H. W. SCHLOSS & H. HAWLEY.

BRAID LAPPING OR BOLTING MACHINE.

APPLICATION FILED MAY 6, 1910.

978,657.

Patented Dec. 13, 1910.

3 SHEETS—SHEET 1.

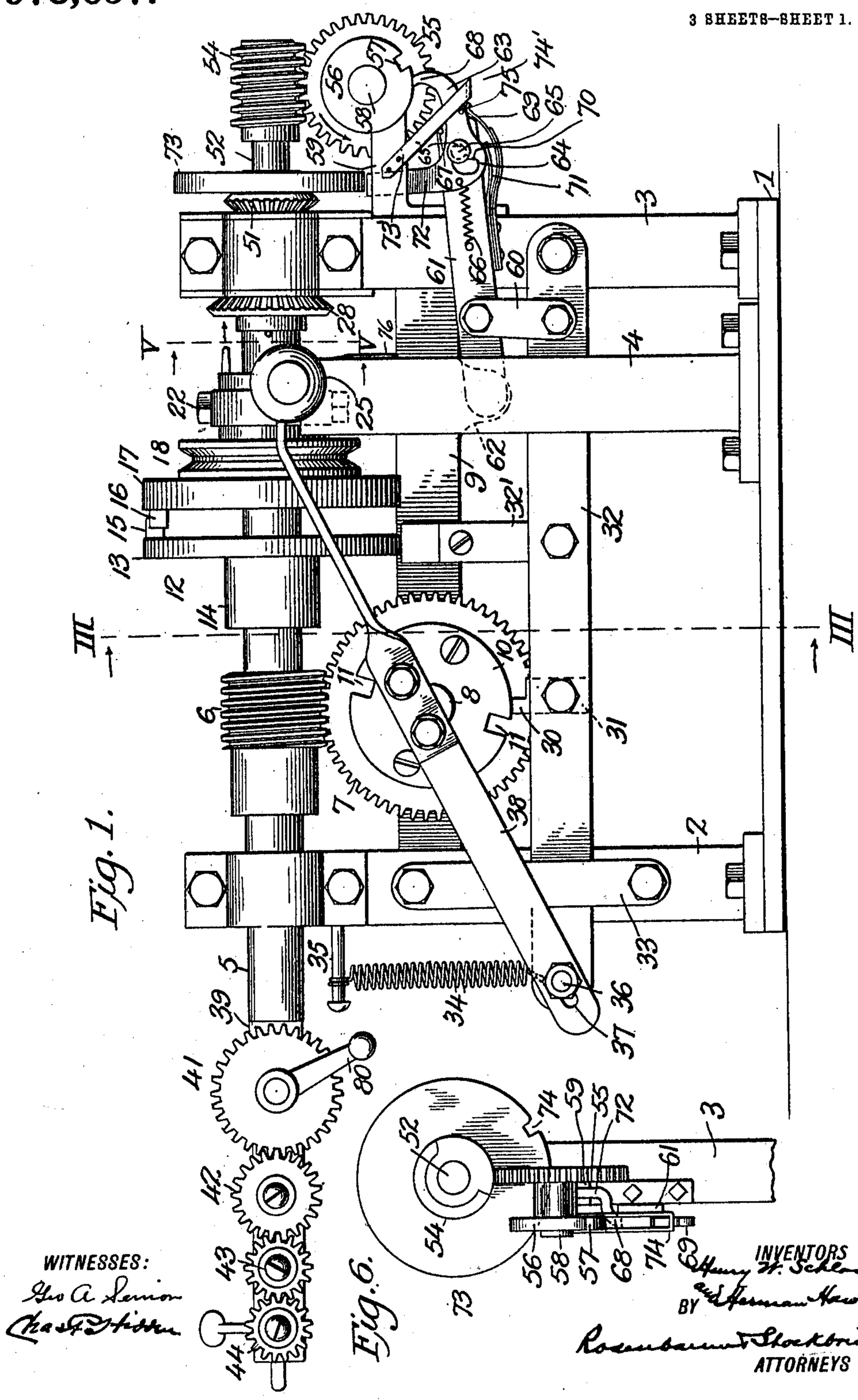

Fig. 1.

Fig. 6.

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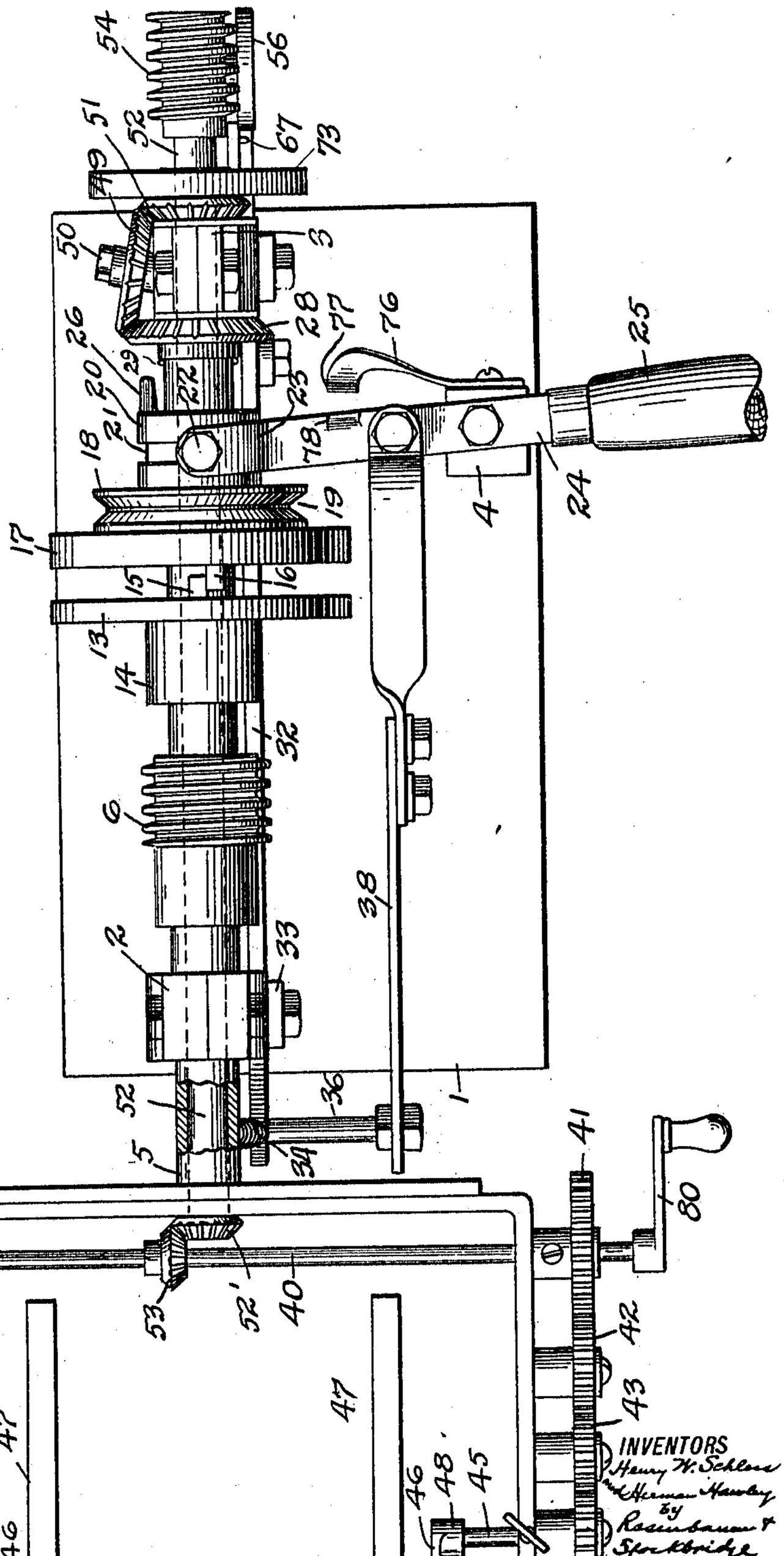

Fig. 2.

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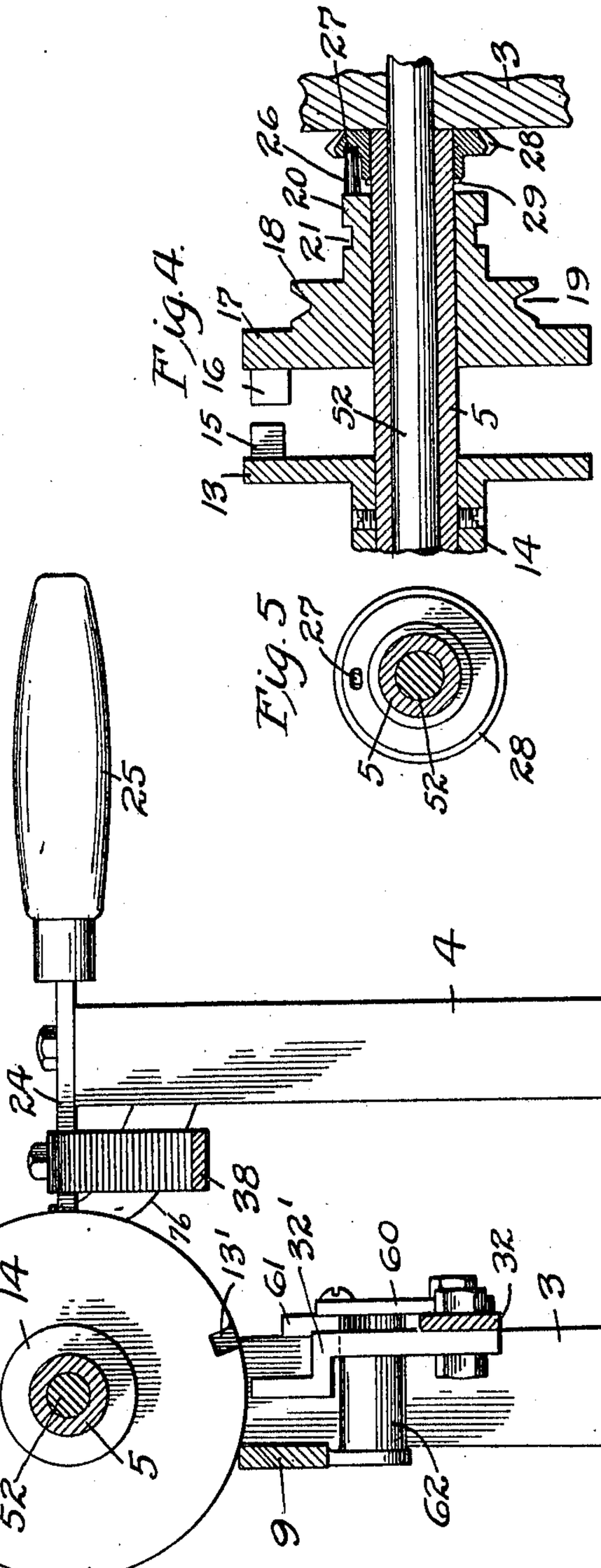

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UNITED STATES PATENT OFFICE.

HENRY W. SCHLOSS AND HERMAN HAWLEY, OF NEW YORK, N. Y., ASSIGNORS TO CASTLE BRAID COMPANY, A CORPORATION OF NEW YORK.

BRAID LAPPING OR BOLTING MACHINE.

978,657. Specification of Letters Patent. **Patented Dec. 13, 1910.**

Application filed May 6, 1910. Serial No. 559,703.

To all whom it may concern:

Be it known that we, HENRY W. SCHLOSS and HERMAN HAWLEY, citizens of the United States, residing at the city of New York, in the boroughs of Manhattan and Brooklyn, respectively, and State of New York, have invented certain new and useful Improvements in Braid Lapping or Bolting Machines, of which the following is a full, clear, and exact description.

This invention relates to braid-bolting or lapping machines, and has for its object the provision of mechanism for expeditiously lapping and binding braid into bolts while automatically limiting the length of braid in each bolt to the proper and predetermined amount; the bolt so formed being wound neatly and presenting an attractive appearance when finished.

Bolts of braid are usually formed by lapping a number of turns upon suitable supports and thereafter binding the lapped strand by rotating the supports or holders about an axis at right angles to that of the lapping operation. Devices for accomplishing this purpose have heretofore been driven by hand power and the number of laps or number of binding turns in a bolt have been determined by the operator, upon whom devolved the duty of keeping tally of the respective laps and binding turns.

We have constructed a mechanism in which means are provided for performing substantially the whole operation automatically; the parts being driven by power and the braid being automatically measured out to the proper length during the operations of lapping and binding. This is a most desirable feature, in that it obviates the possibility of error on the part of the operator; who, when the lapping and binding is accomplished directly through his instrumentality, is apt to lap too few turns or perhaps too many, and who may also bind the bolt with either too few or too many binding turns; as a result of which a bolt properly, let us say of twelve or twenty-four yards may be somewhat short, possibly several inches or even a foot, or more; or it may correspondingly be too long, which results in loss to the manufacturer.

Other novel features of invention will be hereinafter more fully set forth and particularly pointed out in the appended claims.

Referring to the accompanying drawings which form a part hereof and in which like characters of reference designate like parts throughout the several views: Figure 1 is an elevation of our improved lapping machine; Fig. 2 is a plan of the same; Fig. 3 is a section taken on line III—III of Fig. 1, looking in the direction of the arrows; Fig. 4 is a fragmentary section taken through the shaft showing the clutch structure; Fig. 5 is a section taken on line V—V of Fig. 1, showing the rear face of the bevel gear which is shown in section in Fig. 4, and Fig. 6 is a fragmentary end elevation of our device.

Upon a suitable base 1 are provided preferably two bearing brackets 2 and 3, which are intended to support the operative parts of the device. Correspondingly a handle supporting standard 4 extends upward from the front edge of the base. Journaled in suitable bearings upon the said brackets is a hollow spindle or shaft 5, which extends through the bearings aforesaid. This shaft carries a worm 6 which is disposed for engagement with a worm wheel 7, said wheel being pivoted at 8 to a cross-bar 9 which extends between and is secured to brackets 2 and 3. This gear carries upon its outer face a notched circular disk 10, notches 11 in which are shown in Fig. 1. The hollow spindle 5 carries suitably secured thereto, as by a key or set screw, a clutch member 12, which consists substantially of a disk 13, having a hub 14 integrally formed therewith, which latter is suitably secured in manner aforesaid to the spindle.

Laterally projecting from the face of the disk 13 is a lug 15 which is adapted for engagement with a corresponding lug 16 carried by a disk 17 which forms a part of a loose clutch member or element 18 also mounted upon spindle 5. Upon the outer side of the clutch disk 17 is formed a pulley 19 which is preferably adapted to be driven by a round belt. Also forming a part of the element 18 and laterally disposed with respect to said pulley, is a collar 20 which is grooved at 21 for engagement with suitable studs or pins 22 carried by a yoke 23 which is pivotally mounted on the upper extremity of bracket 4; the stem of the yoke being extended to form a lever 24 upon the outer extremity of which is a suitable handle 25 for operating the clutch parts. The member 18 is loosely mounted upon the hollow spindle and is reciprocable thereupon

by means of the said handle. When the handle is moved to the right, the yoke at the other extremity of the lever moves the clutch element 18 to the left and effects the engagement of lugs 15 and 16. It will be understood of course that the member 18 is normally driven continuously by its belt so that the engagement of the said lugs tends to rotate the spindle 5. In this embodiment of my invention, the said spindle is rotated clockwise as viewed from the right hand end of the mechanism. A pin 26 extends outwardly from the right hand face of the collar 20; and this pin is adapted to engage a recess 27 in the rear face of a bevel gear 28; such gear being also loosely mounted upon the hollow spindle, but being kept from endwise movement thereupon by lugs or pins 29 on the spindle, which engage the face of the hub of said gear, and by the face of the bracket 3. When the loose clutch element 18 is moved to the right, as it does when the handle aforesaid is moved to the left, the first portion of such movement disengages lugs 15 and 16 and the latter portion of the movement effects the engagement of pin 26 with the aperture or recess 27 in the face of the gear 28.

Referring now to the notched plate 10, it will be observed on inspection of Fig. 1, that the notches 11 are adapted for engagement with a tooth 30, which in this instance has been formed upon a member 31 which is suitably secured to a pivoted lever 32. This lever is preferably pivoted to the side of the bracket or standard 3, and extends forwardly therefrom, adjacent to and beyond the bracket or standard 2. To the side of this standard is affixed a retaining plate or strip 33 which may be secured thereto by bolts or in any other suitable manner, its purpose being merely to hold the lever 32 so it may oscillate only in a vertical plane. The lever 32 normally tends to move toward, but preferably not quite up to its uppermost position through the action of a spring 34 which is secured to the free end of said lever, the other end of said spring being attached to a pin 35 which extends out from the side of the standard 2. The said free extremity of the lever 32 is provided with a stud 36 which is disposed in a slot 37 in the lower extremity of an obliquely positioned link 38. This link is slotted at its extremity so that proper adjustment may be afforded and the upper extremity of the said link is pivotally connected to the stem of the yoke 23, or in other words, to the lever 24 adjacent to, but somewhat beyond, its pivotal point. When the handle is moved to the right the oblique link obviously moves downward and to the left thereby depressing the lever 32 and disengaging the tooth 30 from its slot 11. This permits the spindle 5 to rotate freely upon the engagement of the lugs 15 and 16 of the clutch. Assuming now that the worm 6 is a single pitch worm, the gear 7 will advance one tooth for every revolution of the spindle 5 and will so continue to advance until the tooth 30 is again opposite a notch 11, when, due to the action of spring 34, if the handle has meanwhile been released, the tooth will slip into said notch and lock the spindle against further movement. The belt upon the pulley 19 is sufficiently loose to permit it to slip thereover when the spindle is thus locked against rotation should the clutch inadvertently fail to release.

As the worm and gear necessarily have a certain amount of play and as, too, such parts wear to some measure, in use, it is advisable to provide a positive lock for the spindle. For this purpose the clutch disk 13 is notched at a point 13′ on the periphery thereof, and the lever 32 carries an upwardly projecting bar 32′, the uppermost extremity of which is perfectly offset and is disposed for engagement with the notch 13′; the bar 32′ being shown in alinement with the disk 13 in Fig. 1. When the lever 32 is allowed to move upward through the co-action of its tooth 30 and one of the notches 11, the end of bar 32′ is pushed up into notch 13′ as soon as the latter has come into alinement therewith; and this serves to more accurately determine the stopping position of the spindle.

Upon the left hand extremity of the spindle 5 is secured in any proper manner a U-shaped frame 39 upon which are mounted a number of spur and bevel gears disposed as follows: A spindle 40, preferably of small diameter, extends longitudinally of the frame and out through the parallel sides thereof adjacent the base of the frame and such spindle carries upon its extremity the spur gears 41, which gears form part of a gear train which extends along either arm of the frame and consists respectively in each instance of gears 41, 42, 43 and 44. Gears 42 and 43 are mounted upon suitable studs which are secured preferably in bosses on the respective arms of the frame, while gears 44 are carried upon the short spindles 45 which are rotatably mounted in the extremities of the said arms and are driven by the said gears. The inner ends of the spindles 45 carry the braid supporting members 46, each of which members preferably comprise a blade like braid support 47 and an offset hub 48. The construction of these members is such that braid may be first looped around the blades, out of alinement with the spindles 45, in order to clear the extremities of the frame.

In practice the operator passes a single loop of the braid around the blades and temporarily secures the same in place in any desired manner; most conveniently by passing the body portion of the braid over its ex-

tremity when it has formed a complete loop around the two blades, the extremity being hence held by friction against one of the said blades. The handle 25 is then moved to the right, which disengages the tooth 30 from the slot with which it happened to be in engagement, and effects the engagement of lugs 15 and 16. The blades 47 then rotate about the axis of the hollow shaft or spindle 5, and thereby wind a predetermined number of laps of braid upon the said blades, the number of laps being limited and determined by reason of the engagement of tooth 30 with the next notch 11. It is obvious of course that the operative should not continue to hold the handle after the machine has once started, since otherwise spring 34 would be continuously opposed and the lapping operation would continue indefinitely. The handle will remain, however, sufficiently to the right to permit the clutch parts to continue in engagement until the tooth is pulled into its slot in the manner aforesaid, when the spring 34 will abruptly throw the handle into its median position. The operative now takes the portion of the braid which would have been next lapped upon the blades 47 and forms a bight by driving such portion down into the upper end of the body of the lapped braid by means of a suitable tool; and finally slips the braid loops along over their supports until they are in substantial alinement with spindles 45. The braid is now ready for the binding operation which is accomplished by moving the handle 25 to the left. This effects an engagement of the pin 26 with the gear 28 and said gear is correspondingly driven clockwise while as it is free to rotate upon the spindle 5, said spindle will remain locked in the position in which it stopped. The gear 28 is meshed with a bevel gear 49 which is rotatably mounted upon a stud 50, said stud projecting outwardly from the rear of the standard 3, and in this instance is angularly disposed to accommodate the bevel gearing. Gear 49 intermeshes with a pinion 51 which is carried upon a shaft or spindle 52, and such shaft is rotatably mounted in the hollow spindle 5, but is locked against endwise movement therein by the engagement of the face of gear 51 with the bearing upon standard 3 and by a gear 52′ which is secured to the other extremity of the spindle 52, the hub of which gear bears against the outer side of the frame 39 before mentioned. Intermeshed with gear 52′ is a pinion 53 which is keyed or otherwise secured to the spindle 40, which spindle drives the gears 41, 42, 43, and 44, and thereby rotates the spindles 45 and the braid supports 47. It may be here noted that normally the braid supports come to rest in alinement with the arms of the U-shaped frame 39 but outwardly projecting therefrom, or in other words directly opposite the position in which they are shown in Fig. 2. As a result of this arrangement of parts, when the handle 25 is urged to the left, the braid lapped upon the blades 47 in the manner above described may be neatly bound substantially at right angles to the loops previously formed, the binding turns being fed on by the operative while the blades 47 rotate about the axis of spindles 45 preferably in such manner that no two binding turns overlap.

We shall now describe how our device automatically determines the number of binding turns which shall be disposed upon a bolt of braid. The spindle 52 carries upon the right hand extremity thereof a worm 54 which is intermeshed with a worm wheel 55. This gear carries upon one side thereof a notched plate 56, a single notch 57 being shown in this instance. The gear 55 is loosely mounted upon a stud 58 which is carried by a bracket 59 which extends out from the side of the standard 4. The lever 32 has a link 60 pivoted thereto adjacent its pivoted end; the other extremity of which link is pivotally connected to a lever 61, which lever is pivotally mounted upon a depending lug 62 which is preferably integrally formed upon the lower side of crossbar 9. The free extremity of the lever 61 carries a loosely mounted pawl 63 which has an L-shaped slot 64 therein. A stud 65, one side of which is flattened, as at 65′ is secured in the said free extremity of lever 61 and extends into the said slot so as to permit movement of the pawl 63 longitudinally and also, as will be hereinafter described, transversely of the major axis of lever 61. The pawl also is enabled to pivot about the said stud. A spring 66 is secured to the pawl and to said lever so that the pawl is normally restrained in the position shown in Fig. 1. A pin 67 at the extreme end of lever 61 serves, among its several functions, as a stop for the pawl, preventing it from moving upward beyond the position shown. The extremity of the pawl forms a tooth 68 which is adapted for engagement with the slot 57 in the plate 56.

As the gear 28 is driven clockwise, the gear 51 will be driven counterclockwise, and gear 55 will be correspondingly driven counterclockwise as indicated by the arrow thereupon. This tends normally when the pawl is in engagement with its slot to pull the said pawl against the tension of spring 66 to its outermost position. Spring 34 can only pull tooth 30 about half way into slot 11, so that when the said tooth and slot are in engagement, with the handle 25 in its median position, the said handle 25 may be driven to the left thereby forcing the tooth 30 still more deeply into its notch and effecting the engagement in the manner above described of the pin 26 and gear 28. This

same action serves to elevate the free end of lever 61 so that the pawl upon said end impinges against the cylindrical surface of plate 56. The notch 57 will not be directly in alinement with the extremity of the pawl for reasons hereinafter to be described, the gear 55 will be free to rotate, and hence, the plate 56 will advance slowly counter-clockwise until the said notch comes opposite the spring pressed pawl. A strong spring 69 normally urges the pawl against the stop pin 67; or if it be out of engagement with said pin by reason of the extremity of the pawl engaging the face of plate 56, against the said plate. After the point of the pawl has dropped into the slot 57, the gear is still free to rotate a short distance which is determined practically by the length of the substantially horizontal leg of slot 64; but when the pawl has been pulled outwardly until the flattened side of pin 65 reaches the abrupt wall 70 of the slot; under the influence of a second spring 71, which like spring 69 is also secured to the extremity of lever 61 and which bears against the inner end pawl 63, the said end of said pawl is forced abruptly upward, the stud 65 seating itself in the vertical leg of the slot the pawl pivoting itself about pin 67, and an upwardly-extending, offset arm 72 of the pawl is forced into engagement with the cylindrical face of a disk 73 which is keyed to the hub of gear 51. The periphery of this disk is notched as at 74, and the upper extremity of arm 72 seats itself in this notch and locks the spindle against rotation. The arm 72 is held firmly against lateral displacement during this operation by the walls of the slot in bracket 59 through which it extends; the slot walls quite neatly engaging the sides of the offset portion of the arm. The arm is however free to move endwise through said slot whether pulled outwardly by gear 55 or retracted by spring 66. The spring 69 while quite strong, is rather stiff, and when the point of the pawl has entered notch 57 this spring practically ceases to exert any pressure upon the pawl.

Downwardly projecting from the side of bracket 59 is an obliquely disposed strip 73′, the lower extremity 74′ of which is inwardly bent so as to adapt it for engagement with a pin 75 upon the pawl 63; and this pin is so positioned with respect to the inwardly projecting end of the strip 73′ that it is engageable therewith when the pawl 63 is in its outermost position and the lever 61 is downwardly rotated about its pivotal point. As a result of this engagement the outer extremity of the pawl upon which pin 75 is positioned is temporarily held against further descent while the pin 67 presses upon the upper edge of the pawl and thereby rotates the pawl about pin 75 as an axis. As a result of this the stud 65 moves upward, relatively speaking, through the vertical leg of the slot 64 and when it reaches the upper portion of said slot, spring 66 abruptly pulls the pawl to the left, setting the parts in their initial position, and disengaging pin 75 from strip 73′. The pawl is hence reset ready for the next tripping operation.

The pin 26 carried by collar 20 is preferably somewhat tapered at its end as is also, in corresponding fashion, the engaging side of slot 27 in gear 28; so that when the gears 28, 49 and 51 are locked against rotation by pawl arm 72, the pin is forced out of engagement with its slot and lever 24 is moved substantially to its median position. A rather stiff spring 76, which is secured to the side of the standard 4, and projects therefrom in the direction of the spindle 5 is provided with a lipped end 77 which is adapted for engagement with a notch or depression 78 in the face of the stem of yoke 23, and spring 76 hence tends to hold pin 26 in place in slot 27, when once moved into clutching relationship, in spite of the beveled sides of the pin and slot, until the stoppage of wheel 28 overcomes such retaining action. The clutch parts are then disengaged, and the handle returned substantially to its median position. In this relation the clutch disengaging means employed in connection with the drive of spindle 5 may here be again referred to. The spring 34 which serves to effect the engagement of the fingers or prongs 30 and 32′ with their respective notches in disks 10 and 13 is quite stiff and is stretched but a comparatively short distance when the lever 32 is moved to its lowermost position; so that when it is free to raise the said lever and thereby move the handle to the left, such handle is merely moved to its median position which is just sufficient to disengage the lugs 15 and 16 while locking the spindle 5 in the manner above described.

When the handle is moved by the operative to the extreme left of its throw, spring 34 is placed slightly under compression which aids the beveled clutch pin 26 in effecting its release when the spindle 52 is arrested. There is hence a co-action between spring 34, the bevel gear clutch and the locking device for this clutch; as well as between spring 34, clutch parts 13 and 17 and the locking device for such clutch parts. The number of teeth in gear 55 or the disposition of one or more slots 57 upon plate 56 will determine the number of binding turns in the same manner that the corresponding wheel 7 and its plate 10, determine the number of laps. As shown in Fig. 1 the provision of two notches upon the wheel 10 adapts the mechanism for winding twelve yard bolts, but should it be desired to wind bolts of double this length, it is obvious that but a single notch may be used in the plate

so that it becomes possible by changing the number of notches in wheels 10 and 56 to determine the number of laps and binding turns without altering the gearing of the device.

A small crank 80 is disposed upon one extremity of the spindle 40 so that if desired the clutch mechanism just described may be thrown out of commission and the spindles 45 rotated by hand if desired.

We have therefore described a mechanism which is adapted to automatically lap soutache braid or any like material and to bind the same into bolts; the number of laps and also the number of binding turns in each bolt being predetermined, and as a result of this, each bolt must have exactly the proper length of braid in it; the human factor being almost entirely eliminated in winding such bolt.

Having thus described our invention, what we claim, is:

1. In a lapping machine, supports for braid, mechanism for lapping the braid to be wound, around the said supports, means for automatically stopping said mechanism when a predetermined number of turns of braid have been lapped on said supports, and means for rotating the braid loops so formed about an axis substantially perpendicular to the first, for binding said loops into a bolt.

2. In braid bolting mechanism, rotatably mounted supports for the braid, means for rotating said supports about an axis a predetermined number of turns, and means for rotating said supports about an axis substantially at right angles to the first for a predetermined number of turns.

3. In a braid bolting machine, supports for braid, power driven mechanism for rotating said supports about a given axis, means for limiting the rotation of said members to a predetermined number of turns, and power driven mechanism for rotating said supports about an axis substantially at right angles to the first.

4. In a braid bolting machine, supports for braid, power driven mechanism for rotating said supports about a given axis, means for limiting the rotation of said members to a predetermined number of turns, power driven mechanism for rotating said supports about an axis substantially at right angles to the first, and means for automatically stopping the operation of said latter mechanism when a predetermined number of binding turns have been made.

5. In a braid bolting machine, a hollow spindle, a yoke carried thereby, braid supports mounted upon said yoke, means for intermittently driving said hollow spindle comprising a clutch, and mechanism for disengaging said clutch and for positively stopping the rotation of said spindle when a predetermined number of rotations have been made.

6. In a braid bolting machine, a hollow spindle, a yoke mounted thereon, braid supports rotatably mounted upon said yoke, a shaft in said hollow spindle, means for rotating said spindle and said shaft independently of each other, said means comprising a manually controlled clutch which when moved in one direction will effect the rotation of said hollow spindle and thereby of said supports about an axis substantially in alinement with said spindle, limiting mechanism for stopping the rotation of said spindle when a predetermined number of turns have been made, and means coöperating with the clutch for rotating said supports about an axis substantially at right angles to that of the spindle, and means for limiting the number of turns of said supports about the last mentioned axis.

7. In a power driven braid bolting machine, driving spindles, clutch parts coöperating therewith, braid supports mounted for rotation about two angularly disposed axes, and mechanism for rotating said supports about one of said axes for a predetermined number of turns, said mechanism comprising clutch disengaging means and a locking device.

8. In a power-driven braid bolting machine, driving spindles, clutch parts coöperating therewith, braid supports mounted for rotation about two angularly disposed axes, mechanism for rotating said supports about one of said axes for a predetermined number of turns, said mechanism comprising clutch disengaging means and a locking device, and mechanism for rotating said supports about the other of said axes.

9. In a power-driven braid bolting machine, driving spindles, clutch parts coöperating therewith, braid supports mounted for rotation about two angularly disposed axes, mechanism for rotating said supports about one of said axes for a predetermined number of turns, said mechanism comprising clutch disengaging means and a locking device, and mechanism for rotating said supports about the other of said axes for a predetermined number of turns, said second mechanism also comprising clutch disengaging means and a locking device.

10. In a power-driven braid bolting machine, a driving spindle, clutch parts cooperating therewith, braid supports mounted for rotation about an axis, mechanism for rotating said supports for a predetermined number of turns, said mechanism comprising gearing and a notched plate driven thereby, and a lever having a projecting part adapted for engagement with said notched plate.

11. In a power-driven braid bolting machine, a driving spindle, clutch parts co-

operating therewith, braid supports mounted for rotation about an axis, and mechanism for rotating said supports for a predetermined number of turns, said mechanism comprising gearing and a rotatable member driven thereby, and a spring pressed part having means for engaging said rotatable member.

12. In a power-driven braid bolting machine, a driving spindle, clutch parts cooperating therewith, braid supports mounted for rotation about an axis, and mechanism for rotating said supports for a predetermined number of turns, said mechanism comprising gearing and a rotatable member driven thereby, and a spring pressed part having means for engaging said rotatable member and mounted for movement thereby, and a second rotatable part engageable by said spring pressed part at the completion of a predetermined movement of the latter, said second rotatable part and said spring pressed part coöperating to lock said mechanism against further rotation.

13. In a power-driven braid bolting machine, a driving spindle, clutch parts cooperating therewith, braid supports mounted for rotation about an axis, and mechanism for rotating said supports for a predetermined number of turns, said mechanism comprising a limiting device consisting of a plurality of rotatable members and a spring pressed part mounted for both oscillatable and translatable movement.

14. In a power-driven braid-bolting machine, mechanism for lapping and binding braid to form a bolt of predetermined length, said mechanism comprising braid supports, means, including a clutch, for rotating said supports about a given axis, and means for disengaging said clutch and simultaneously locking said supports against rotation after a predetermined number of laps have been wound thereon.

15. In a power-driven bolting machine, mechanism for lapping and binding braid to form a bolt of predetermined length, said mechanism comprising braid supports, means, including clutch parts, for rotating said supports about a given axis, means for disengaging said clutch parts and simultaneously locking said supports against rotation after a predetermined number of laps have been wound thereon, means, including additional clutch parts, for rotating said supports about an axis angularly disposed with respect to the first mentioned axis, and means for disengaging said additional clutch parts and simultaneously locking said supports against rotation about said second axis, after a predetermined number of binding turns have been wound.

In witness whereof, we subscribe our signatures, in the presence of two witnesses.

HENRY W. SCHLOSS.
HERMAN HAWLEY.

Witnesses:
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JAMES D'ANTONIO.