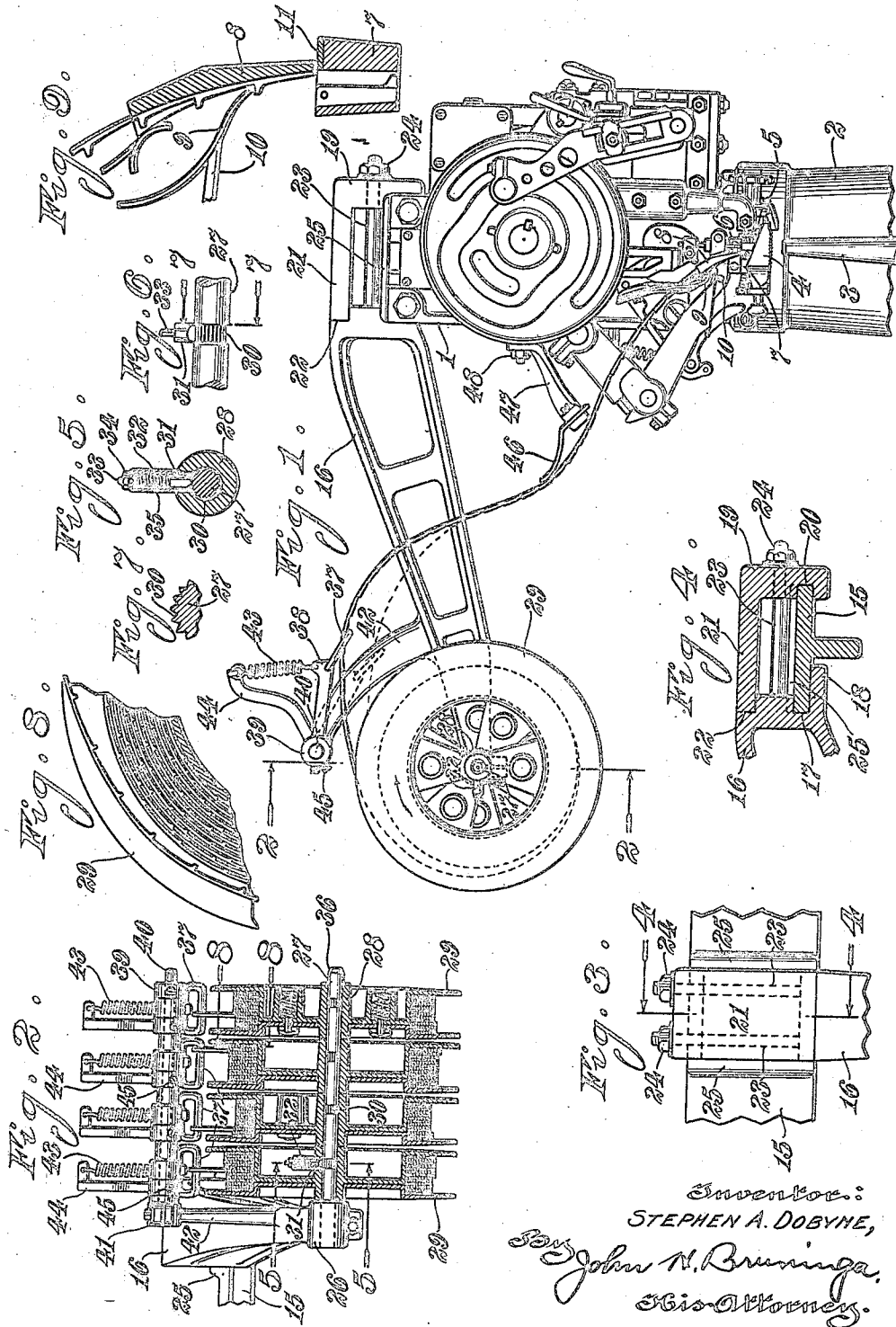


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FASTENER STOCK SUPPLYING MECHANISM FOR FASTENER INSERTING MACHINES.
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UNITED STATES PATENT OFFICE.

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FASTENER-STOCK-SUPPLYING MECHANISM FOR FASTENER-INSERTING MACHINES.

Application filed February 26, 1919. Serial No. 279,381.

To all whom it may concern:

Be it known that I, STEPHEN A. DOBYNE, a citizen of the United States, and residing at St. Louis, Missouri, have invented the new and useful Improvement in Fastener-Stock-Supplying Mechanism for Fastener-Inserting Machines, of which the following is a specification.

This invention relates to mechanism for feeding strands of fasteners from coiled sources of supply, and more particularly, to means for feeding a strand of connected nails from a reel on which the strand is coiled, to fastener inserting mechanism which severs the nails from the string and drives them.

Fastener inserting machines utilizing strands of connected nails have the fastener stock coiled on a reel or reels mounted on the machine; the strand of connected nails is conducted or fed from the coiled source of supply to the operating means which completely severs the partially severed nail from the string and drives it. In such a machine the string is fed by the engagement with the head of a nail on the string in order to insure the accurate cutting of the nail just above its head. A stop or pawl is provided to arrest retrograde movement of the strand, this pawl engaging the head of a nail on the string so as to insure accurate positioning of the strand.

This strand should have its nails as nearly severed as possible without, however, causing the strand to become broken, as the operation of the machine is thereby interfered with and a piece of work into which the fasteners are driven may thereby become spoiled. Accordingly violent kinking or twisting of the strand must be avoided in order to prevent such parting.

In order to permit shipment and utilization of the fastener stock, it should, of course, be coiled so as to not only present the smallest possible space, but also to permit ready delivery of the strand. Such a coil should, of course, be wound as closely as possible in order to not only save space, but also prevent tangling of the coils.

In order to obtain all of these desirable features, a limitation or difficulty is encountered which is essentially inherent in coiled fastener stock strands and more especially in strands of connected nails. Such

a strand presents a series of lateral projections, formed by the heads of the nails, which are liable to become caught in the adjacent coils on the reel so that when it is attempted to unreel the strand from its coiled source, the strand is liable to become kinked or even broken, where it is the weakest, namely where one nail point joins the adjacent nail head.

One of the objects of this invention, therefore, is to provide mechanism of the class described which is constructed to cause release of the strand at the source and to loosen the unwinding coil at source of supply.

Another object is to provide mechanism of the class described which is constructed to not only insure delivery of the strand but also to prevent binding, kinking and breaking of the strand.

Another object is to provide mechanism of the class described whereby a retrograde tension is applied to the strand in order to insure accurate positioning, feeding and delivery of the strand to operating mechanism.

Another object is to provide a fastener inserting machine of the class described which will employ the desirable features heretofore described, in order to insure accurate, constant and certain delivery of the fastener strand to the fastener inserting mechanism.

Further objects will appear from the detailed description taken in connection with the accompanying drawing, in which:

Figure 1 is a front elevation of a fastener inserting machine showing the mechanism embodying this invention;

Figure 2 is a section on the line 2-2, Figure 1, showing more particularly the reel and auxiliary mechanism;

Figure 3 is a detail showing the attachment of the reel bracket to the fastener inserting machine;

Figure 4 is a section on the line 4-4, Figure 3;

Figure 5 is a section on the line 5-5, Figure 2, showing the ratchet and detent mechanism for restraining the movement of the reel;

Figure 6 is another detail of the same mechanism;

Figure 7 is an enlarged section on the line 7-7, Figure 6;

Figure 8 is an enlarged section on the line 8—8, Figure 2, showing the nail reel; and

Figure 9 is a detail enlarged section showing the feeding and arresting mechanism of the fastener inserting machine.

Referring to the accompanying drawing, the invention is shown as applied to a fastener inserting machine of the well known string nail type, the particular embodiment being that shown in application, Serial Number 174,096, filed June 11, 1917.

The fastener inserting machine comprises a machine head 1 mounted on a column 2, a work support 3, a presser foot 4, an awl 5, a driver 6, a throat 7, a string nail guide 8 provided with a stop pawl 9 and a feeding and cutting member 10 cooperating with a die 11 on the throat 7, all as shown in the application heretofore referred to.

In the operation of this machine, the feeding and cutting member 10 moves down along the stop pawl 9 which is yielding, until it engages the head of the first nail on the string; then moves down to feed the first nail into the throat 7, being arrested by engagement with the top face of the throat; the feeding and cutting member then moves along the throat to the right, Figure 9, and cooperating with the die 11 to sever the first nail now in the throat from the string, the nail guide 8 yielding during such movement; the feeding and cutting member 10 now moves back along the string nail guide 8, but as the head of the next succeeding nail has moved below the end of the stop pawl or plate 9, retrograde movement is prevented as the feeding and cutting member moves over the head of the nail now below the stop pawl 9.

Mounted on a cross-beam 15 on the machine head is a bracket 16. This bracket is provided with an undercut portion 17 taking over one of the flanges of the beam and having a lip 18 taking underneath the beam. A clamping element 19 has a channel 20 engaging the opposite edge of the beam and has a web 21 engaging a cut out portion 22 in the bracket 16. One or more studs 23 tapped into the bracket passing through the clamping element 19 and provided with nuts 24 operate to securely clamp the bracket in position on the machine head. It will, therefore, be seen that the bracket is detachably mounted on the machine head, embraces the beam and is securely clamped in position. In order to readily locate the bracket on the machine head, the cross-beam 15 is provided with lugs 25 which are spaced to receive the bracket and clamping element therebetween.

Mounted on the end of the bracket is a split bearing 26 arranged to receive a shaft 27 which is clamped in the bearing. This shaft 27 is arranged to receive the hubs 28

of a series of reels 29 which may be constructed as shown in application Serial Number 245,731, filed July 19, 1918.

The shaft 27 is long enough to permit a series of reels to be arranged therealong, depending upon the number of strands of fastener stock which it is intended to employ in the particular machine under consideration.

The shaft 27 is provided with a series of grooves 30 providing surfaces of smaller diameter than the shaft so as to form side shoulders as shown more particularly in Figure 6. Each of these reduced portions forming the grooves is toothed as shown in Figure 7 on preferably about a sixty degree angle so as to provide rising and falling surfaces. These teeth are adapted to be engaged by a detent 31 having its end arranged at the same angle and sliding in a tube 32 tapped into the hub 28. The detent has a reduced shank 33 which passes through the end of the tube so threaded to receive a stop nut 34 and is encircled by a spring 35. The spring operates to hold the detent in firm engagement with the ratchet 30 while the stop 34 prevents inward movement too far of the detent when the reel is removed from the shaft. In order to permit ready placement of the reel on the shaft, the end of the latter is coned as shown at 36 so as to permit the detent to readily slide on the shaft. After the reel is in place, it will drop into the reduced portion, and this detent engaging with the shoulders on the reduced portion will effectually retain the reel against endwise movement on its shaft. It will be understood, of course, that the shaft, and more particularly the ratchet portion 30 and the detent 31 are hardened to prevent wear.

Each strand of fastener stock passes from the reel through an elongated eye 37 mounted or formed on the end of an arm 38, pivoted on a shaft 40, clamped in a bearing 41 on an arm 42, formed on or secured to the bracket 16. The arm 38 is loose on the shaft 40 and is connected by a spring 43 with an arm 44 clamped on the shaft 40 by a suitable screw 45. In this way, the tension of the spring 43 can be adjusted by adjustment of the arm 44 on the shaft 40. It will be understood that there are a series of eyes and their corresponding tension springs arranged along the shaft 40, one for each reel, and that the eyes are suitably rounded so as to permit positioning of the strand. The arms 38 and 44 are spaced by collars and retained by an end collar 39.

The strand, passing through the eye, is engaged by a yielding finger 46 mounted on a bracket 47 secured by a screw 48 to the machine head. This spring finger 46 forms a tensioning device engaging the opposite side of the string from that engaged by the

eye 37 and that the string or strand then passes to the string nail guide 8. There are a series of fingers 46 one for each strand.

During the operation of the fastener inserting machine, the movement of the feeding and cutting member will, as heretofore described, feed the strand step by step and intermittently. As the strand is fed there is applied a pull thereon tending to move the reel in the direction of the arrow, Figure 1, so as to unwind the coil on the reel. This movement is however, restrained by the engagement of the detent on the reel with the ratchet on the shaft. The result is, therefore, that the tension devices 37 and 46 are both placed under tension. Now it will be noted that these tension devices operate oppositely to deflect the strand from its normal course in opposite directions. The tension device 46 will, of course, yield only slightly, but the tension 37 will yield considerably until it moves to dotted position, Figure 1. At this time, the tension between the ratchet and detent is overcome, the detent rises to the top of a tooth on the ratchet so that the tension on the reel is suddenly released. The result, therefore, is that the tension 37 moves suddenly from dotted to full line position, Figure 1, while the finger 46 will suddenly move back with the result that a whipping action is imparted to the strand. The strand being fed by the feeding and cutting member, as this feeding and cutting member moves back, the strand is allowed to move back under the tension of the tension devices 37 and 46 until it is suddenly arrested by the stop pawl or plate 9. The result is that there is a sudden movement given to the strand in a similar way as if one end of a rope is given a wave movement. The result is, therefore, that this wave movement is imparted along the strand and travels from the arrested end, in engagement with the stop 9, towards the reel, with the result that the coil is released nearly half way around the reel as shown in Figure 1 and also Figure 8. The result is, therefore, that the strand is released at its source, by loosening the unwinding coil, leaving the source, from the remaining coils in the reel. This insures that the strand coil being unwound, is separated from the adjacent coil or coils not by a pulling movement, but by a straight outward movement or radial movement applied to the coil over half of its circumference, so that this coil is in effect loosened by a radial movement, so that the heads of the nails over that coil cannot catch. As a result, therefore, over half of a coil is continually being loosened and unwound, and remains unwound during the operation of the machine, so that there is no pulling action at all and all danger of kinking and breaking is, therefore, avoided.

This mechanism has an additional advantage in that as a retrograde tension is applied to the strand, it is insured that this strand will always be positioned in correct position, with the head of the last nail against the stop, so that this nail will always be in position and will not be overthrown during the speedy operation of the machine. This is an important feature in string nailing machines where the string must be fed accurately to position the end face of the head of the nail at the cutting position.

It is obvious that various changes may be made in the details of construction without departing from the spirit of this invention; it is, therefore, to be understood that this invention is not to be limited to the specific construction shown and described.

Having thus described the invention, what is claimed is:

1. Mechanism for feeding a strand of fastener stock from a coiled source of supply to operating means, comprising means for guiding the strand, and yielding means adapted to deflect the strand from its normal course at a plurality of spaced points along the strand, adapted to release the strand from the remaining coils of stock at the source.
2. Mechanism for feeding a strand of fastener stock from a coiled source of supply to operating means, comprising, means for guiding the strand, and yielding means adapted to deflect the strand from its normal course adjacent the source and the operating means respectively, adapted to release the strand from the remaining coils of stock at the source.
3. Mechanism for feeding a strand of fastener stock from a coiled source of supply to operating means, comprising, means for guiding the strand, and means oppositely engaging the strand adapted to deflect the strand from its normal course at a plurality of spaced points along the strand, adapted to release the strand from the remaining coils of stock at the source.
4. Mechanism for feeding a strand of fastener stock from a coiled source of supply to operating means, comprising, means for guiding the strand, and means engaging the strand adapted to oppositely deflect the strand yieldingly from its normal course at a plurality of spaced points along the strand, adapted to release the strand from the remaining coils of stock at the source.
5. Mechanism for feeding a strand of fastener stock from a coiled source of supply to operating means, comprising, means for intermittently feeding the strand adapted to permit substantial retrograde movement of the strand, means for yieldingly restraining feeding movement of the strand, and means for arresting retrograde movement of the

strand, adapted to release the strand from the remaining coils of stock at the source.

5 6. Mechanism for feeding a strand of fastener stock from a reel to means for operating on fastener stock, comprising, means for feeding the strand, means operating in timed relation therewith for causing the reel to move at the termination of the feed of the strand.

10 7. Mechanism for feeding a strand of fastener stock from a reel to means for operating on fastener stock, comprising, means for yieldingly deflecting the strand, and means for restraining and suddenly releasing the reel.

15 8. Mechanism for feeding a strand of fastener stock from a reel to means for operating on fastener stock, comprising, means for yieldingly deflecting the strand, and means for restraining the reel adapted to cause sudden release thereof.

20 9. Mechanism for feeding a strand of fastener stock from a reel to means for operating on fastener stock, comprising, means for yieldingly deflecting the strand, and means for restraining the reel adapted to cause sudden release thereof at the termination of the feed of the strand.

10. Mechanism for feeding a strand of fastener stock from a reel to means for operating on fastener stock, comprising, means for yieldingly deflecting the strand, feeding means adapted to permit retrograde movement of the strand, and means for restraining the reel adapted to cause sudden release thereof.

11. Mechanism for feeding a strand of fastener stock from a reel to means for operating on fastener stock, comprising, means for yieldingly deflecting the strand, feeding means adapted to permit retrograde movement of the strand, and means for restraining the reel adapted to cause sudden release thereof at the termination of the feed of the strand.

12. Mechanism for feeding a strand of fastener stock from a reel to means for operating on fastener stock, comprising, means for yieldingly deflecting the strand, feeding means adapted to arrest the movement of the strand, and means for restraining the reel adapted to cause sudden release thereof.

In testimony whereof I affix my signature this nineteenth day of December, 1918.

STEPHEN A. DOBYNE.