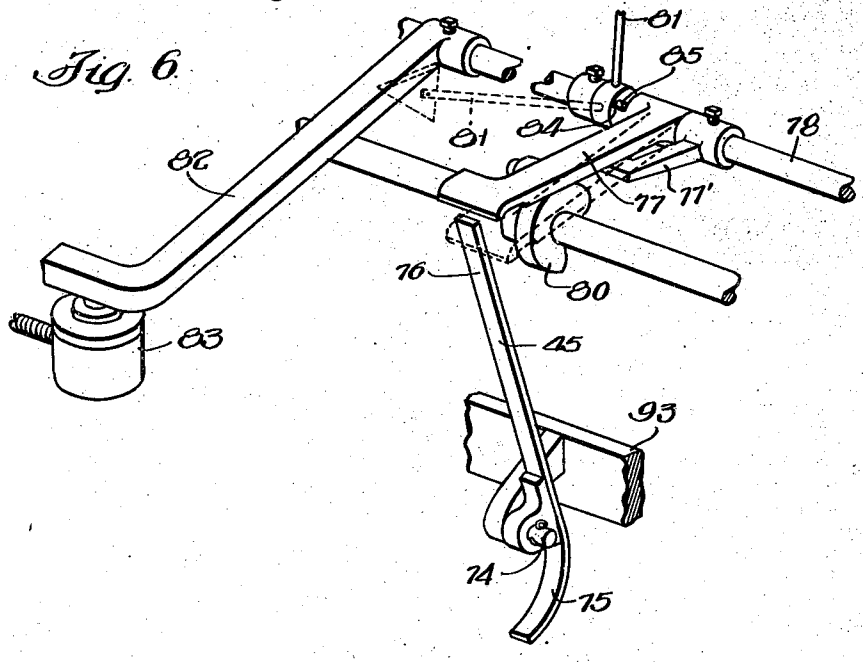
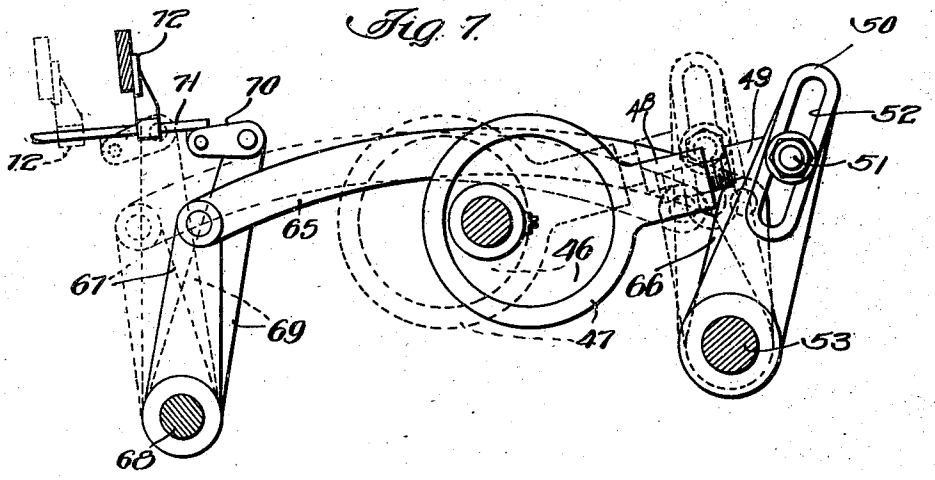


Fig. 7.



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By Hill & Hill Attys.

Witness

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Patented Nov. 5, 1935 2,020,027

UNITED STATES PATENT OFFICE

2,020,027

STACKING MACHINE

James L. Gore, Chicago, Ill., assignor, by mesne assignments, to The Patent and Licensing Corporation, New York, N. Y., a corporation of Massachusetts

Application December 2, 1929, Serial No. 411,037
Renewed August 27, 1932

1 Claim. (Cl. 270—58)

The invention relates to that general class of devices known as stacking machines and is particularly designated for bundling a commodity such as roofing shingles.

The invention has as one of its prime objects the provision of a machine for forming bundles of a commodity such as above referred to, each bundle having relatively different colored shingles contained therein.

It is an object of the invention to employ a plurality of magazines, each of which contains shingles of a certain color and to combine with said magazines a mechanism whereby the individual shingles in each magazine will be ejected therefrom, deposited and piled one upon the other to complete a bundle of variegated colors.

It is a further object of the invention to provide a machine employing magazines having combined therewith a conveyor which travels relatively to the magazines to thereby arrange a certain portion of the conveyor so that a shingle from each magazine is deposited on said certain portion of the conveyor to thereby produce a bundle of variegated colors.

It is a further object of the invention to provide a machine of the character above referred to having means whereby the machine will be automatically brought to a rest when one or the other of the magazines is depleted of its supply of shingles.

A further object of the invention is to provide a machine having means for arresting the operation thereof when a condition such as that just referred to occurs having combined therewith a signal so that the operator may be apprised of the condition of the machine.

A further object of the invention is to provide means for removing or ejecting the lowermost shingle of a stack from those arranged above and upon said lower shingle.

Another object of the invention is to provide gripping and feeding rollers which cooperate with the ejector mechanism to feed the shingle from the magazine to the conveyor.

The invention has these and other objects, all of which will be more readily understood when read in conjunction with the accompanying drawings in which one embodiment of which the invention is susceptible is illustrated, it being obvious that changes and modifications may be resorted to without departing from the spirit of the appended claim forming a part hereof.

In the drawings, Fig. 1 is a plan view of a machine constructed according to the invention;

Fig. 2 is an end elevation of the machine shown in Fig. 1, certain portions thereof being shown in section for the purpose of illustration;

Fig. 3 is an elevation of the opposite end of the device shown in Fig. 1;

Fig. 4 is a side elevation of a portion of the machine shown in Fig. 1 and looking toward the front of the machine, certain portions thereof being broken away for the purpose of illustration;

Fig. 5 is a plan view of that portion of the structure shown in Fig. 4;

Fig. 6 is a perspective view of a signal and controlling means for controlling the operation of the machine;

Fig. 7 is a detail view of the mechanism employed for operating certain ejectors employed in the construction; and

Fig. 8 is a perspective view of one of the shingles which it may be desired to form in a bundle.

In the embodiment of the invention illustrated in the drawings, the mechanism is designed to be operated through the medium of an electric motor generally designated 10 which is best illustrated in Fig. 2. The shaft 11 of the motor 10 is provided with a pinion 12 which meshes with a gear 13 mounted upon a stub shaft 14. The shaft 14 upon which the gear 13 is mounted has a pinion 15 keyed thereto. This pinion 15 meshes with a gear 16 which is mounted upon the shaft 17, the latter of which has a gear 18 which in turn meshes with the gear 19.

The shaft 20 upon which the gear 19 is mounted provides means for actuating certain other elements of the structure including the ejector generally designated 21. The gear 19 meshes with a gear 22, this gear 22 being secured to a shaft 23, which shaft preferably extends throughout the length of the machine and is provided with a plurality of feed rollers 24 which assist the ejector in feeding the shingle 25 from the magazines 26 to a conveyor. The gear 22 mounted upon the shaft 23 cooperatively engages a gear 27 formed on the shaft 28 (see Fig. 4) and thus provides a means for rotating the shaft 28 to assist the feed rollers 24 to feed the shingle 25 into the trough 29 along which the conveyor 30 operates.

The shaft 23 is provided with a sprocket 31 best seen in Fig. 3 over which a sprocket chain 32 travels to actuate the sprocket 33 secured to the shaft 34. This shaft 34 enters into a mechanism for controlling or arresting the operation of the machine when one or the other of the magazines are depleted of shingles. This mech-

anism will be described in detail in the following:

The shaft 20 has a beveled gear 35 keyed thereto which meshes with a pinion 36, the latter being mounted upon a shaft 37 having a sprocket wheel 38 over which a sprocket chain 39 is entrained, the sprocket chain forming part of the conveyor generally designated 30, it being understood that the opposite end of the chain 39 providing part of the conveyor travels over the sprocket wheel 40 located at the opposite end of the trough 29.

The machine contemplates the utilization of a plurality of magazines which are best shown in Fig. 1 and designated A, B, C, and D. Any number of magazines may be employed, it being understood that each magazine has a stack of shingles of a certain color arranged therein and that each stack is of a relatively different color. It will thus be readily understood that as a certain color shingle contained in the magazine D is fed into the trough 29, the conveyor carries said shingle to a position opposite the magazine C so that another differently colored shingle contained in this magazine may be ejected into the trough and piled upon the shingle previously introduced thereto. Since the magazines A and B also contain shingles of a color different from the former, it is manifest that as one shingle is piled upon another the result is a bundle of different colored shingles. It is further manifest that the length of the machine and the number of magazines of a given machine will be controlled by the number of colors or the number of shingles which it is desired to have contained in a given bundle.

Again referring to Fig. 2, it is manifest that when the motor is energized, motion will be transmitted to the conveyor including the sprocket chain 39 and the ejector mechanisms generally designated 21, causing the lowermost shingle of a stack of shingles contained in the magazines to be engaged and fed between the feed roller 24 and the feed roller 41 mounted upon the shaft 42 which is driven by means of the gears 41' and 23' provided upon the respective shafts 42 and 23. This will convey the shingle from the magazine to the feed roller shaft 28 which cooperates with the shaft 43 to thus move a shingle to the dotted line position thereof shown in Fig. 2 causing it to be deposited in the trough 29 between certain pairs of lugs 44 provided upon the sprocket chain 39 of the conveyor generally designated 30.

It may be here stated that the shafts 23, 28, 34, 42, 43, and 53 extend throughout the length of the machine and that the gear mechanism shown in Fig. 2 providing a driving connection between the motor 10 and the shafts is located at any desired position relatively to other parts of the machine. It may be further stated that each of the magazines A to D is provided with an ejector mechanism generally designated 21 and each magazine also includes a pair of feed rollers such as 24 and 41, it being understood that each of the magazines has a controlling mechanism such as that designated 45 for arresting the operation of the machine should any of the hoppers become depleted of its supply of shingles.

Since the ejector mechanism of one magazine corresponds to the structure of that of another, an explanation of the construction and operation of one will suffice for an understanding of all. By referring to Figs. 2 and 7, the construction and the mechanism for operating the ejector is clearly seen. The ejector mechanism of each magazine includes an eccentric 46 secured to the shaft 20. The strap 47 of the eccentric has a threaded extension 48 with which the element 49 is threadedly connected for adjustment. The element 49 is connected with an arm 50 through the agency of a stud and nut 51 and the arm 50 has a slot 52 whereby adjustment of throw or movement of the arm 50 may be accomplished. The arm 50 is mounted upon a shaft 53 which may be supported through the agency of an arm such as 54 extending from the main frame of the machine. An arm 55 is also connected to the shaft 53 for operation thereby and extends from the shaft in an upwardly direction toward the bottom of the magazine. A link 56 is connected to the free end of the arm 55 and said link 56 is in turn secured to the element 57, the element being designed to engage the edge of a shingle and thus assist in ejecting a shingle from the magazine. This element 57 is designed to operate in a slot 58 provided in slats 59 and 60 (see Fig. 5) which, with slats such as 61, provide a table or support for the shingles contained in the magazines located above the slots. These slats 59 to 61, inclusive, are supported at their opposite ends by means of transversely arranged supports respectively designated 62 and 63 located adjacent the opposite ends of the slats and supported by the main frame. The ejector elements 57 are each provided with a shoe 64, the upper face of which is inclined toward the rear of the machine to provide means at the forward portion of the shoe for engaging the rear edge of the lowermost shingle to separate it from the stack and eject it from the magazine upon forward movement of the ejector, the inclination being provided to allow the ejector to be moved in the opposite direction without injury to the lowermost shingle contained in the magazine upon the return movement of the ejector. The eccentric and lever mechanism just referred to is designed to impinge the lowermost shingle and impart thereto a quick initial movement to thereby insure separation of the lowermost shingle from the remainder of the stack of shingles contained in the magazine. The ejector, as before stated, feeds the lowermost shingle to the rollers 24 and 41 and thence to the rollers 28 and 43 from which they are deposited in the trough 29 where they are engaged by the elements such as 44 of the conveyor generally designated 30. The mechanism for actuating the eccentrics and the ejector is further employed to engage the shingle after it has been deposited in the trough 29 to jog an edge of the shingle into abutting relation with a vertical side wall of the trough 29 to thereby align the edges of the shingles deposited upon the conveyor. The mechanism for accomplishing the last mentioned feature includes a link 65 which has one end connected to an arm 66, the latter of which is also secured to the shaft 53. This link 65 has its opposite end connected with an arm 67, the latter of which is mounted upon a shaft 68. Another arm 69 is connected to the shaft 68 and has a link 70 connected with the upper end thereof. This link 70 is in turn secured to a rod 71 having the jogger element 72 secured thereto. The rod 71 is reciprocably mounted in lugs such as 73, it being understood that these rods are arranged below the bottom of the trough 29 with the jogger elements 72 extended through a transversely arranged slot provided in the bottom of the trough. It is manifest from this that after a shingle has been deposited in the trough, the joggers 72 engage an

edge of a shingle and bring these and the opposite edges thereof into alignment with each other.

As before stated, provision is made for arresting the operation of the entire machine when the supply of shingles in any of the several magazines becomes depleted. The mechanism shown for accomplishing this feature includes the gravity operable pivoted member 45 which pivots upon a shaft 74. The end 75 of said member extends from the shaft into the path of travel of the shingle as said shingle is ejected from the magazine. This end 75 of the member 45 is curved in the direction of travel of the shingle. The opposite end such as 76 of the member 45 is designed to cooperate with a latch or control arm 77 which is connected with a shaft 78. This latch or control arm 77 is provided with an antifriction roller 79 which is designed to cooperate with a cam 80. This cam is secured for rotation with the shaft 34 which it will be remembered is driven through the agency of the sprocket chain 32 and the sprocket wheel 31, the latter of which is secured to the shaft 23 which is driven by the gear train including the gear 22. The mechanism for arresting the operation of the machine upon the occurrence of a condition such as that above referred to also includes a flag or signal 81 and an arm 82 most clearly shown in Fig. 6 for actuating an electric switch 83 which is connected in circuit with the motor 10 to control operation of the motor. It is evident that since the end 75 of the arm 45 is located in the path of movement of a shingle as it is ejected from the magazine, said end 75 of the arm is engaged by the shingle which causes the opposite end such as 76 thereof to be located in the dotted line position thereof shown in Fig. 2 and will thus hold the arm 77 in an elevated position regardless of the position of the low portion of the cam 80. It can be seen from this that should feeding of a shingle fail to occur, the arm 45 will assume the full line or lowered position thereof shown in Fig. 2, it being understood that the arm 77 is movable relatively to and is moved through the medium of the cam 80 so as to elevate the arm 77 and allow the end 76 of the arm 45 to be released from engagement with the arm 77 so that this arm 77 is free to move in a downward direction when the lower face of the cam is located relatively to the arm to allow movement thereof in the manner described. Upon this lowering movement of the arm 77, said arm engages the arm 77' which thus causes rotation of the shaft 78 and movement of the arm 82 resulting in the operation of the switch 83 which will open the circuit of the motor and bring the machine to a rest.

It will be noted by referring to Fig. 6 that the hub of the arm 77 is provided with a cut-away portion 84, the shoulders of the cut-away portion being designed to cooperate with a pin 85 provided upon the hub of the flag or indicator 81. Under normal or operating conditions the flag is arranged in the position shown in Fig. 2, in which position the pin 85 of the flag will engage a shoulder of the cut-away portion 84 which will thus cause movement of the flag 81 when the arm 77 is moved to assume a lowered position. The flag 81 is loosely mounted on the shaft 78 and therefore, when the flag is moved by said arm to one side of the center of the shaft 78, said flag will automatically assume a lowered position as shown in Fig. 6 which will indicate to the attendant that this particular machine is not functioning.

Again referring to the magazines generally designated A, B, C, and D, it will be noted by referring to Figs. 2 and 5 that these magazines are comprised of the vertically arranged elements 86 and 87 defining the ends of the magazine and includes the uprights 88 located at the rear portion of the machine and also includes the uprights 89 and 90 located at the front of the magazine and adjacent the feed rollers 24 and 41. The elements 86, 87 and 88 are adjustably mounted upon a support or bar 91 which is supported at intervals of its length by means of supports such as 92. The uprights 89 and 90 are mounted on a similar bar designated 93, the latter being suitably connected to some stationary portion of the machine frame.

It will be noted by referring to Fig. 2 that the pairs of uprights 89 and 90 are spaced relatively different distances from the upper face of the table formed by the slats 59, 60, and 61, the uprights 90 being spaced from the table a distance only sufficient to allow a single sheet or shingle to pass between it and the table, which will thus allow the lowermost shingle to be separated from the stack of shingles contained in the magazines and be extracted therefrom, retaining the remaining shingles in the hopper. It may be here stated that the feed roller 43 is resiliently mounted in boxes 94 located at suitable points along the length of the roller 43.

It will be noted by reference to Fig. 4 that the lower portion of the sprocket chain 39 is supported during its travel. The particular means employed in the present structure is designated by the numeral 96 which, in effect, is nothing more or less than an idler sprocket, however, this sprocket is provided with a cut-away portion 97 to allow for the reception of the lugs 44 of the sprocket chain 39.

It will be further noted by referring to the rollers 41 particularly the showing thereof in Fig. 4 that these feed rollers may be adjusted along the length of the shaft 42 to thereby permit of their being arranged to compensate for shingles of different lengths.

From the foregoing description of the structure, it is evident that when the machine is in operation, the conveyor travels in a direction from the magazine D toward the magazine A and that a shingle will be ejected into the trough 29 and deposited upon the sprocket chain 39 between the elements 44 provided upon the conveyor. It is further manifest that as the conveyor travels across the front of the magazines, a shingle is ejected therefrom and respectively deposited upon a shingle previously introduced to the conveyor which results in the formation of a bundle upon different portions of the conveyor, each bundle being comprised of separate shingles which bundle may be and preferably is variegated as to color. It is further evident that the means for ejecting the lowermost shingle from the remaining shingles of the stack impinges said lowermost shingle in a manner to insure separation of the lowermost sheet from the remainder of the sheets of the stack. This feature of the structure will be more readily appreciated when the weight of a stack of shingles such as would be deposited in one of the magazines is borne in mind.

It is also manifest that a means is provided for automatically arresting operation of the machine

should one of the magazines become depleted of its supply of shingles.

Having thus described the invention, what I claim and desire to cover by Letters Patent is:

In a machine of the kind described, the combination of a plurality of sheet supporting magazines adapted to support a stack of sheets therein, and means associated therewith for removing the lowermost sheet of said stack and gathering a sheet from each magazine to thereby form a bundle, and means for arresting operation of said machine when the supply of sheets in any of said magazines is exhausted, said means including a rotatable element having a depressed portion, a member cooperating therewith adapted to enter said depressed portion and allow operation of said arresting means, and a lever for cooperation with said member, said lever providing means for preventing and permitting movement of said member into said depressed portion, said lever being movable by a sheet to said first mentioned position.

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