

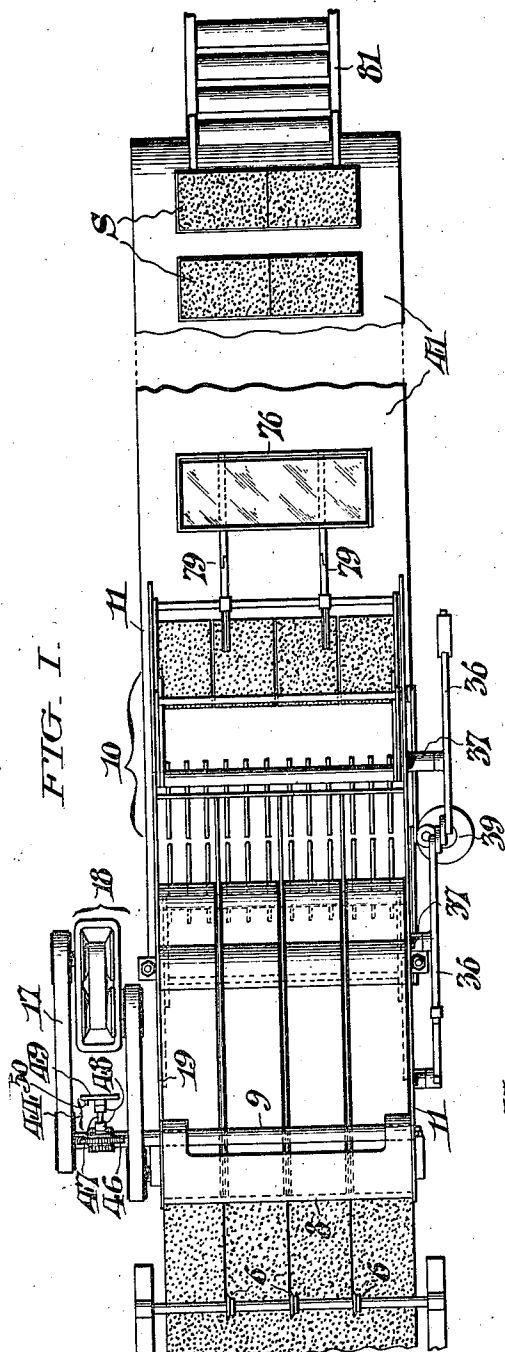
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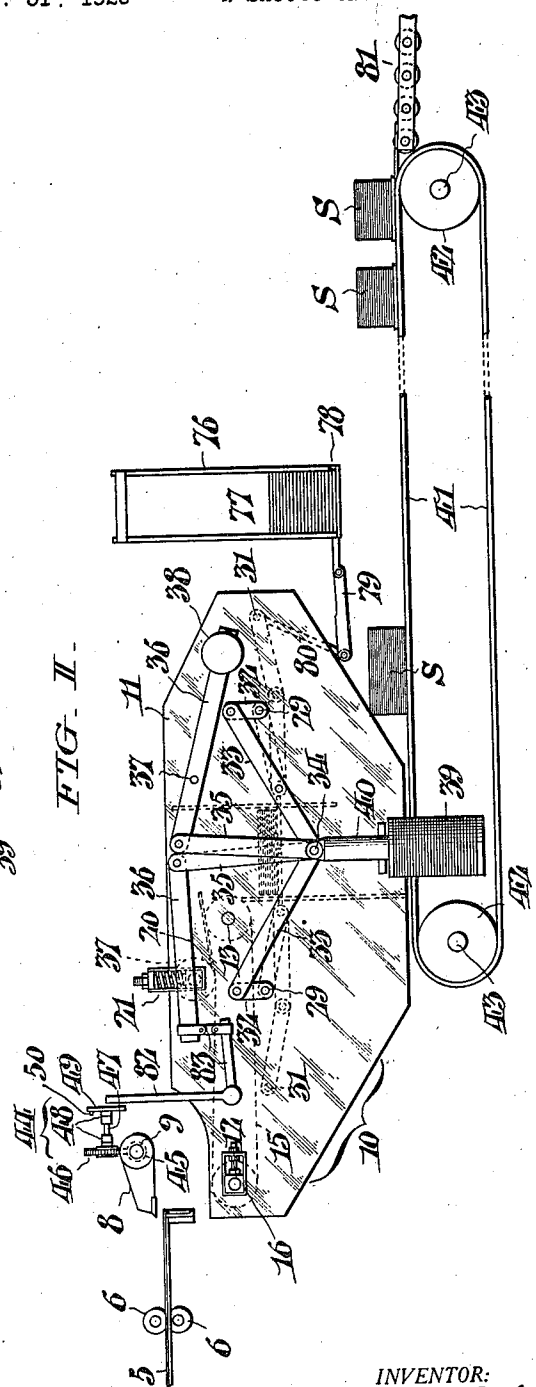
W. J. HART ET AL
COUNTING AND STACKING MACHINE

Filed Oct. 31. 1925

2 Sheets-Sheet 1



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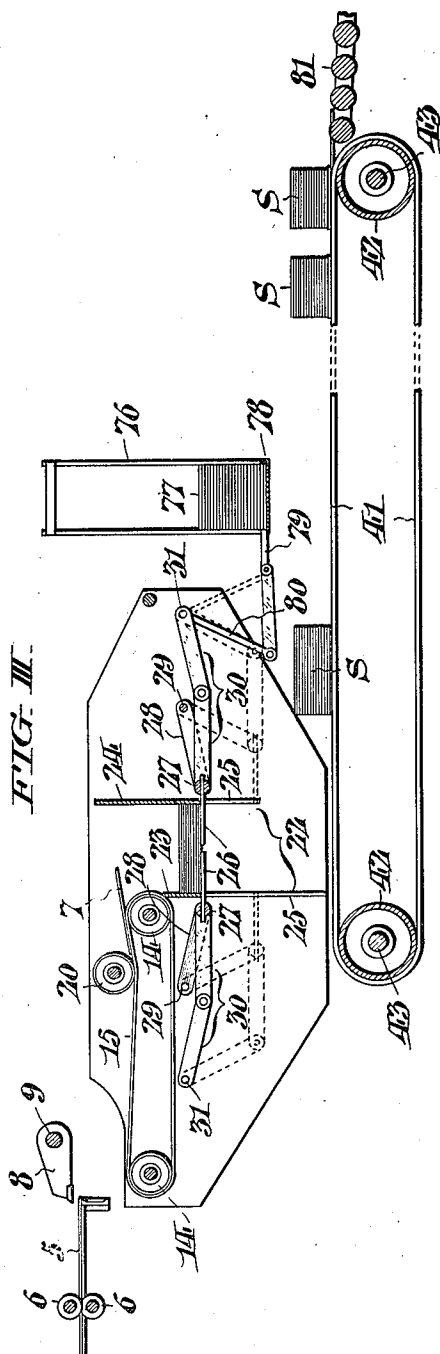
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE.

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COUNTING AND STACKING MACHINE.

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This invention relates generally to machines adapted for counting and stacking units as fed thereto either by individual or collective severance from continuous material, or otherwise supplied; while it has more particular reference to an assemblage of mechanisms useful for the purpose of piling shingles in stacks ready for packing, each said stack including a predetermined number of such shingles.

An object of this invention is to provide a machine of the typified character which is automatically controlled by means of an electrically actuated switch.

Another object is the provision of an automatic counting and stacking machine which is positive in action and not liable to get out of order incident to the handling of impregnated shingle material.

A further object is to provide a machine of the type referred to embodying means whereby its speed may be varied as desired.

With the foregoing and other objects in view, which will be apparent from the following description, this invention essentially consists of the matters hereinafter set forth, typically illustrated on the accompanying sheets of drawings, and succinctly defined as to subject-matter—as well as scope—by the appended claims.

In the drawings:—

Fig. I, is a broken plan view of a composite cutting, counting and stacking machine incorporating the present improvements.

Fig. II, is a side elevation of the same.

Fig. III, is a longitudinal section taken approximately as indicated by the arrowed lines III—III in Fig. I; and,

Fig. IV, is a diagrammatic view of an electrical control hereinafter fully explained.

As machines to which our invention may be applied are well known in the art, the following description will be mainly confined to a detailed explanation of the alleged novel features, while similar reference indicia are applied to corresponding parts in the several views of the drawings.

Referring more particularly to Figs. I—III of the drawings, it will be seen that the shingle material 5, fed from any suitable source of supply—not shown, is longitudi-

nally slit to the desired widths by means of appropriate knife rolls 6, and severed into individual shingles 7 by a revolving cutter head 8 carried by the jack shaft 9 co-ordinated, in any of the well known ways, with a convenient source of power. In the drawings we have shown—by way of example only—a machine adapted for simultaneously slitting and severing four shingles 7—7 from a width of web material; or, a less number of units may, obviously, be concurrently cut by the same machine. Furthermore it will be equally apparent that by separating the slitting rolls 6 and using the cutter head 8 only, shingle strips may be severed having a major dimension equaling the width of the material 5. Hence, it is to be expressly understood, our apparatus is easily adaptable for the cutting, counting and stacking of all kinds of strip or shingle squares.

Contiguous the aforesaid cutter head 8 is a frame 10 comprising spaced plate members 11, affording journal bearing for a pair of shafts 12, 13, each carrying a plurality of aligning rolls 14 around which are trained belts 15 functional as conveyors for the severed shingle units 7; while one of said shafts—12 for instance—is provided with adjusting means 16—Fig. II—whereby the several belts 15 are maintained taut. The shaft 13 is co-ordinated with the aforesaid jack shaft 9 through the medium of a belt drive 17, a variable speed transmission device 18 of approved standard type, and a second belt drive 19, as will be well understood from an examination of the drawings without further explanation.

Associated with the conveyor belts 15 are idler pulleys 20 vertically adjustable by conventional means 21 so as to deflect the course of said belts and effect an upward inclination of their trailing ends, as clearly indicated in Figs. II and III. As a result of this provision, in conjunction with the variable speed device 18, the severally severed shingles 7 are caused to drop evenly into the stacker 22. This stacker 22 comprises spaced comb-plates 23, 24 secured transversely across the side members 11, 11 in staggered relation; that is to say the plate 23 extends between the conveyor belts 15, and the lower edges of said side members, whereas the plate 24 is upwardly staggered

relative thereto, as clearly shown in Fig. III. It is to be noted, however, that the vertical slots 25 in the comb-plates 23, 24 at their upper ends coincide in a horizontal plane, for a purpose later on explained.

Co-operating in the comb plate slots 25 are opposed sets of prongs or bars 26 rigidly secured to transverse carrier members 27, having hinged to their free ends rock arms or levers 28, in turn pivoted by means of a horizontal shaft 29 between the side members 11, 11 aforesaid. In view of the fact that each set of prongs or bars 26 is supported and actuated—in corresponding manner—by complementary means, we will describe the associated mechanism of one set only, it being readily understood that the same equally applies to the other set. Each aforesaid carrier member 27 is provided adjacent its ends with a jointed linkage 30, carried by a transverse shaft 31, and functioning in parallel with the associated rock arms 28, whereby the prongs or bars 26 are simultaneously raised and lowered with a correlated approach and retractive motion, respectively. The means effective to retain the prongs or bars 26 elevated during feeding into the stacker 22 of a predetermined number of shingles 7 comprises short links 32, securely attached to the outer ends of the horizontal shafts 29, having rockable connection—at one side of the frame 10—through the medium of a jointed linkage 33. From the pivot or joint connection 34 of the linkage 33 are upwardly projected members 35, in turn hinged to the adjacently disposed ends of counterbalance members 36, fulcrumed at 37 to the juxtapositioned side wall 11, of the frame 10. One, or both, of the counterbalance members 36 is, or are, provided with a movable weight 38, whereby the supporting capacity of the prongs or bars 26 may be accurately adjusted to accommodate stacks composed of different numbers of shingles 7.

In order that the prongs or bars 26 may be automatically released after the required number of shingles 7 have been fed into the stacker 22, we employ a main or control solenoid 39, the plunger 40 whereof is connected to the pivot connection 34 of the linkage 33—above described—and it will be clearly apparent that, when said solenoid is energized the plunger 40 draws the linkage 33 downwardly, and vice versa. The downward movement of the linkage 33 effects a change in position of the prongs or bars 26 and associated mechanism from that shown by full lines to the dotted line posture indicated in Fig. III, thereby releasing a stack S of shingles 7 onto the continuously moving conveyor belt 41, trained around pulleys or rolls 42 carried by shafts 43.

Referring again to the solenoid 39, it is to be remarked that the same is under control

of a mechanical switch, comprehensively designated 44 in Figs. I and II. This switch 44 is operated by means of a worm gear 45 on the jack shaft 9 which drives an interchangeable worm wheel 46 at one end of a short shaft 47, journaled in bearings 48, and having a switch dial or member 49 at its other end. The switch dial 49 is provided with a laterally projecting pin or lug 50, Fig. IV, adapted to periodically close a circuit through the solenoid 39 when the proper number of shingles 7 have been fed into the stacker 22. Attention is also directed to the fact that by having the worm wheel 46 interchangeable with other gears we are enabled to vary the time periods of actuation for the dial 49, as will be well understood by those conversant with such devices, while it will be equally obvious that said dial makes one complete rotation for each stack S, hence the provision of interchangeability to accommodate stacks of different numerical content. As shown in Fig. IV, the dial pin or lug 50 is adapted to engage a projecting finger 51 of a switch member 52, pivoted at 53 and under the action of a spring 54, to bring about engagement of contacts 55 which close an independent circuit 56 through a solenoid 57, the plunger 58 whereof is hingedly connected to a switch arm 59 pivoted at 60 and under the influence of a spring 61. Associated with the contact arm 59 is a dash-pot 62 filled with oil, the viscosity whereof determines the closure of a second independent circuit 63 through another solenoid 64, the plunger 65 of which is hinged to a magnet switch arm 66, pivoted at 67, and under the action of a spring 68. The dash-pot 62, furthermore, regulates the time period of closure through the circuit 63; or in other words, the period of engagement of opposed contacts 69 for said circuit, and the opening of the circuit 56 by separation of the contacts 55 therefor, after the pin or lug 50 disengages the finger 51 aforesaid. The solenoid 64, when energized, attracts the magnet switch arm 66 and by engageable contacts 70, 71, closes a circuit through leads 72, 73 to the control solenoid 39, hereinbefore referred to. On the other hand, when the contacts 70, 71 are separated the magnet switch arm 66 automatically—under influence of the spring 68—short circuits the control solenoid 39 through a resistance 74 to absorb the back electromotive force in the coil of said solenoid, by engagement of contacts 70 with contacts 75. The object of the just described arrangement of devices is to ensure quick action of the control solenoid 39, and effect immediate return of the prongs or bars 26 to shingle sustaining position after each stack S is released on to the conveyor 41, anterior the entry of freshly cut shingles into the stacker 22, and which might otherwise impede proper closure.

Suitably arranged in juxtaposition to the frame 10 is a container 76 of packing boards 77 which are ejected in pairs through an outlet 78 by means of a reciprocable pusher 79 coordinated with, and operable from the transverse shaft 31 by means of a connecting rod or rods 80. Thus it will be readily apparent that, each time the shingle stacker 22 is dumped, two packing boards 77 for a pair of stacks S will be simultaneously ejected from the container 76 ready for packing said stacks of shingles in accordance with conventional practice. As the dumped stacks of shingles 7 are received by the conveyor 41 the boards 77 are manually applied, and each said stack is progressed onto a roller table 81 where they are tied and manually diverted to a gravity conveyor—not shown—for transportation into storage. In connection with this phase of our invention, it is well to note that, while we have shown the container 76 as of dimensions to accommodate packing boards 77 suitable to receive two stacks S, it will be self-evident said container may be made adjustable—or of other size—to receive boards suitable for individual stacks of shingle squares or strips of all sizes within the capacity of our novel apparatus.

For convenience, we may provide a hand lever 82 for manually operating the stacker mechanism, through appropriate connections 83, in the event the control solenoid 39 is not employed or gets out of order. 84 designates the main line electric service connections for the respective independent circuits 56, 63, and for supply of electromotive force to the control solenoid 39.

From the foregoing description, taken in connection with the accompanying drawings, the practicability and mode of operation involved in our novel cutting, counting and stacking, machine will be well understood without a further extended explanation. Furthermore, changes in the form, proportions and minor details, obviously, may be effected within the scope of our invention, without departing from the spirit or sacrificing any of the advantages thereof.

Having thus described our invention, we claim:

1. The combination, with means for severing material into units, of counterbalanced stack forming and releasing means for the severed units; means supplying pairs of packing boards concurrently with the release of successive stacks of said units; and a solenoid control adapted to accommodate variation in the complement of said stacks.

2. The combination, with means for slitting and severing material into units, of counterbalanced prong members and cooperative comb plates for collecting the severed units in stacks of predetermined numerical content; means delivering pairs of packing

boards adjacent to and concurrently with the release of successive stacks of said units; and a solenoid control adapted to accommodate variation in the complement of said stacks.

3. The combination, with means for slitting and severing material into units, of means collecting the same into stacks of predetermined numerical content; means delivering packing elements adjacent to successive stacks of said units; and electrically controlled mechanism adapted to simultaneously release the stacks with the requisite packing elements, said mechanism being variable to automatically accommodate stacks of different numerical content.

4. In a machine of the type described, the combination of a conveyor adapted to receive severed units of material; means impressing the conveyor adjacent its discharge end to effect even collection of said units; stack supporting and releasing mechanism capable of elevation and descent with co-related approach and retractive motion, respectively; and an electrical control therefor adapted to accommodate variation in the complement of the stacks.

5. In a machine of the type described, the combination of a conveyor adapted to receive severed units of material; means impressing the conveyor adjacent its discharge end to effect even stacking of the units; stack supporting and releasing mechanism comprising opposed members and parallel link-motions capable of elevation and descent with co-related approach and retractive motion, respectively; and an electrical control therefor adapted to accommodate variation in the complement of the stacks.

6. In a machine of the type described the combination of a conveyor adapted to receive severed units of material; means impressing the conveyor adjacent its discharge end to effect even stacking of the units; stack supporting and releasing mechanism comprising opposed prong members and parallel link-motions capable of elevation and descent with co-related approach and retractive motion, respectively; one of said link-motions having co-ordinated means functional to disengage packing elements concurrently with the discharge of successive stacks; and an electrical control therefor adapted to accommodate variation in the numerical content of the stacks.

7. In a machine of the described, the combination with stack supporting and releasing mechanism of a solenoid control, and an electromagnetic switch for short circuiting the solenoid circuit terminals to offset the effect of back electromotive force therein.

8. In a machine of the type described including stack supporting members actuable by link motion, the combination of a solenoid control, and an electromagnetic switch

functional to short circuit the solenoid circuit terminals and thereby offset the effect of back electromotive force in the solenoid coil.

5 9. In a machine of the type described including stack supporting members actuatable by parallel link motions, the combination of a solenoid control having its plunger coordinated with said link motions, and an
10 electromagnetic switch functional to short circuit the solenoid circuit terminals to offset the effect of back electromotive force in the solenoid coil.

15 10. In a machine of the type described including stack supporting members actuatable by parallel link motions, the combination of a solenoid control having its plunger coordinated with said link motions, an electromagnetic switch functional to short circuit
20 the solenoid circuit terminals, and an auxiliary switch under dash-pot influence

determining movement of said electromagnetic switch to close the solenoid circuit.

11. In a machine of the type described including stack supporting members actuatable
35 by parallel link motions, the combination of a solenoid control having its plunger coordinated with said link motions, and a control for the solenoid comprising independent
40 circuits one of which contains an electromagnetic switch to short circuit the solenoid terminals, another includes a dash-pot influenced switch determining closure of said solenoid circuit, and a third involves a mechanically timed switch adapted to accommodate variation in the periods of stack release.

In testimony whereof, we have hereunto signed our names at Madison, Illinois, this 20th day of October, 1925.

WILLIAM J. HART.
RALPH T. BOAZ.