(No Model.) 2 Sheets—Sheet 1.

J. E. CRISP.

TACK DRIVING MACHINE.

No. 573,449. Patented Dec. 22, 1896.

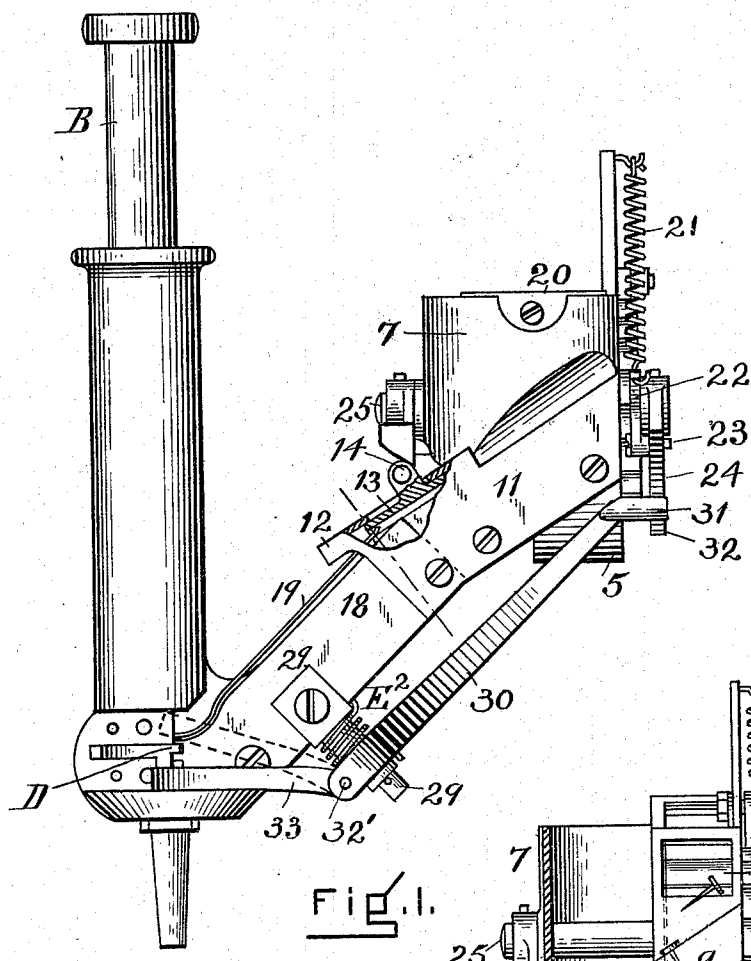

Fig. 1.

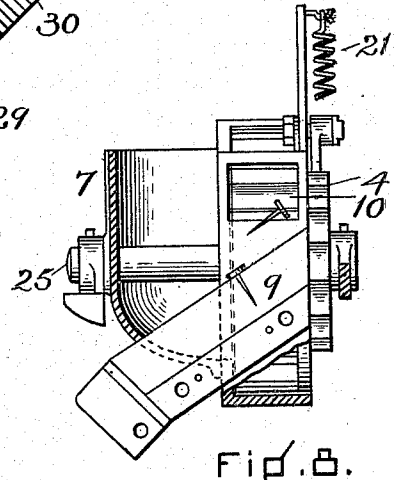

Fig. 2.

WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 7.

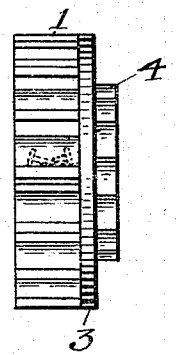
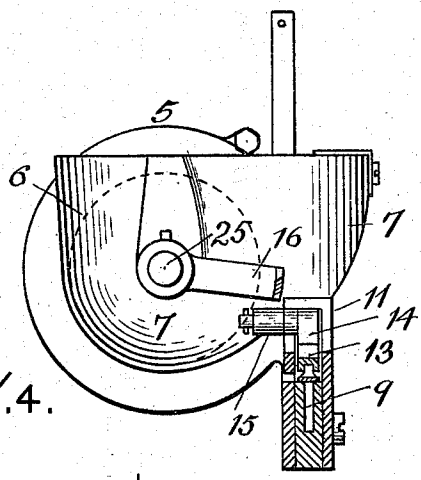


Fig. 4.



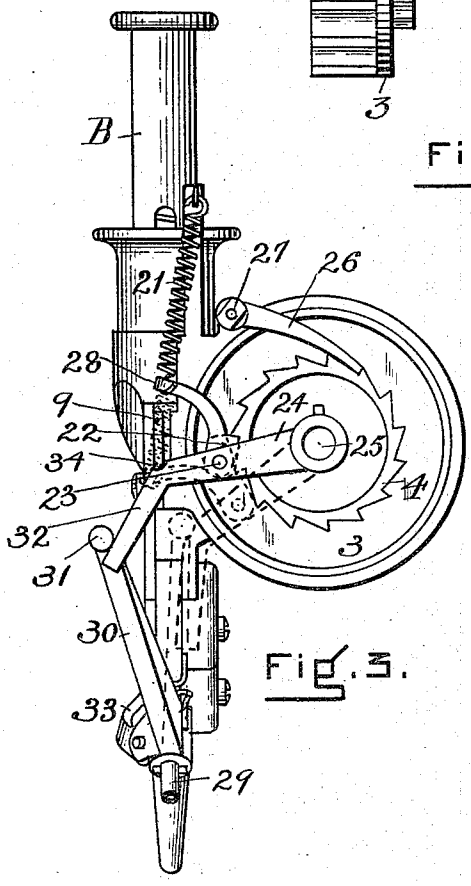


Fig. 3.

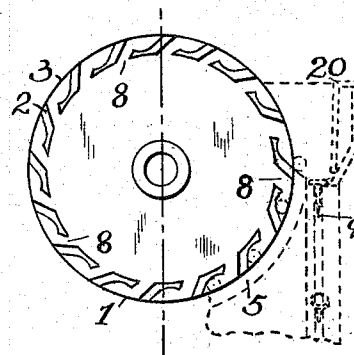


Fig. 5.

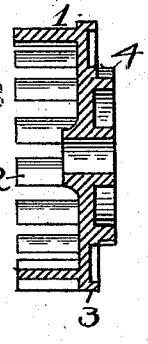


Fig. 6

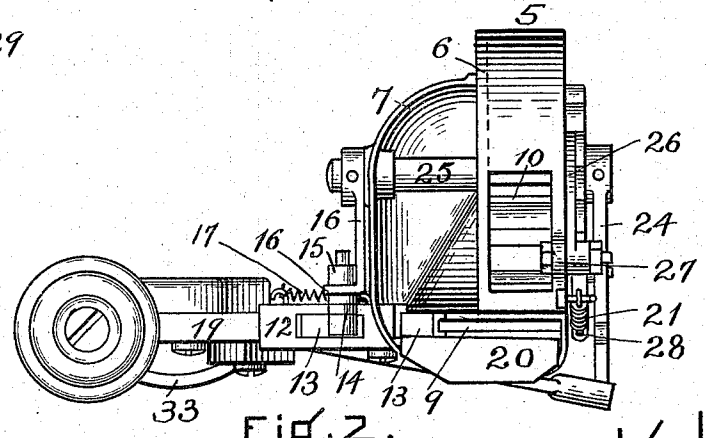


Fig. 2.

WITNESSES

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UNITED STATES PATENT OFFICE.

JOSEPH E. CRISP, OF SOMERVILLE, MASSACHUSETTS.

TACK-DRIVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 573,449, dated December 22, 1896.

Application filed November 22, 1895. Serial No. 569,814. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH E. CRISP, a citizen of the United States, residing at Somerville, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Tack-Driving Machines, of which the following is a specification.

This invention relates to improvements in mechanism which serially arranges loose or bulk tacks in the chutes of tack-driving machines.

It consists of a tack-elevator wheel of peculiar construction which separates tacks from the mass in the hopper and delivers them substantially parallel into the guide-groove of a tack-chute which is located near to the outer circumference and parallel with the axis of said elevator-wheel.

It also consists in arranging and operating the tack-elevator wheel with reference to the tack-chute so that the buckets of the elevator-wheel serially in turn form one side of the tack-receiving hopper which is usually fixed to the upper end of inclined tack-receiving chutes.

It further consists in connecting and operating mechanism for the tack-elevator wheel so arranged in combination with a hand tack-driving machine that the driving of tacks from the tack-driver correctly positions and holds the buckets of the elevator-wheel at the upper end of the tack-receiving chute. This hopper and elevator-wheel can be used in combination with any tack-driving mechanism, but in the present instance it is shown in combination with the tack-driving machine shown and described in United States Letters Patent No. 500,225, granted June 27, 1893, to J. E. Crisp and L. D. Junkins, to which reference is hereby made.

In the drawings forming part of this specification, Figure 1 is a side elevation of the hopper and tack-elevating mechanism in combination with a hand tack-driving machine, showing the relation of each to the other and also showing in section the mechanism which removes from the upper end of the tack-receiving chute tacks that are not properly located therein. Fig. 2 is a plan elevation of Fig. 1. Fig. 3 is a rear elevation of Fig. 1, showing the mechanism which operates the tack-elevator wheel. Fig. 4 is a front elevation of the tack-hopper, showing in cross-section a portion of the tack-chute. Fig. 5 is a front elevation of the tack-elevator wheel, showing by dotted lines the relation of the upper end of the tack-receiving chute to said wheel. Fig. 6 is a cross-section of the elevator-wheel shown in Fig. 5. Fig. 7 is a side elevation of the tack-elevator wheel, showing the side next the tack-chute and also showing the manner in which the tacks arrange themselves in the buckets of the elevator-wheel preparatory to their delivery in the tack-chute. Fig. 8 is a side elevation of the upper part of the tack-chute which is secured to or made integral with the casing, also showing by section and dotted lines the relation of tack-hopper and casing.

The elevator-wheel 1, Figs. 5, 6, and 7, is provided with elevating-buckets 2, which project a little more than the length of the longest tacks it is desired to use from the supporting-flange 3, on the rear side of which there is formed or attached the ratchet 4, which is provided with a tooth for each of the buckets 2.

The buckets 2 are formed on the outer circumference of the flange 3, and they are shaped, as shown in Fig. 5, so that each bucket will receive and hold two or more tacks parallel with their length, as shown in Fig. 7, when the elevator-wheel is in operative position in the casing 5. When in this position, the circumferential edges of the buckets are in intimate contact with the sides of the casing and the ends of the buckets with a rim 6, formed at the inner end of the casing, as shown by the dotted lines in Figs. 2 and 4, the elevator-wheel being introduced into the casing from the outer side, as seen in Fig. 3.

When in the casing, the buckets of the elevator-wheel form boxes open only at their inner upper edge, through which openings 8 the tacks back of the buckets pass and are retained in said buckets regardless of the inclinations of the tack-elevator wheel until they are delivered therefrom over the tack-arranging chute.

To the opposite side of the casing 5 there is attached or formed thereon the hopper 7,

into which the loose tacks to be used are placed. From the hopper 7 the tacks pass into the interior of the elevator-wheel back of the buckets.

When the elevator-wheel is revolved in the direction of the arrow, Fig. 5, tacks which are parallel with the openings 8, formed between the buckets of the elevator-wheel, pass through said openings and rest between the inner sides of said buckets and the casing 5, as shown in Figs. 5 and 7.

The tack-chute 9 is located parallel with the axis of the tack-elevator wheel and close to the side of the casing 5, as shown in Fig. 5, and the side of the casing is cut through and beveled, as shown at 10 in Figs. 2 and 5, to allow the tacks to fall directly into the groove of the chute when a bucket of the tack-elevator is positioned and held with reference to the incline, as shown in Fig. 5. The tack-chute 9 is preferably made in two parts, one secured to or made integral with the casing and the other part 11 secured thereto, as shown in Fig. 1, the tack-receiving groove being formed between the two parts. The part 11 is made with a projecting lip 12, as shown in Figs. 1, 2, and 4, in which is formed a guideway for the reciprocating slide 13. The reciprocating slide 13 is fitted to move close to the upper surface of the tack-chute, and its under surface is provided with a groove large enough to allow the free passage of the tack-heads when they are properly positioned in the groove of the tack-chute.

To the upper part of the slide 13, on a suitable projection 14, there is pivoted the roll 15, which the cam 16, when actuated, as hereinafter described, acts against and presses the slide 13 against the tension of the spring 17, and then suddenly releases it.

When from any cause the tacks delivered from the buckets of the tack-elevator wheel do not fall correctly into the groove of the tack-receiving chute 9 and remain resting thereon, so as to prevent the downward flow of other tacks, the motions just described of the slide 13 cause said tacks to be removed from the surface of the tack-chute and fall back into the tack-hopper, from which they pass again to the interior of the tack-elevator wheel to be again raised and dropped over the upper end of the tack-chute.

To the lower end of the tack-chute 9, attached to the casing and hopper, the upper end of tack-chute 18, attached to the tack-driver, is secured, as shown in Fig. 1, in any desirable manner, the upper end of the cover 19 of the chute 18 being fitted to the groove in the under surface of the slide 13, so that the heads of the tacks will pass free under the cover 19.

The side of the hopper 7 is extended over the upper end of the chute 9 a little more than the length of the longest tacks which are used, as shown by Figs. 2 and 4. The lower part of this extension is drawn in toward and fitted close to the top of the chute, so as to form one side of a tack-receiving hopper at the upper end of the tack-chute.

As before described, the buckets of the tack-elevator wheel serially form the other side of this tack-receiving hopper.

To insure the tacks passing substantially correct into the groove of the tack-chute, a very thin elastic diaphragm or guide-plate 20, as shown in Figs. 1, 2, 4, and 5, is fixed over the upper end of the tack-chute, which acts to guide the tacks parallel into the groove of the tack-chute. This diaphragm acts as a guide-plate until the tacks supplied by the elevator-wheel are in excess of the quantity necessary to fill the groove of the tack-chute. When this point is reached, the diaphragm yields and the tacks delivered from the elevator-wheel mass up until enough tacks are driven from the nozzle of the tack-driver to leave a space at the upper end of the tack-chute. When this occurs, the motion of the slide 13 causes the lower tacks to fall back into the tack-hopper, and the yielding of the diaphragm allows the tacks above to follow them.

Should any tacks get positioned endwise in the openings 8 of the elevator-wheel, so that they would remain in and project beyond the circumference of the elevator-wheel and not drop out over the groove in the tack-chute and contact with the casing, they would stop the revolution of the elevator-wheel. To prevent this casualty, the opening 10 in the casing is extended to about vertically over the axis or center of the elevator-wheel, so that said tacks by gravitation will fall back into the interior of said wheel back of the buckets.

The tack-elevator wheel is given active motion by the spring 21, one end of which is attached to a projection formed on or attached to the casing 5, and the other end to the extension 28 of the pawl 22, which is pivoted at 23 to the swinging lever 24, Figs. 1, 2, and 3. The lever 24 is fixed to the shaft 25, which is free to turn in bearings formed in the tack-elevator wheel and the tack-receiving hopper, and which has fixed to the opposite end the swinging cam 16, which operates the slide 13.

When the swinging lever 24 is depressed, as shown by the dotted lines of Fig. 3, the pawl 22 will move down the space of one of the ratchet-teeth of the tack-elevator wheel, and when the lever 24 is released the spring 21 will act to move the tack-elevator wheel forward, so as to bring the next serial bucket in position to deliver whatever tacks it may hold over the tack-arranging chute, the motion of the swinging cam 16 and the slide 13 being coincident with that of the swinging lever 34.

To prevent retrograde movement of the tack-elevator wheel, a swinging retainer-pawl 26 is suitably pivoted to the casing 5 at 27, as shown in Figs. 2 and 3.

To prevent the inertia given to the tack-elevator wheel by the action of the spring 21 from causing said wheel to move farther than

the desired space, from bucket to bucket, the pawl 22 is provided with an extension 28, to which the spring 21 is secured.

The leverage of the extension 28 causes the face of the pawl 22 to act with a clamping action against the face of the ratchet-teeth of the tack-elevator wheel and causes said wheel to stop at the limit of the swinging motion of the lever 24. In the present instance depressing the lever 24 and controlling its range of motion is accomplished as follows: A pivot-pin 29 is fixed under the center of the part of the tack-chute fixed to the tack-driver, as shown in Figs. 1 and 3.

Fitted to swing upon the pivot 29 is the swinging lever 30, whose upper end 31 engages with an angular extension 32, formed upon or attached to the swinging lever 24. Pivoted to the opposite end of the lever 30 at 32′ is the swinging lever 33, whose free end can be swung into engagement with the tack-feeding finger D of the patent hereinbefore referred to. When in this position, the spring E^2 will cause the tack-feeding finger D to operate as described in said patent and also cause the lever 30 to swing in unison therewith.

By the above-described mechanism each reciprocation of the plunger B of the tack-driver causes the tack-elevator wheel to move the space of one bucket, where it is held substantially fixed until the next reciprocation of the plunger B, and the tack or tacks arranged in and carried up by said bucket are delivered substantially parallel over the upper end of the tack-arranging groove of the tack-chute. If the incline 32 of the lever 24 was of sufficient length to engage with the side of the upper end 31 of the lever 30 when in the position shown by the dotted lines of Fig. 3, the action of the spring 21 would be transmitted to the lever 33 and cause the feed-finger D and its attachments to clamp the driver of the tack-driving machine and prevent the upward rise of the plunger B. To prevent this action of the spring 21, the length of the incline 32 is limited by the notch or depression 34, formed at the point of union of the incline 32 and lever 24. When the upper end 31 of the lever 30 rests in the depression 34, side pressure upon the part 31 is relieved and changed into tension upon the lever 30, and the part 31 acts as a lock to hold the lever 24 at its downward limit of motion until the plunger B has raised sufficient to allow the spring E^2 to swing the tack-feeding finger inward and move the end 31 of the lever 30 out of the depression 34. The spring 21 will then act as hereinbefore described and move the tack-elevator wheel one space. The working face of the swinging cam 16 is also fitted to act as a lock against the action of the spring 17 at the termination of its active movement by allowing its squared end to pass beyond the center of the roll 15 after the cam or angular part has moved the slide 13 back the desired distance.

The buckets of the tack-elevator wheel are designed to hold and carry about two tacks of the largest size to be used in the tack-driving machine, or, in other words, to carry tacks enough to the inclined tack-chute to give a supply slightly in excess of the demand.

In operation the loose tacks are placed in the hopper 7. From thence they flow through the opening in the casing over the rim 6 to the interior of the elevator-wheel back of the buckets 2.

When the elevator-wheel is revolved in the correct direction, the tacks roll over and over in a mass, and some of the outer tacks of the revolving mass pass through the openings 8 to the buckets of the elevator-wheel, which are back of the axis of its revolution with reference to the delivery-opening through the casing. These tacks arrange themselves parallel with the inner surface of the buckets of the elevator-wheel by their slight friction against the side of the stationary casing in which the elevator-wheel revolves.

When the tacks in the buckets of the elevator-wheel have been moved up to the opening 10 through the casing over the groove of the tack-arranging chute, they roll from said buckets substantially parallel therewith, and the diaphragm 20 guides them into said groove.

Having thus described my invention, its construction and operation, I claim and desire to secure by Letters Patent—

1. In combination with mechanism for driving loose tacks, a tack-elevator wheel fitted to revolve in a casing, openings from the interior of said wheel to the buckets thereof, tack receiving and delivering buckets adapted to deliver tacks substantially parallel with the groove of a tack-arranging chute located near the circumference of said tack-elevator wheel, and parallel with the axis thereof, substantially as and for the purpose set forth.

2. In combination with mechanism for driving loose tacks, a tack-elevator wheel fitted to revolve in a casing which surrounds the same, openings from the interior of said wheel to the buckets thereof, a delivery-opening through the side of the casing from said buckets, buckets for said wheel designed to carry tacks to said opening regardless of the angular inclinations of said wheel, substantially as and for the purpose set forth.

3. In combination with mechanism for driving loose tacks, a tack-elevator wheel fitted to revolve in a casing which surrounds the same, openings from the interior of said wheel to the buckets thereof, a delivery-opening through the side of the casing from said buckets, and mechanism to move said wheel bucket by bucket opposite said opening, substantially as and for the purpose set forth.

4. In combination with mechanism for driving loose tacks, a tack-elevator wheel fitted to revolve in a casing which surrounds the same, a hopper connected to said casing which communicates with the interior of said wheel, a delivery-opening through the side of the

casing from said buckets, and mechanism to move said wheel bucket by bucket opposite said opening, substantially as and for the purpose set forth.

5. In combination with mechanism for driving loose tacks, a tack-elevator wheel fitted to revolve in a casing, openings from the interior of said wheel to the buckets thereof, a delivery-opening through the side of the casing from said buckets, mechanism to move and then clamp said wheel bucket by bucket opposite said opening, substantially as and for the purpose set forth.

6. In combination with mechanism for driving loose tacks, a tack-elevator wheel fitted to revolve in a casing which surrounds the same, openings from the interior of said wheel to the buckets thereof, a delivery-opening through the side of the casing from said buckets, an inclined tack-chute located near the circumference of said elevator-wheel and parallel with the axis of revolution thereof, substantially as and for the purpose set forth.

7. In combination with mechanism for driving loose tacks, a tack-elevator wheel fitted to revolve in a casing which surrounds the same, openings from the interior of said wheel to the buckets thereof, a delivery-opening through the side of the casing from said buckets, an inclined tack-chute located near the circumference of said elevator-wheel and parallel with the axis of revolution thereof, carrying and delivering buckets for said tack-elevator wheel, formed to act as one side of the chute-hopper and mechanism to move and stop said tack-elevator wheel with reference to the opening through the casing, substantially as shown and described.

8. In combination with mechanism for driving loose tacks, a tack-elevator wheel fitted to revolve in a casing which surrounds the same, a delivery-opening through the side of said casing, an inclined tack-chute located near the circumference of said elevator-wheel and parallel to the axis of revolution thereof, an elastic diaphragm located over the upper end of the tack-chute opposite the delivery-opening through the side of the casing, and mechanism to move and stop said tack-elevator wheel with reference to said opening, substantially as and for the purpose set forth.

9. In combination with mechanism for guiding loose tacks, a tack-elevator wheel, fitted to revolve in intimate contact with the sides and ends of the casing said casing having an opening leading to a raceway and designed to receive loose tacks at the interior circumference of its buckets and deliver them at its exterior circumference, said buckets being of sufficient size to receive and carry two or more tacks, substantially as described.

JOS. E. CRISP.

Witnesses:
FRANK G. PARKER,
EDWARD S. DAY.