(No Model.) 4 Sheets—Sheet 1.

G. GODDU.

NAIL MAKING MACHINE.

No. 592,729. Patented Oct. 26, 1897.

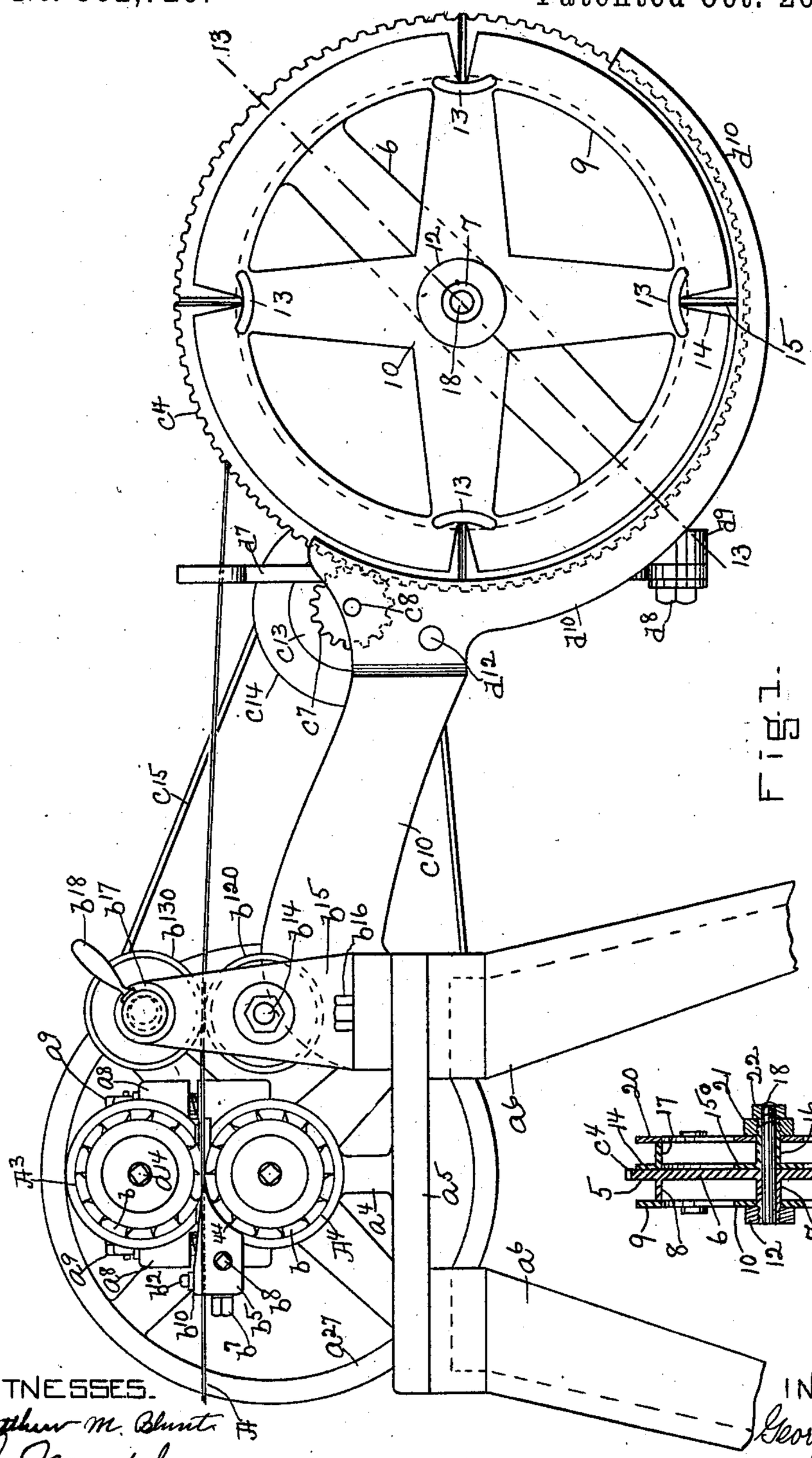

Fig. 1.

Fig. 12.

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(No Model.) 4 Sheets—Sheet 2.

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NAIL MAKING MACHINE.

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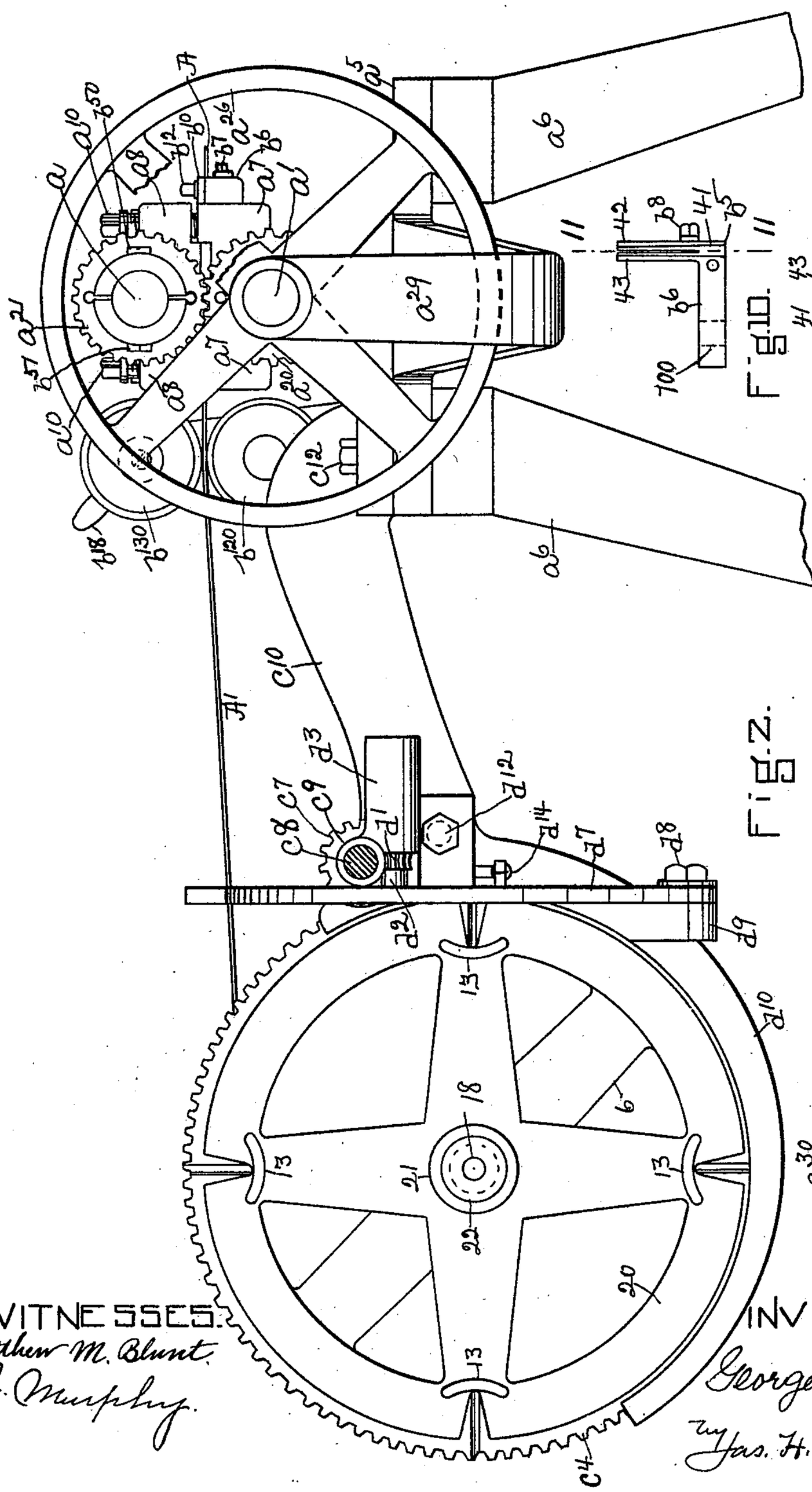

Fig. 2.

Fig. 10.

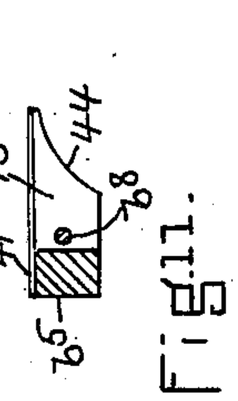

Fig. 11.

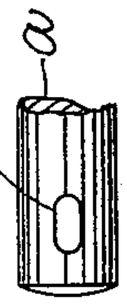

Fig. 13.

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NAIL MAKING MACHINE.

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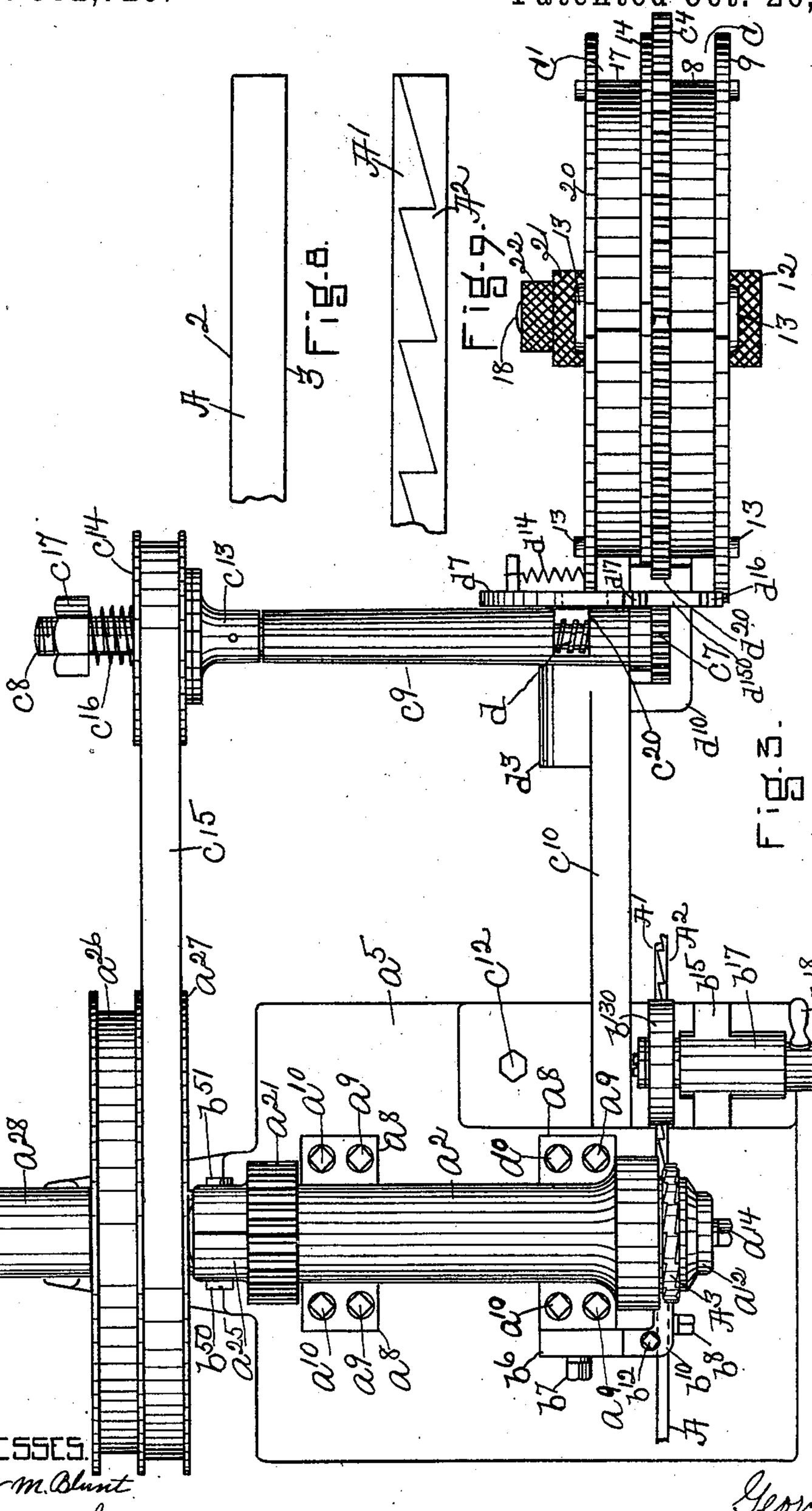

Fig. 3.

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No. 592,729. Patented Oct. 26, 1897.

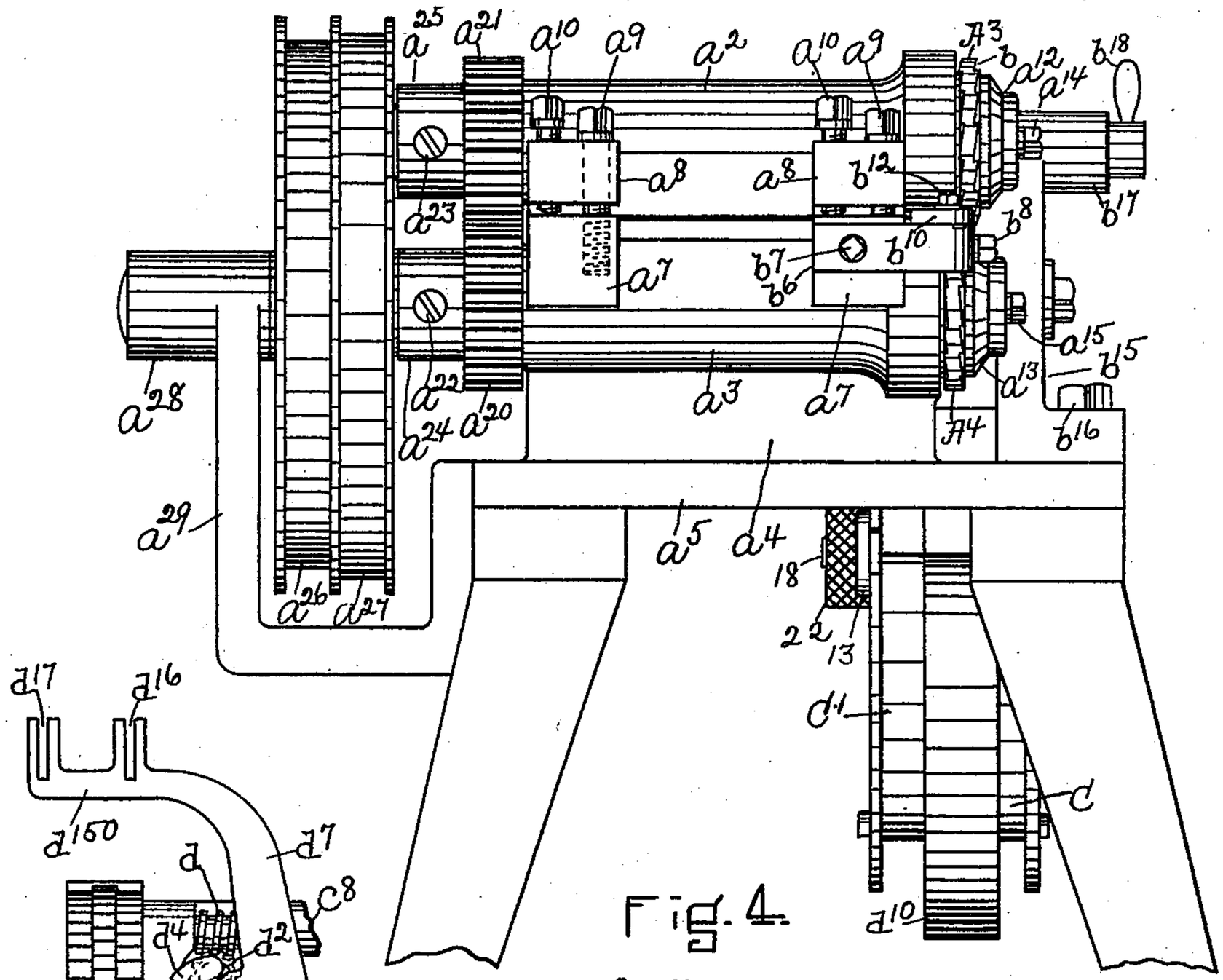

Fig. 4.

Figs.

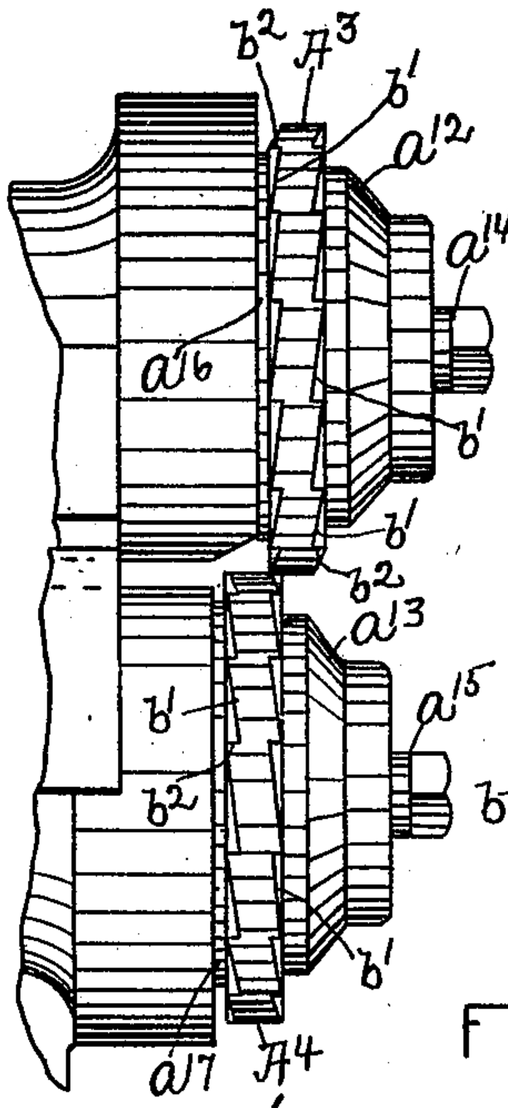

Fig. 6.

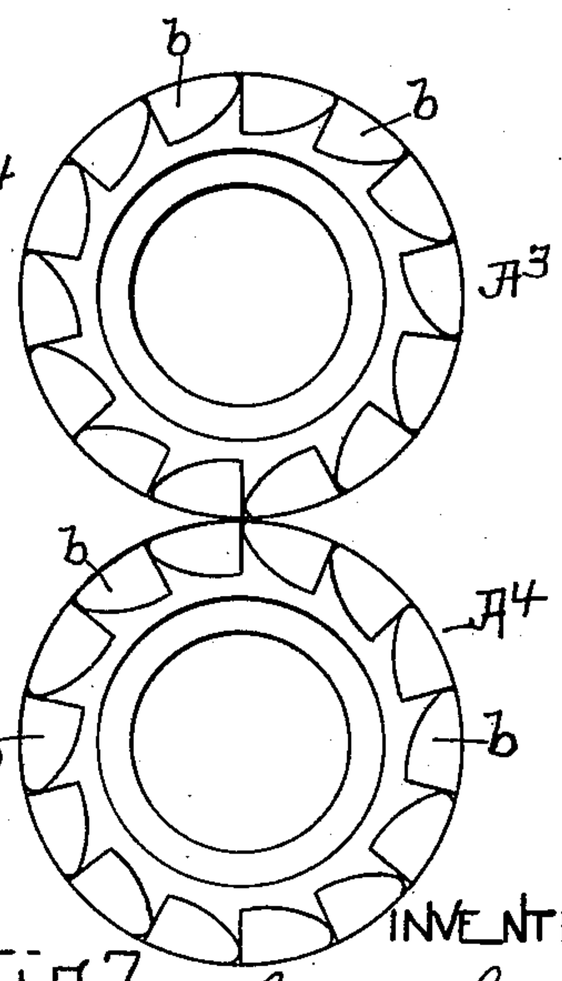

Fig. 7.

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UNITED STATES PATENT OFFICE.

GEORGE GODDU, OF WINCHESTER, MASSACHUSETTS, ASSIGNOR TO THE GODDU SONS METAL FASTENING COMPANY, OF PORTLAND, MAINE.

NAIL-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 592,729, dated October 26, 1897.

Application filed December 10, 1896. Serial No. 615,195. (No model.)

To all whom it may concern:

Be it known that I, GEORGE GODDU, residing in Winchester, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Nail-Making Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates to an apparatus for producing string-nails from a substantially flat ductile ribbon or band of metal, whereby duplicate strips or lengths of string-nails may be made at one operation and in a continuous manner, so that each string-nail strip consists of a plurality of connected headed and pointed nails having tapering sides extended from the points to the heads and so that the ribbon or band is cut without loss of metal and the string-nail formed so as to retain the original ductility of the band.

In accordance with this invention the ribbon or band, which is to be formed into duplicate nail-strips comprising connected headed and pointed tapering nails of uniform length, is cut longitudinally and transversely intermediate of its sides, the longitudinal cuts being inclined with relation to the sides of the ribbon or band and the transverse cuts extending substantially at right angles to the sides of the ribbon or band and made of less length than the width of the said ribbon or band, so as to leave uncut portions of metal at opposite ends of the said transverse cuts, which uncut portions form the points of one set of nails and a portion of the heads of a contiguous set of nails, so that duplicate nail-strips of connected headed and pointed nails are formed at one operation without waste of metal and without decreasing in the nail-strips thus formed the ductility of the original ribbon or band.

The ribbon or band may and preferably will be cut longitudinally and transversely, as above stated, by means of rotatable cutting-disks or circular dies, between which the said ribbon or band is fed and which are arranged with the inner side of one disk overlapping the outer side of the other disk to an extent or distance substantially equally to the length of the transverse cuts in the ribbon or band.

The circular disks or dies are provided on their contiguous or adjacent overlapping faces at their circumferential edges with a plurality of connected or contiguous shallow recesses, preferably tapering and constituting the dies proper, each of which is substantially triangular in shape on the periphery of the said disks and tapers or inclines radially from the said periphery toward the side of the disk.

The edges of the recess in the periphery of the cutting-disks constitute the cutting edges of the dies, and the triangular edges on the periphery of one disk extend in an opposite direction from the triangular cutting edges of the coöperating disk, so that the said edges may register or coincide when the circular dies or disks are rotated in opposite directions.

The inclined cutting edges of the dies are made of a length equal to the length of the tapered side of each connected nail, and in order that the connected headed and pointed tapering nails may be of uniform length the circular disks are made of the proper diameter to obtain a circumferential length divisible by the desired length of nail, so that the entire circumference of the circular disk may be provided with dies having inclined cutting edges of uniform length, and as a result all the nails cut in one revolution of the disks are of uniform length, which is especially desirable and advantageous when the string-nail strips are employed in the manufacture of boots and shoes.

The ribbon or band on its passage to the revolving dies is passed through a guide of a novel construction, as will be described, which is extended to substantially the point where the said dies cut the ribbon or band, and after being acted upon by the revolving cutters the string-nails thus formed are passed between suitable straightening devices, preferably rolls, and are then carried to separate reels, upon which they are wound or coiled. The nail-strips, after leaving the straightening-rolls, are separated and are carried through a strip-guide or traverse, to which motion is applied, as will be described, so as to lay the

string-nails upon the reels as the latter are revolved, as will be described.

These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is a side elevation of a string-nail-forming apparatus embodying this invention; Fig. 2, a side elevation of the machine shown in Fig. 1, looking at the opposite side thereof; Fig. 3, a top or plan view of the machine shown in Fig. 1; Fig. 4, a front elevation of the machine shown in Fig. 1, looking toward the right; Fig. 5, a detail of the traverse or strip-guide, to be referred to; Fig. 6, a detail, on an enlarged scale, of the rotating cutting disks or dies; Fig. 7, a side elevation of the dies shown in Fig. 6 removed from their spindles or shafts; Fig. 8, a detail of a portion of the ribbon or band, on an enlarged scale, before the latter is cut into string-nail strips; Fig. 9, a detail illustrating the band shown in Fig. 8 as cut into duplicate nail-strips; Fig. 10, a detail in plan view of the guide, to be referred to; Fig. 11, a section on the line 11, Fig. 10; Fig. 12, a sectional detail of the reels, to be referred to; and Fig. 13, a detail of a portion of one of the cutter-shafts, to be referred to.

In accordance with this invention a ribbon or band A, substantially flat and of uniform thickness throughout its length, having parallel sides 2 3 and preferably of a width sufficient to be cut into two strips A' A² in one continuous operation and without loss of metal, is subjected to the cutting action of suitable dies A³ A⁴ of novel construction, as will be described, which are mounted upon shafts a a', (see Fig. 2,) having bearings in a suitable framework, herein shown as consisting of two sleeves or cylindrical hubs a^2 a^3, through which the shafts a a' are extended and in which the said shafts have a substantially long bearing, the said shafts fitting the said sleeves or hubs, so as to run substantially tight therein. The bearing a^3 is secured to or forms part of an upright web a^4, erected upon a table or platform a^5, supported upon suitable legs a^6, as herein represented, and the bearing a^2 in the present instance is located above the bearing a^3 and secured to and supported by the bearing a^3, as will now be described.

Referring to Figs. 3 and 4, the bearing a^3 on its opposite sides and at opposite ends thereof is provided with two sets of laterally-projecting lugs or ears a^7, with which register like ears or projections a^8 on the bearing a^2, and the ears or laterally-projecting lugs a^8 are adjustably fastened to the lugs or ears a^7 by means of bolts or screws a^9, extended through suitable slots in the lugs or ears a^8 and into suitably-threaded sockets in the lugs or ears a^7, the lugs or ears a^8 also having threaded holes through which are extended adjusting-bolts a^{10}, which bear on the upper surface of the lugs or ears a^7. The cutting-disks A³ A⁴ are mounted on the ends of the shafts a a', which project beyond one end of the bearings a^2 a^3, and in the present instance the cutting-disks A³ A⁴ are rendered fast onto the shafts a a', so as to revolve therewith, by means of caps or washers a^{12} a^{13}, fitted over the ends of the shafts a a' and secured thereto by means of screws a^{14} a^{15}, which are tapped into the ends of the shafts a a', and which have their heads abutting against the ends of the caps or washers a^{12} a^{13}. The shafts a a', as herein shown, are provided at one end of the bearings a^2 a^3 with annular flanges a^{16} a^{17}, between which and the nuts or washers a^{12} a^{13} the cutting-disks A³ A⁴ are firmly clamped. The shafts a a' are rotated in opposite directions by means of a gear a^{20} on the shaft a' (see Fig. 4) meshing with a gear a^{21} on the shaft a, the said gears being adjustably fastened to their shafts, as by screws or bolts a^{22} a^{23}, extended through split hubs a^{24} a^{25} of the said gears and through elongated slots in the shafts, only one of said slots a^{30} being shown in Fig. 13, the said bolts being provided with a head b^{50} and with a nut b^{51}. (See Fig. 3.) The shaft a' in the present instance is represented as the main shaft, and has mounted upon it driving-pulleys a^{26} a^{27}, the shaft a' having its extreme end journaled in a bearing-hub a^{28}, attached to a substantially U-shaped bracket or arm a^{29}, which in the present instance is represented as integral with the table or platform a^5.

The cutting-disks A³ A⁴ are provided on their peripheries at their circumferential edges with a plurality of connected or contiguous shallow recesses b, constituting the dies proper, and each of the said recesses or dies is provided in the present instance with substantially triangular cutting edges, consisting of a substantially long inclined cutting edge b' and a shorter transverse cutting edge b^2, the inclined cutting edge b' extending from one face of the cutting-disk A³ until it meets the inner end of the transverse cutting edge b^2, which also extends from the same face of the cutting-disk. The inclined cutting edge b' of the die b on the cutting-disk A⁴ and the transverse cutting edge b^2 of the said die extend in an opposite direction from corresponding cutting edges of the dies b on the disk A³, and the disks A³ A⁴ are arranged on their respective shafts a a', so as to overlap one another a distance substantially equal to the length of the transverse cutting edges b^2, so that in the revolution of the cutting-disks A³ A⁴ in opposite directions the cutting edges of the contiguous dies on the cutting-disk A³ will register or coincide with the cutting edges of contiguous dies on the disk A⁴.

In order that duplicate string-nail strips of connected headed and pointed tapering nails may be made at a single operation and without loss of metal from a ductile ribbon or band A, the transverse cutting edges b^2 of the dies on the coöperating cutting-disks A³ A⁴ are made of a length less than the width of the band or strip A, so that when the said band or strip is fed or passed between the

cutting-disks A^3 A^4 it will be cut longitudinally and transversely intermediate of its sides 2 3, so that the successive transverse cuts leave on opposite sides of them uncut or connected portions of the strip, which form, respectively, the point of one nail and a portion of the head of a contiguous nail, and the inclined cutting edges of the dies *b* form a longitudinal cut in the band A intermediate of its sides 2 3 and inclined with relation to the said sides, as shown in Fig. 9, to form in one operation the tapering sides of the two nails, which tapering sides extend from the head of one nail to the point of the next adjacent or contiguous nail, thereby permitting duplicate string-nail strips A' A^2 to be formed from the band A without loss of metal.

In the present instance I have represented in the drawings each of the cutting-disks A^3 A^4 as provided with two sets of dies *b* at the opposite edges or sides of the said disks, so that in case the cutting-edges of one set of dies should become dulled the other set of dies may be utilized by transferring the cutting-disk A^3 from the shaft *a* to the shaft *a'* and the cutting-disk A^4 from the shaft *a'* to the shaft *a*. In practice the shaft *a* is adjustable radially with relation to the shaft *a'* by the adjusting-screws a^{10}, (see Fig. 4,) so that the cutting-edges of the dies *b* on the disks A^3 A^4 may be brought substantially in contact or in such close proximity as will effect a complete cut of the band A passed or fed between them, and also to take up wear in the gears a^{20} a^{21}, whereby the teeth of the said gears may engage, so as to obviate lost motion.

The shaft *a'* is prevented from moving endwise by the flange a^{17} abutting against one end of the bearing a^3 and by the gear a^{20} abutting against the opposite end of the said bearing, and to compensate for wear of the flange and one end of the bearing a^3 and of the gear a^{20} and the opposite end of said bearing the gear a^{20} is adjustably secured to the shaft *a'*, as above described. The shaft *a* is confined against endwise movement in a similar manner by the flange a^{16} and the gear a^{21} and wear is compensated for by adjustably securing the said gear as above described. In this manner the cutting edges of the dies *b* on the cutting-disks A^3 A^4 are kept in proper working position with relation to each other.

In order to secure the complete severance of the ribbon or band into duplicate nail-strips, the said band is firmly held against movement close up to the cutting point or edge of the dies, which may and preferably will be accomplished by means of a guide for the band, preferably made as herein shown, (see Figs. 1, 4, 10, and 11,) and consisting of a block or metal piece b^5, having at its rear end an arm b^6, which is fastened to the lug or ear a^7, as by a screw b^7, extended through a slot 100 in the arm b^6, normally covered by the flange on the head of the said screw. The block b^5 is provided, as shown, with a substantially flat upper face, having in it a longitudinal slot, channel, or guideway 41 of substantially the same area in cross-section as the band or ribbon, so as to form a bottom upon which the strip rests, and upright side walls separated from each other substantially the width of the strip, so as to substantially engage the strip and prevent lateral movement of the latter with relation to the cutting edges of the disks A^3 A^4, and the front end of the said block is split vertically and longitudinally for a portion of its length to form spring-fingers 42 43, which are drawn or held together by a screw b^8, and the fingers 42 43 on their front under side are curved or arc-shaped, as at 44, (see Figs. 1 and 11,) and of substantially the same curvature as the cutting-disk A^4, so that the end of the guide may extend substantially to the cutting-point of the two disks. The guide b^5 is provided with a cap b^{10}, secured thereto by a screw b^{12} and tapering on its upper surface toward its front end to confine the band in the guideway 41 up to substantially the cutting-point, as shown in Fig. 1.

The fingers 42 43 of the guideway are clamped or drawn together by the screw b^8, which is inserted through them near their rear ends—that is, near the rear end of the longitudinal slot in the block b^5—so as to leave or impart to the front end of the fingers a slight spring action, which permits the said fingers to yield slightly in case of any slight irregularity in the width of the band A, and the guideway 41 is preferably made slightly tapering from its rear toward its front or discharge end, which permits the band to be easily drawn by the cutting-dies through the said guideway in case the said band should be slightly wider in parts than the width of the guideway between the fingers 42 43.

The cap b^{10} is fastened by the screw b^{12} to the solid rear part of the guide-block b^5, so that the front end of the cap may yield or be lifted in case the band A should be of uneven thickness. The fingers 42 43 of the guide-block may be adjusted toward and from each other by means of the adjusting-screw b^8 to enable bands or ribbons A of varying widths to be presented properly to the cutting-dies, so that the duplicate nail-strips may be formed with uniform sizes of nails.

The severed ribbon or band A may, and preferably will, be passed through straightening devices, shown as rolls b^{120} b^{130}. One of the rolls, b^{120}, is loosely mounted on a stud or arbor b^{14}, carried by an upright or bracket b^{15}, secured to the table a^5, as by a bolt or screw b^{16}, and the other roll, as b^{130}, is eccentrically mounted in a hub or sleeve b^{17} on the bracket b^{15}, and, as shown, is provided with a handle b^{18}, by which the eccentrically-supported shaft for the roll b^{130} may be turned in its bearings so as to increase or decrease the pressure or binding effect of the rolls b^{130} b^{120} on the string-nail strips cut by the dies of the disks A^3 A^4. In the passage of the ribbon or band A be-

tween the cutting-disks A^3 A^4 the nail-strips A' A^2 are forced by the cutting action of the disks A^3 A^4, one above and the other below a plane extended between and tangential to the cutting-disks, and these nail-strips are again brought into substantially the same plane after they have passed beyond the cutting-disks A^3 A^4 by the straightening-rolls b^{130} b^{120}.

The nail-strips A' A^2, formed as above described, may, and preferably will, be wound upon separate reels C C', located on the opposite faces or sides of a toothed disk or gear c^4 and of a construction as will be described.

The gear c^4, as herein shown, (see Fig. 12,) is composed of a rim 5 and a cross-bar 6, from which extends a hub 7, and the said rim is provided with an annular side flange 8, constituting the periphery of the reel C and with which coöperates a removable side composed of a ring or rim 9, attached to a spider 10, detachably mounted on the hub 7, it being secured thereon by a nut 12. The rim 9 of the removable side of the reel C is preferably provided with strengthening-ribs 13 on its outer side and is further provided with radially-extended openings 14, with which coöperate radial grooves or channels 15 in the side of the gear c^4 to permit of the passage of a binding or tie wire under and about the coil of string-nails wound on the reel C, so that the coil may be easily removed from the periphery 8 of the said reel after the removal of the side 9.

The reel C' is separate from the gear c^4 and is provided with two sides, one of which is composed of the rim 14, spider 150, from which latter extends a hub 16, and an annular flange 17, integral with the rim 14, the hub 16 being fitted loosely on a stud or pin 18, driven into the hub 7 of the gear c^4 and extended beyond the hub 16, which has fitted loosely on it the removable side 20.

The side 20 is secured by means of a nut 21, engaging screw-threads on the end of the hub 16, and the completed reel C' is secured on the pin 18 by a nut 22. The gear c^4 and its attached reels C C' are supported by a substantially semicircular arm d^{10}, secured to a bracket c^{10}, as by a bolt or screw d^{12}, the said bracket being secured to the table a^5, as by a bolt or screw c^{12}. The substantially semicircular arm d^{10} is provided with a substantially central and longitudinal groove d^{20}, (see Fig. 3,) into which extends the gear c^4.

The gear c^4 is rotated, as herein shown, by means of a pinion c^7, fast on a shaft or arbor c^8, having bearings, as herein shown, in a sleeve or hub c^9, secured to or forming part of the bracket c^{10}, the said shaft having fast on it a hub c^{13}, with which coöperates a loose pulley c^{14}, connected by a belt c^{15} to the pulley a^{27} on the main shaft a'. The loose pulley c^{14} is held in frictional but yielding engagement with the hub c^{13} by means of a spring c^{16} encircling the threaded end of the shaft c^8 between the pulleys c^{14} and an adjusting-nut c^{17}, and by means of said nut the tension of the spring c^{16} may be regulated, as desired, to increase or decrease the friction between the pulley c^{14} and hub c^{13}. This frictional construction or device constitutes an automatic tension-regulator for the coils wound on the reels. The shaft c^8 is further provided, as herein shown, near its opposite end with a worm d, (see Fig. 3,) which engages a worm-gear d', (see Figs. 2 and 5,) fast on a shaft or arbor d^2, (see Fig. 5,) having bearings in a hub or sleeve d^3, secured to or forming part of the bracket c^{10}. The bearing sleeve or hub c^9, as shown in Fig. 3, is provided with an opening or slot c^{20}, into which the worm-gear d' extends to engage the worm d. The shaft d^2 has secured to or forming part of it a heart-shaped cam or eccentric d^4, provided with a reëntrant portion or notch d^5, located at substantially the center of the shaft d^2 and with which coöperates a finger or projection d^6 on a guide arm or lever d^7, pivotally mounted, as at d^8, (see Fig. 2,) to a depending lug or arm d^9 on the curved arm or support d^{10}. The finger d^6 on the lever d^7 is held in engagement with the heart-shaped cam d^4 by means of a spring d^{14}, shown as fastened at one end to the lever d^7 and at its other end to a pin d^{15}, extended from the arm c^{10}. (See Fig. 5.) The lever d^7 is provided with a substantially horizontal arm d^{150}, having two sets of upright fingers, forming guides d^{16} d^{17}, which are properly separated or spaced to coöperate with the reels C C' and between which the nail-strips are carried on their passage to the said reels.

The operation of the machine herein shown may be briefly described as follows: The substantially flat ductile band or ribbon A, of any desired length and of substantially uniform thickness throughout its length, is passed through the guide b^5 to the cutting-disks A^3 A^4, and is cut longitudinally and transversely between its sides by the dies b on the said disks as the latter are revolved, and after passing beyond the cutting-disks A^3 A^4 the duplicate nail-strips A' A^2, which are severed from each other but remain integral with or attached to the uncut ribbon or band A, pass between the rolls b^{130} b^{120}, and then through the guides d^{16} d^{17} of the strip-carrier to the reels C C', upon which they are wound in successive layers by the traverse of the strip-carrier d^7. When the reels C C' are full, the machine is stopped and the coil on the reel C is removed after being tied together as described and may be placed directly onto the reel of a nailing or other machine, as its nails point in the proper direction for driving them. The coil on the reel C' is wound reversely, and therefore this coil is unwound from the reel C' and wound upon a similar reel, so as to properly position the points of the nail. By making the cutting-disks of a diameter which permits their circumferential length to be divided by the length of nail desired the individual nails of the string-nails are made of uniform length.

By making the shafts *a a'* longitudinally adjustable, as described, the cutting edges of the disks A^3 A^4 may be accurately positioned or alined so as to insure proper cutting of the band. So, also, by making the shaft *a* adjustable radially with relation to the shaft *a'* the cutting-disks may be adjusted so that their cutting-edges are properly positioned and the teeth of the gears a^{20} a^{21} kept in close mesh or contact. The automatic tension device insures the string-nails being properly wound on their reels, as it governs the rotation of the gear c^4 and the reciprocation of the strip-guide d^7. The guide b^5 is made adjustable in a plane substantially parallel to the axis of the shafts *a a'*, so that the said guide may be properly positioned with relation to the cutting-dies.

The string-nail strip produced with the machine herein shown and in the manner herein described is not herein claimed, as it forms the subject-matter of another application, Serial No. 582,519, filed by me March 10, 1896.

By reference to Fig. 1 it will be seen that the guide b^5 has its guideway 41 extended beyond a vertical line tangential to the cutting-disks and close up to the dies which are cutting the ribbon or band, and by reason of the guide being provided with a bottom upon which the ribbon rests and with upright side walls which embrace the sides or edges of the ribbon or band the guide has imparted to it the function of a support for the ribbon or band on its bottom and sides, so as to obviate the ribbon or band turning or curling up sidewise under the action of the disks A^3 A^4, which in no way support the ribbon or band. The liability of the ribbon or band to curl or twist sidewise, and thereby be improperly presented to the cutting edges of the disks A^3 A^4, which would result in spoiling both of the string-nails, is increased if the cutting-dies of one of the disks should be duller than the other.

I claim—

1. In a machine of the character described, the combination of the following instrumentalities, viz: a rotatable cutting-disk provided on its periphery with a plurality of substantially triangular recesses having inclined and transverse cutting edges of unequal length and extended from the circumferential edge of one face of the disk toward the other face of the said disk to form cutting-dies, and a coöperating cutting edge upon which rests the material cut, substantially as described.

2. In a machine of the character described, the combination of the following instrumentalities, viz: a rotatable cutting-disk provided on its periphery with a plurality of substantially triangular recesses having inclined and transverse cutting edges of unequal length and extended from the circumferential edge of one face of the disk toward the other face of the said disk to form cutting-dies, and a coöperating rotatable disk overlapping the first disk and having like cutting-dies with their cutting edges extended in an opposite direction from the cutting edges of the dies on the first-mentioned disk, substantially as described.

3. In a machine of the character described, the combination of the following instrumentalities, viz: a rotatable cutting-disk provided on its periphery with a plurality of substantially triangular recesses having inclined and transverse cutting edges extended from the circumferential edge of one face of the disk toward the other face of the said disk, and a coöperating cutting edge upon which rests the material cut, and a guide for the ribbon or band extended toward and in close proximity to that die of the disk which is cutting the ribbon or band, substantially as described.

4. In a machine of the character described, the combination of the following instrumentalities, viz: a strip-cutting mechanism, rotatable reels, a reciprocating traverse provided with two strip-guides coöperating with said reels, mechanism to rotate said reels and reciprocate said strip-guides, a tension mechanism controlling the rotation of said reels and the reciprocation of said traverse and its guides, and a straightening device intermediate of the strip-guides and cutting mechanism, substantially as described.

5. In a machine of the character described, the combination of the following instrumentalities, viz: a strip-cutting mechanism, a gear, reels secured to said gear to revolve therewith, a reciprocating strip-carrier coöperating with said reels, a main driving-shaft, a counter-shaft, gearing actuated by the counter-shaft to rotate said reels and strip-guide, and frictional mechanism driven from the main shaft and controlling the rotation of the counter-shaft and the said reels, and the reciprocation of the strip-guide, substantially as described.

6. The combination with a rotatable cutting-disk provided on its periphery with a plurality of substantially triangular recesses having inclined and transverse cutting edges, of a coöperating rotatable cutting-disk overlapping the cutting edge of the first-mentioned disk and provided with substantially triangular recesses having inclined and transverse cutting edges extended in an opposite direction from the cutting edges of the first-mentioned disk, means to rotate said disks, and an adjustable guide coöperating with said disks, substantially as described.

7. In a machine of the character described, the combination of the following instrumentalities, viz: a rotatable cutting-disk provided on its circumferential edge with dies, a cooperating cutting-disk having on its circumferential edge coöperating but reverse dies, shafts on which said disks are mounted, gears on said shafts in mesh with each other and longitudinally adjustable thereon, bearings for said shafts, one of which is adjustable ra-

dially with relation to the other, and a guide for the ribbon or band coöperating with the cutting-disks, substantially as described.

8. In a machine of the character described, the combination of the following instrumentalities, viz: a rotatable cutting-disk provided on its circumferential edge with dies, a cooperating cutting-disk having on its circumferential edge coöperating but reverse dies, shafts on which said disks are mounted, gears on said shafts in mesh with each other and longitudinally adjustable thereon, bearings for said shafts, one of which is adjustable radially with relation to the other, and an adjustable guide for the ribbon or band coöperating with the cutting-disks, substantially as described.

9. In a machine of the character described, the combination of the following instrumentalities, viz: the rotating circular cutting-disks A^3 A^4 having their peripheries substantially in contact and provided with the dies b reversely arranged on the peripheries of said disks at the circumferential edges of the opposite sides of said disks and provided with substantially long inclined cutting edges b' and substantially short transverse cutting edges b^2, which coöperate to cut the metal ribbon, and the stationary guide b^5 provided with a guideway of substantially the same area in cross-section as the ribbon or band to be cut and having a bottom upon which the ribbon or band rests and upright side walls which embrace the sides or edges of the ribbon or band, and which bottom and side walls are extended close up to the active cutting-dies of the disks A^3 A^4 to impart to the guide b^5 the function of a support for the ribbon or band and thereby enable a narrow ribbon or band to be cut into duplicate string-nail strips, substantially as described.

10. In a machine of the character described, the combination of the following instrumentalities, viz: a strip-cutting mechanism, reels, upon which the said strips are wound, a reciprocating lever provided with two strip-guides coöperating with said reels, and a tension mechanism controlling the rotation of the said reels and the reciprocation of the said lever and attached guides, substantially as described.

11. In a machine of the character described, the combination with disks having circumferential cutting-dies of uniform length, and with cutting edges reversely arranged, of means to rotate said disks in opposite directions, and an adjustable guide having adjustable fingers, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE GODDU.

Witnesses:
JAS. H. CHURCHILL,
J. MURPHY.