Feb. 23, 1943. F. W. ADAMS 2,311,627

SHINGLE COUNTING DEVICE

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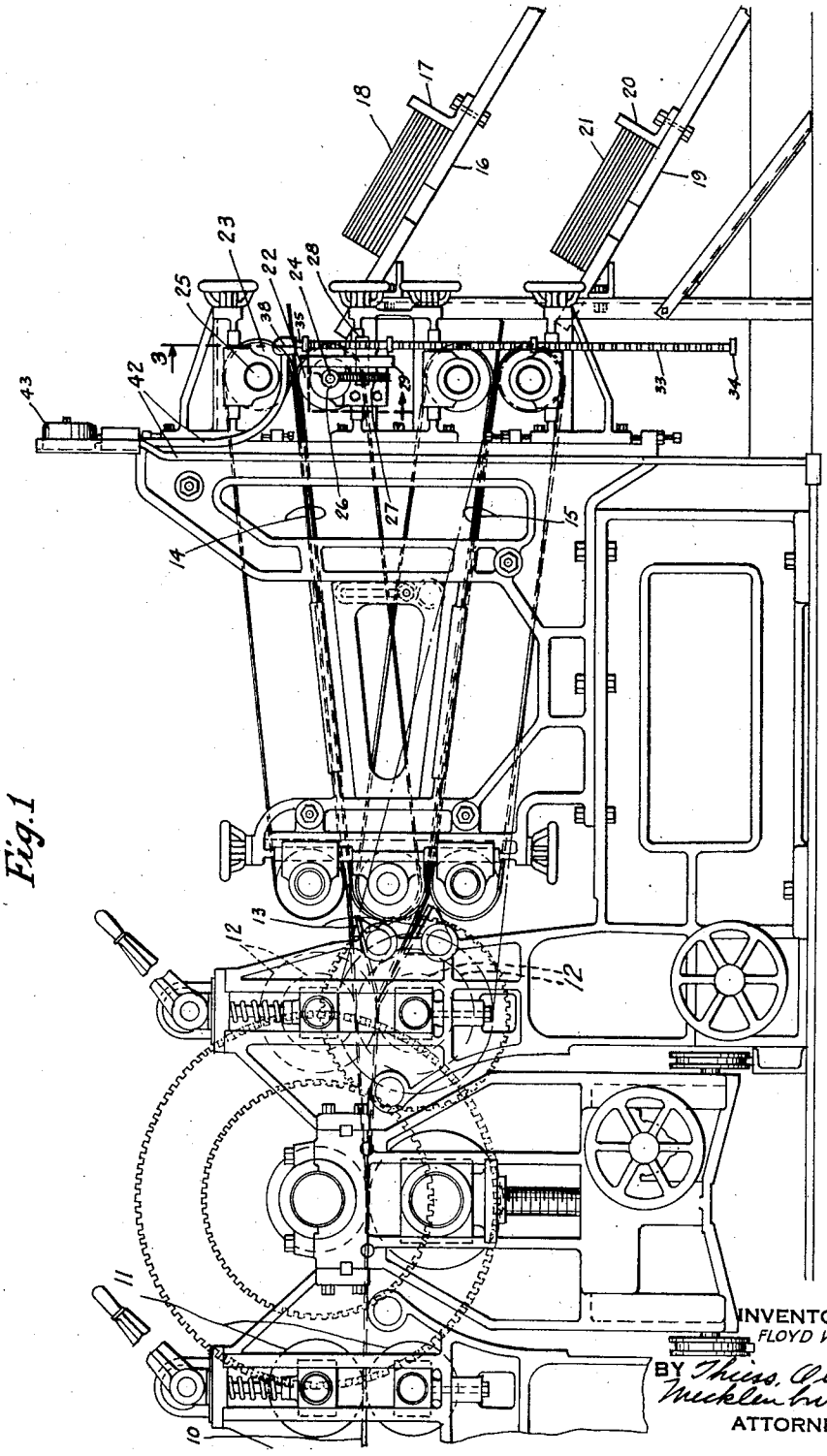

Fig. 1

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Fig. 2

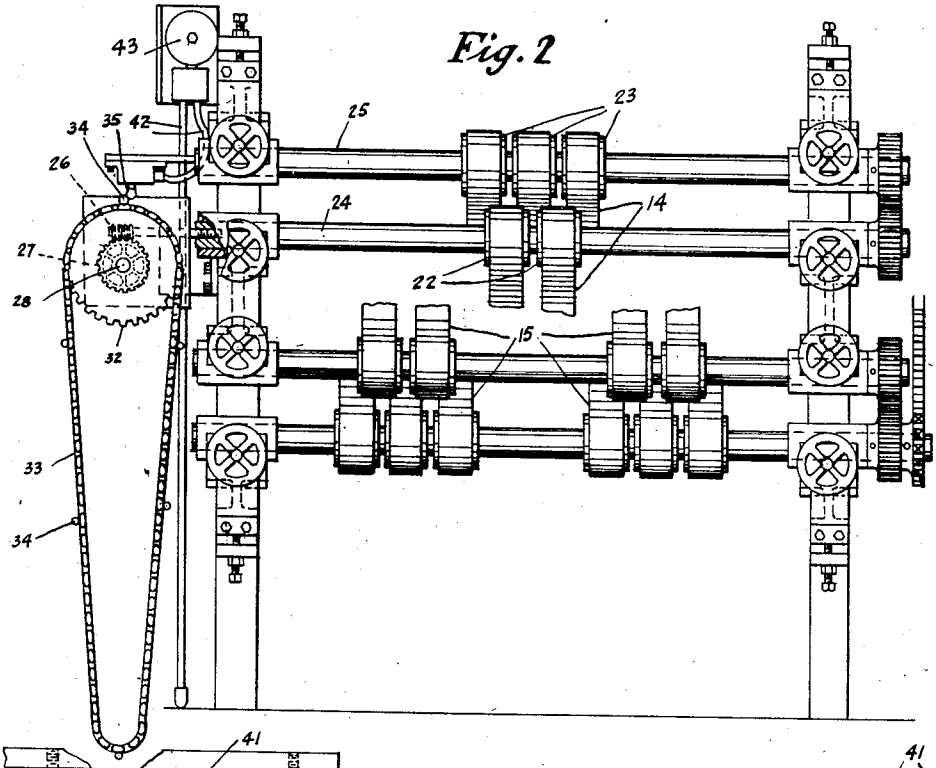


Fig. 3

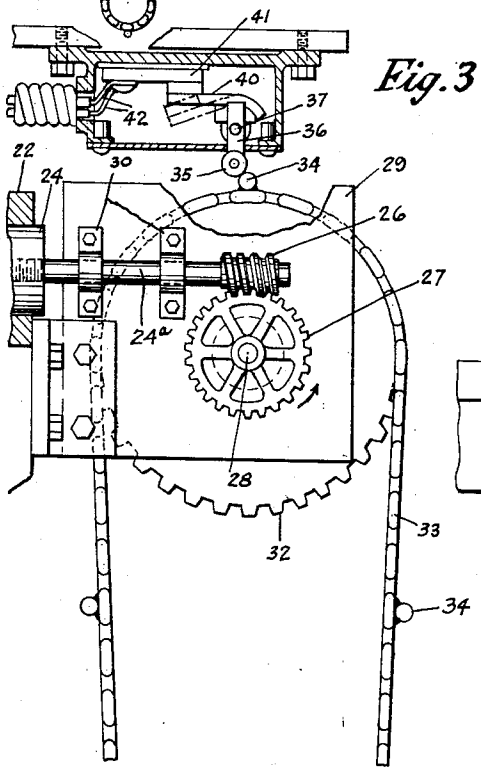
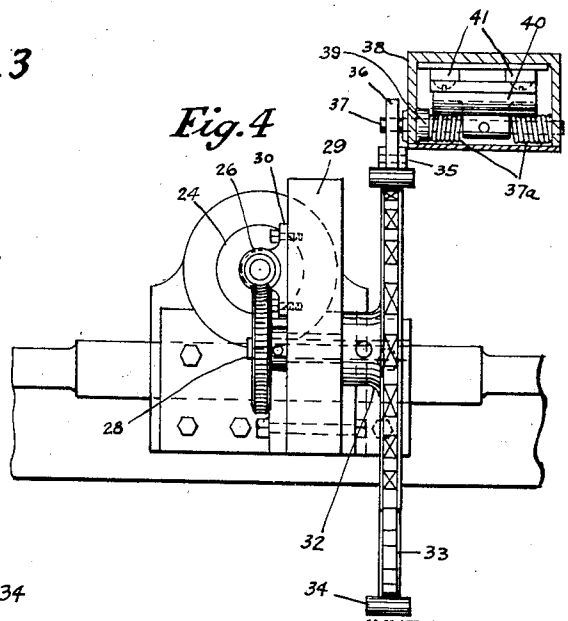


Fig. 4



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Patented Feb. 23, 1943 2,311,627

UNITED STATES PATENT OFFICE

2,311,627

SHINGLE COUNTING DEVICE

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Application September 8, 1941, Serial No. 410,007

10 Claims. (Cl. 214—6)

This invention relates to counting devices for articles of manufacture, and more particularly to counting devices adapted for counting asphalt shingles or the like delivered from a conveyor to a pickup rack.

In forming bundles of the asphalt shingles as delivered from a cutting machine, it is customary to manually assemble the shingles so that, at least in the lighter weight types of shingles, each bundle or a group of two or more bundles may contain a predetermined number of shingles sufficient to cover a "square" of surface. That is, one bundle, or if desired a group of bundles, will cover 100 square feet of surface when the shingles are laid in the required manner. The number of shingles required in a bundle or group to cover a square varies with the type of shingle and its coverage per shingle.

For some types of shingles, particularly the heavier ones, it is desirable to have a group of at least three bundles contain the required number of shingles to accurately cover a square. In other words, if a heavy type of shingle requires eighty shingles to cover a square, then the shingles may be assembled in consecutive groups of bundles, the bundles of each group containing 26, 27, and 27 shingles, respectively, and preferably, although not necessarily, in that consecutive order. Each bundle of a group may, therefore, contain sufficient shingles to cover approximately one-third of a square and the three bundles of the group will accurately cover one square.

In manufacturing these shingles, a web of asphalt material is passed through a shingle cutting machine in which the web is first cut into one or more streams of shingles, each stream the width of one shingle. With some types of shingles, three streams are simultaneously cut; the two outer shingle streams are usually diverted angularly downward and the intermediate stream is directed angularly upward by means of belt conveyors. The shingles are delivered from each conveyor onto respective "pickup" racks or "catchers."

The workman or so-called "picker" who takes the pickups from the racks must be certain that each bundle which he assembles contains the required number of the particular type of shingle being manufactured to cover the desired predetermined area. Therefore, the picker must remove the pickups from the catchers when a predetermined number of shingles have been assembled thereon as indicated by a counter signal and, when the usual type of counter is used, he must also add to, or remove from, the bundles one or more shingles so that each bundle will contain the required number.

When the usual type of automatic shingle counter is used, the counter is set to ring a bell whenever ten shingles have been delivered to a rack. Therefore, when any number of shingles other than a multiple of ten is required to form a bundle, the picker finds it necessary to keep a stack of loose shingles at his side and add a few shingles to, or remove a few from, those picked from the catcher in order to produce a bundle containing the proper number of shingles. Thus, if a type of shingle requires 43 shingles to the bundle, the picker would add 3 shingles to the 40 shingles taken from the catcher in four pickups to make the proper bundle count. If only 39 shingles are required, he would remove one shingle. With such a system, the responsibility for accuracy of the count is entirely on the picker and many errors are made. The number of shingles picked from the loose pile often varies with the result that the number of shingles in a bundle is incorrect. Furthermore, the addition of extra shingles from the loose stack or removal of shingles from the pickups entails considerable extra labor.

It is an object to provide an automatic shingle counter which will accurately count the varying number of shingles in the separate "pickups" of a series as the pickups are consecutively assembled on a catcher, so that a predetermined number of pickups of the series may form a bundle having the correct number of shingles to substantially cover a predetermined area, and also wherein the total number of shingles in each predetermined number of pickups to form a bundle may be an odd or even number as required.

It is a further object to provide, in combination with a shingle machine, a means and method for counting different numbers of shingles in certain consecutive "pickups" of a continuous cycle of groups of pickups, the number of shingles in the individual pickups of a cycle being related so that each group of a predetermined number of pickups has the same number of shingles therein irre-

spective of which pickup in the cycle is first picked up to start the cycle.

It is also an object of the present invention to produce an automatic shingle counter which will accurately count out the correct number of shingles to a bundle or a group of bundles without manual attention.

Another object of the invention is to produce an automatic shingle counter which will materially decrease the labor of the picker.

A further object is to produce an automatic counting device having interchangeable controls whereby the count for bundles or groups of bundles may easily and quickly be changed as required.

In the drawings:

Fig. 1 is a side elevation of the delivery end of a shingle cutting machine with the improved shingle counter operatively associated therewith.

Fig. 2 is a somewhat diagrammatic elevation of the discharge end of the machine with the catcher plates removed.

Fig. 3 is a fragmentary sectional elevation through the machine taken on line 3—3 of Fig. 1.

Fig. 4 is a side elevation of the counter mechanism shown in Fig. 3 with the switch box in section.

Referring to the drawings in detail, the wide web of asphalt shingle material 10 passes between a pair of driven push rolls 11 and a pair of cutting cylinders 12 which cut the web into streams of individual shingles. The shingle streams are then separated by suitable inclined plates 13 so that the central stream of shingles passes upwardly between delivery belts 14 and each of the other streams passes downwardly between delivery belts 15 (Figs. 1 and 2). The individual shingles from upper belts 14 drop onto a "catcher" comprising a plate or support 16 have an adjustable angle stop 17 thereon for engaging the edge of a stack of shingles 18. Each stack of a predetermined number of shingles is commonly called a "pickup." In a similar way the shingles from each set of lowered belts 15 drop onto a respective lower catcher comprising a plate 19 having an angle plate 20 to form a pickup of shingles 21. The upper belts 14 pass around driven rolls 22 and 23 which are mounted on shafts 24 and 25, respectively. The above described machine is well known to the art.

In the present embodiment the shingle counting device is preferably driven by the shaft 24. A worm 26 (Fig. 3) is secured to the shaft 24 by means of an extension 24a and meshes with a worm wheel 27 secured on one end of a short transverse shaft 28, the latter being rotatably supported in a bearing bracket 29. Bearings 30 support the shaft extension 24a and may also be secured to the bracket 29. A sprocket wheel 32 is secured to the end of shaft 28 opposite the worm wheel 27, and a plurality of timing chains 33, only one of which is shown, are adapted to be interchangeably suspended from the sprocket wheel 32. Tripping lugs 34 are secured in spaced relation on the links of each chain 33 and these lugs are arranged to successively contact a roller 35, which latter is rotatably mounted on one end of a switch arm 36, the switch arm being secured to an oscillatable switch shaft 37.

A housing 38 encloses the switch mechanism and provides one or more bearings 39 to oscillatably support the switch shaft 37. A contactor 40 is secured to the switch shaft 37 and makes contact with electrical contact terminals 41 when the roller 35 is moved to the left by one of the lugs 34 (Fig. 3). A coil spring 37a around the switch shaft 37 serves to open the circuit after the lug 34 passes roller 35. Conductor wires 42 leading from the terminals 41 connect a standard electric bell or other signal device 43 (Fig. 1) with a source of electrical energy, so that, when the circuit is closed by the actuation of roller 35 by the chain lug 34, the signaling device will operate, indicating that pickups with a predetermined number of shingles therein have been delivered to the catcher plates 16 and 19. The workmen then remove the pickups from the catcher plates 16 and 19 and the counting cycle is repeated.

The ratios of the gearing elements 26, 27, and 32 of the counter are so adjusted that, for each shingle delivery to the racks, the chain 33 moves the length of one of its links. The contact lugs 34 are spaced on the chain 33 as many links between them as the predetermined number of shingles in the respective pickup. A separate chain 33 is provided for each type of shingle requiring a different count. When changing types of shingles, the chain 33 with the proper spacing of lugs 34 thereon is selected and substituted on the sprocket 32 for the chain last used.

A predetermined number of "pickups," preferably four, taken from the catcher plates 16 and 19 are assembled to form a bundle of shingles of the desired count. For instance, if a type of shingle requires two bundles with 43 shingles in each bundle to cover a square, a chain of 43 links might be used and a series of four lugs spaced apart 10, 11, 11, and 11 links, respectively. Thus, one complete cycle of this chain would count four pickups, which pickups when assembled form a bundle containing the required number of shingles, that is, 43, to exactly cover one half square. The number of shingles is not the same in each pickup; however, the total is the required number 43.

When shingles of the type just mentioned, wherein more than one bundle is required to cover a square, it is preferable to provide a chain having a sufficient number of links to count out a complete cycle of two groups of pickups, each group containing a sufficient number of pickups to form a bundle and the complete cycle containing a sufficient number to form two bundles containing the correct number so that, when laid, they will cover a square. The chain for such a cycle would contain 86 links and the lugs might be spaced with the following numbers of links between successive lugs in the cycle: 10, 11, 11, 11—10, 11, 11, 11, This arrangement provides a cycle of two groups of four pickups each or 43 shingles in each group.

The shaft 24 on which the sprocket 32 is secured rotates in synchronism with the movement of the shingles so that one link of the chain passes the switch tripping roller 35 for each shingle delivery to the racks. The chain may contain a sufficient number of links and switch tripping lugs so that a complete cycle of the chain will count out the correct number of pickups for a plurality of bundles, each bundle containing the required predetermined number of shingles. With some types of shingles, particularly the heavier ones, it is desirable to assemble bundles in consecutive groups with three bundles in each group,

so that each group of three bundles will contain sufficient shingles to exactly cover a square. This also may be accomplished by using a chain in which the number of links used to count the required shingles for each group of bundles is a multiple of the total number of links in the chain.

The following tables indicate the type of chains used in actual practice for various types of shingles.

Type of shingle	Bundle counts	Chain No.	Total links	No. of links between contact lugs	Pick-ups per bundle
A	43-43	1	86	10—11—11—11—11—11—11—10	4
B	50-50	2	100	12—13—13—12—12—13—13—12	4
C	50-50				4
D	25-25				2
E	26-27-27	3	160	13—14—14—13—13—14—14—13—13—13—13—13	2
F	33-35-34	4	200	11—11—11—11—11—11—11—11—11—11—11—11—11—11—11—12—12—11—11	3

With the contact lugs spaced on the chains as indicated in the above table, it is apparent that each bundle and each group of bundles will contain the required number of shingles if the pickup is started at predetermined points in the cycle.

In order to obviate the necessity for starting the pickups at a predetermined point in the chain cycle and to provide the required number of shingles in each bundle and, as in types E and F, in each bundle and in the respective order shown, if desired, irrespective of where the pickup cycle is started, the switch tripping lugs may be spaced on the chain as shown in the following table:

Type of shingle	Bundle counts	Chain No.	Total links	No. of links between contact lugs	Pick-ups per bundle
A	43-43	1	86	10-11-11-11-10-11-11-11	4
B	50-50	2	100	12-13-12-13-12-13-12-13	4
C	50-50				4
D	25-25				2
E	26-27-27	3	160	13-14-13-14-13-13-13-14-13-14-13-13	2
F	33-33-34	4	200	11-11-11-11-11-11-11-11-12-11-11-11-11-11-11-11-12	3

This latter arrangement provides certain material advantages in that, with all types of shingles, consecutive bundles of a group with different numbers of shingles in the bundles may always be assembled in a predetermined order without requiring any attention by the workman with respect to the pickup starting point relative to the lug spacing.

The invention insures accurate bundle counts in either individual bundles or groups of bundles and very materially reduces the work required of the pickers. In fact, the human element is substantially eliminated in so far as accurate count is concerned.

Each chain may be numbered or labeled in accordance with the type of shingle with which it is to be used and the chains are easily interchangeable as they are merely removably suspended on a sprocket.

It is intended, of course, that the invention should not be limited to the specific embodiment or embodiments disclosed herein, since modifications may be made, and it is contemplated, therefore, by the appended claims to cover any such modifications as fall within the true spirit and scope of this invention.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent is:

1. In a shingle machine the combination with means for delivering consecutive shingles to a catcher to form pickups of a plurality of shingles, and means movable synchronously with the delivery of said shingles, of means controlled by said movable means to operate a signal when each pickup of a cycle comprising a predetermined number of pickups has been completed and with one or more of the pickups of each cycle containing a predetermined different number of shingles than other pickups of the same cycle.

2. In a shingle machine the combination with means for delivering consecutive shingles to a catcher to form pickups of a plurality of shingles, of a signal, means synchronized with said shingle delivery means to cause operation of said signal when each pickup has been completed, said signal operating means being so timed with the delivery of individual shingles that the number of shingles in predetermined pickups will be different than in other pickups so that the consecutive pickups as signaled will be in cycles of consecutive groups of pickups with the same number of shingles in each group, and with a different number of shingles in at least one pickup of at least one of said groups than in the remaining pickups of the same group.

3. In a shingle machine the combination with means for delivering consecutive shingles to a catcher to form pickups of a plurality of shingles, of a signal, means synchronized with said shingle delivery means to cause operation of said signal when each pickup has been completed, said signal operating means being so timed with the delivery of individual shingles that the number of shingles in predetermined pickups will be different than in other pickups so that the consecutive pickups as signaled will be in cycles of consecutive groups of pickups with a different number of shingles in at least one group than in the remaining group or groups, and with a different number of shingles in at least one pickup of each group than in the remaining pickups of the same group.

4. In a shingle machine having means to discharge consecutive shingles to a catcher, a sprocket wheel rotatable in synchronism with said discharge means, a chain removably suspended on said sprocket wheel, a signal, and a series of signal controlling means spaced on said chain so that one complete cycle of the chain moving on said sprocket will cause a cycle of signals each corresponding to a pickup, and the total corresponding to a cycle comprising a plurality of groups, all groups consisting of the same number of pickups and with one or more pickups of at least one group having a different number of shingles than the other pickups of the same group, each group containing a predetermined number of shingles to form a bundle and the complete cycle of groups corresponding to the required number of shingles to form a "square."

5. In a counting device for shingles or the like, means for successively delivering shingles to be counted, a catcher for said shingles, a sprocket wheel driven in synchronism with said shingle delivery means, an endless chain supported on said sprocket wheel, said chain being related to said delivery means so as to move the length of one link for each shingle delivered, a plurality of spaced contact lugs on said chain, each adjacent pair of lugs being spaced a multiple of the length of a chain link to form a cycle of nonuniformly

spaced lugs, and a signaling device arranged to be actuated periodically by said contact lugs and in accordance with the spacing thereof to indicate the delivery of predetermined nonuniform numbers of said shingles.

6. In a shingle counting device, means for continuously delivering shingles, a rotatable sprocket wheel operatively connected to said delivery means and synchronized with the shingle delivery, a chain suspended on said sprocket wheel, contact lugs on said chain at predetermined intervals corresponding to predetermined numbers of shingles delivered, and a signaling device arranged to be periodically actuated by said contact lugs, said lugs being spaced on said chain to operate said signals in cycles corresponding to equal numbers of shingles with signaled groups in each cycle corresponding to unequal numbers of shingles.

7. In a device for counting shingles, a plurality of catcher supports, a plurality of rotatable means operative to deliver shingles to the respective supports, a sprocket wheel operatively connected to one of said rotatable means, a chain suspended on said sprocket wheel, contact lugs at predetermined unequal intervals on said chain, and a signaling device actuated by the movement of said contact lugs to successively indicate predetermined unequal numbers of shingles delivered to said catcher supports, said lugs being relatively positioned on said chain and related to the delivery means to cause operation of said signal device during each complete cycle of said chain to indicate the delivery of a series of groups of a nonuniform number of shingles in said groups.

8. In a shingle counter, a sprocket or the like rotatable in synchronism with the consecutive delivery of shingles from a shingle machine, an endless chain or the like suspended on said sprocket, a signal, a plurality of means spaced on said chain and arranged to intermittently operate said signal for each plurality of discharged shingles forming a pickup, said pickups forming consecutive groups, each group containing a sufficient number of shingles to form a bundle, a complete chain cycle corresponding to a plurality of complete bundles having a total number of shingles in the cycle of bundles to form a square, the number of shingles in at least one pickup of at least one group being different than the remaining pickups of the same group, the spacing of said plurality of signal operating means on said chain being arranged so that the respective bundles of a complete cycle will contain the same number of shingles irrespective of which signal operating means on the chain is used to start the chain cycle with respect to the pickups.

9. In a shingle machine, means for consecutively delivering shingles to a support to form pickup stacks, and means for automatically signaling the formation of each pickup stack in cycles of constantly recurring groups of pickups with one or more pickups in each recurring group comprising a different number of shingles than in the other pickups of the same group.

10. In a shingle manufacturing machine the combination with means to consecutively deliver shingles to form a stack, of automatic means to operate a signal in cycles of a plurality of signals, said plurality corresponding to the number of groups required to form a bundle with the number of groups in a bundle corresponding to a cycle, one or more of which groups comprise a different number of shingles than other groups in a cycle.

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