F. H. DOERR.

COILING MACHINE.

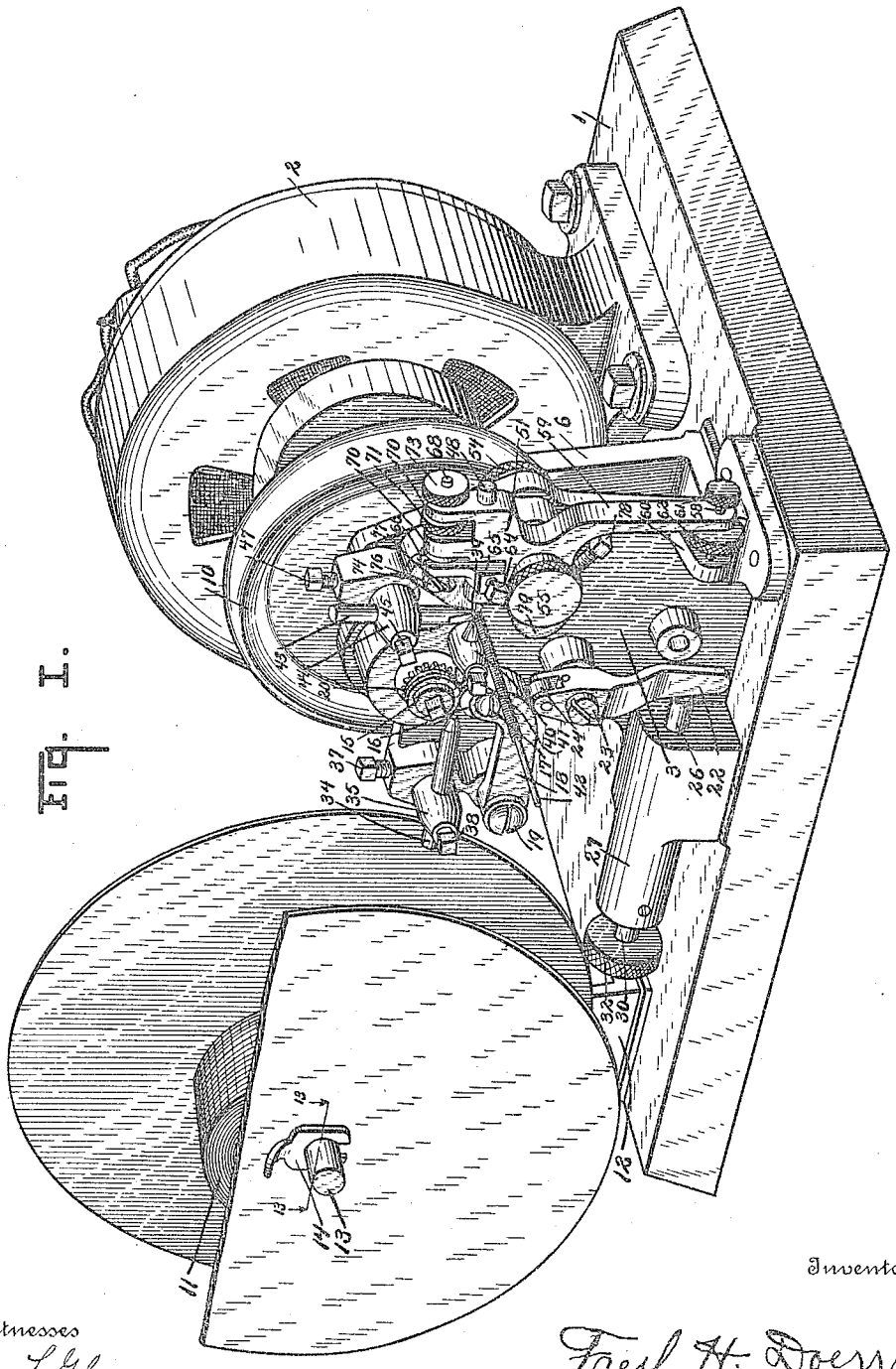
APPLICATION FILED MAY 15, 1914.

1,207,880.

Patented Dec. 12, 1916.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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By Fred H. Doerr

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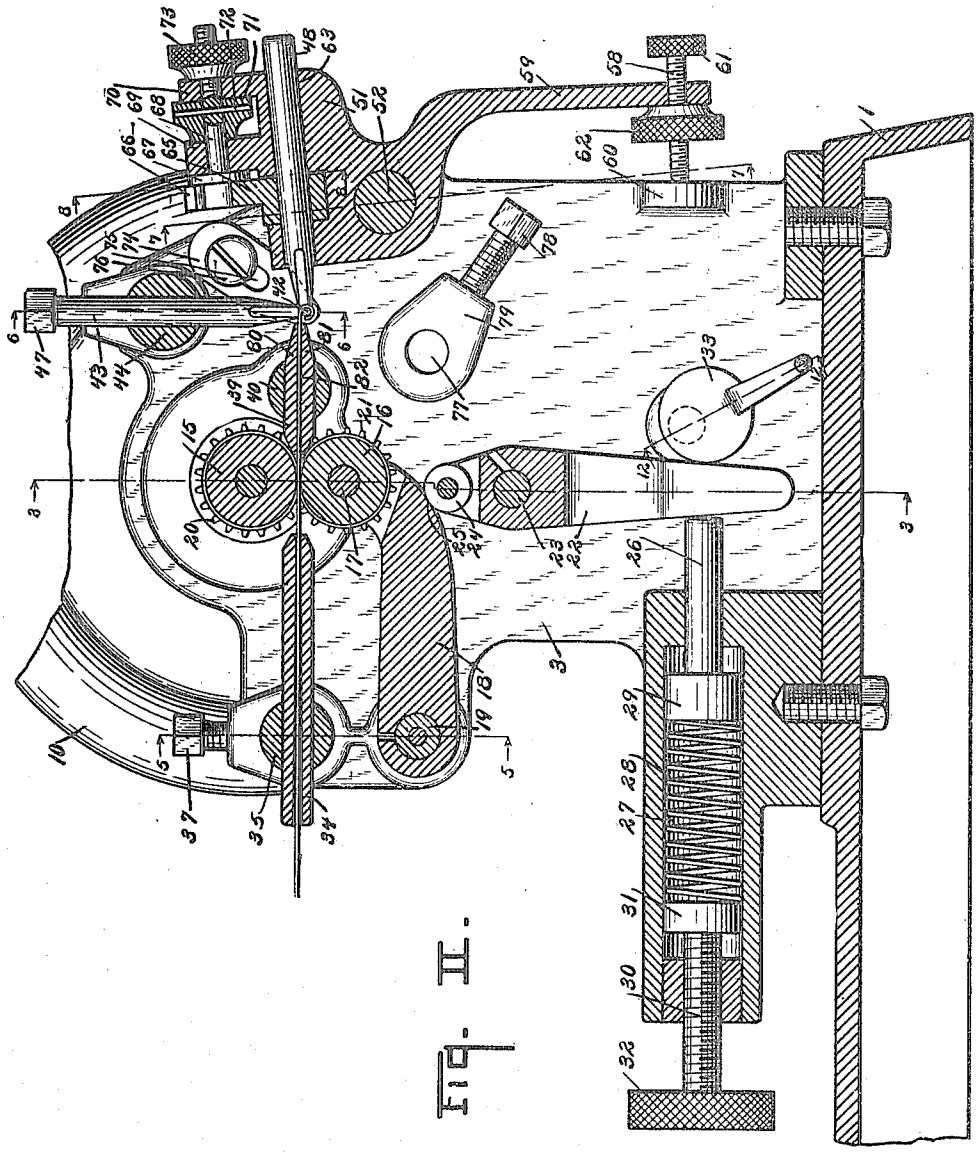


Fig. II.

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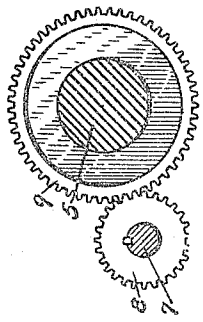


Fig. IV.

Fig. III.

Witnesses

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4 SHEETS—SHEET 4.

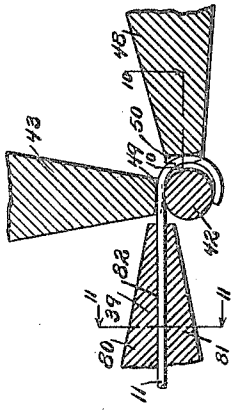


Fig. IX.



Fig. X.

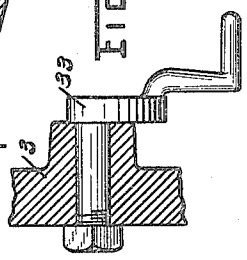


Fig. XII.

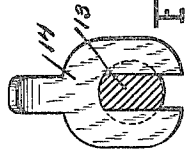


Fig. XIII.

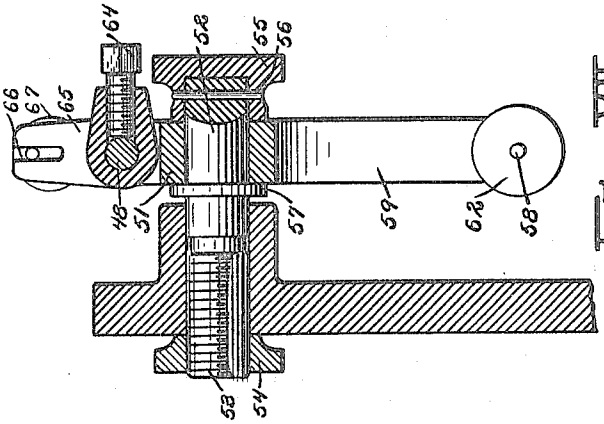


Fig. VII.

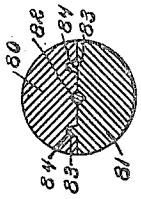


Fig. XI.

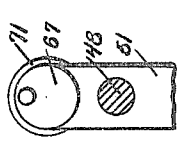


Fig. VIII.

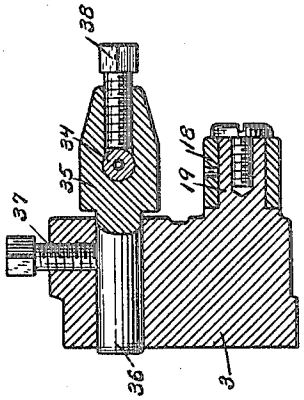


Fig. V.

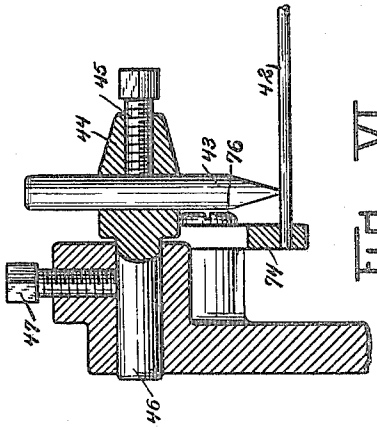


Fig. VI.

Inventor

Witnesses

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UNITED STATES PATENT OFFICE.

FRED H. DOERR, OF GRAND RAPIDS, MICHIGAN.

COILING-MACHINE.

1,207,880. Specification of Letters Patent. Patented Dec. 12, 1916.

Application filed May 15, 1914. Serial No. 838,635.

To all whom it may concern:

Be it known that I, FRED H. DOERR, a citizen of the United States, residing at Grand Rapids, Michigan, have invented certain new and useful Improvements in Coiling-Machines, of which the following is a specification.

This invention relates to improvements in coiling machines.

The main objects of this invention are: First, to provide an improved coiling machine, particularly adapted for the forming of springs from fine wire. Second, to provide an improved coil or spring making machine in which the springs are formed from a spool of wire and are of uniform diameter and tension and are produced practically without waste. Third, to provide an improved coiling or spring making machine in which springs of various diameters may be readily produced and also springs of different pitch and tension. Fourth, to provide an improved coiling or spring making machine which may be very quickly and easily adjusted to produce the desired character of spring. Fifth, to provide in a coiling or spring making machine an improved wire feed mechanism. Sixth, to provide an improved coiling or spring making machine which is comparatively simple and compact in structure and one which is readily portable and may be provided with a motor.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is clearly illustrated in the accompanying drawing forming a part of this specification, in which:

Figure I is a perspective view of a machine embodying the features of my invention, one of the spool flanges being broken away. Fig. II is a detail view, partially in vertical section, on a line corresponding to the broken line 2—2 of Fig. III. Fig. III is a detail view, mainly in vertical section, on a line corresponding to the broken line 3—3 of Fig. II. Fig. IV is a vertical section on a line corresponding to line 4—4 of Fig. III, showing details of the driving connections to the motor. Fig. V is a detail vertical section on a line corresponding to line 5—5 of Fig. II, showing details of the feed guide support and of the support for one of the feed rollers. Fig. VI is a detail section on a line corresponding to line 6—6 of Fig. II, showing the holder for one of the tools and its relation to the mandrel, Fig. VII is a detail section on a line corresponding to line 7—7 of Fig. II, showing details of the holder for the other tool illustrated. Fig. VIII is a detail section on a line corresponding to line 8—8 of Fig. II, showing further details of the second tool holder. Fig. IX is an enlarged vertical section, showing details of the tools and the relation thereof to the mandrel and the wire guide. Fig. X is a detail section on a line corresponding to line 10—10 of Fig. IX, showing further details of the tools. Fig. XI is a transverse section on a line corresponding to line 11—11 of Fig. IX, showing structural details of the wire guide member. Fig. XII is a detail section on a line corresponding to line 12—12 of Fig. II, showing details of the wire feed tension releasing eccentric. Fig. XIII is a detail section on a line corresponding to line 13—13 of Fig. I, showing the form of the spool flange fastener or retaining clip.

In the drawing similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawing, the base 1 is preferably a casting of suitable size to receive and support the parts. In the structure illustrated the electric motor 2 is bolted upon the base.

The main parts of the machine are supported upon the frame 3, which has a bearing 4 for one end of the shaft 5, the other end of the shaft being supported by the pedestal 6. The motor shaft 7 is provided with a gear 8 meshing with the gear 9 on the shaft 5. A balance wheel 10 is provided for the shaft 5, the balance wheel, for stability, being arranged between the pedestal 6 and the frame 3. The stock is preferably in the form of spools of wire 11 carried by a suitable bracket 12 having a spool spindle 13 thereon. This spindle is provided with opposed slots adapted to receive the fingers of the retaining member or clip 14 which holds the spool on the spindle.

I provide a pair of coacting feed rollers 15 and 16 which have opposed grooves in their peripheries. The roller 15 is mounted on the shaft 5, while the roller 16 is supported by the journal 17 carried by the forked supporting arm 18 pivotally mounted on the stud 19. On the shaft 5 is a gear 20 with which a gear 21 secured to the roller 16 meshes when the rollers are in their feeding relation.

The feed roller 16 is held in its feeding position by a pressure means consisting, in the structure illustrated, of the lever 22 which is pivotally mounted at 23 and provided with a roller 24 at its upper end engaging the cam surface 25 on the support 18. The lower end of the lever is engaged by the spring actuated member or plunger 26 which is arranged through one end of the spring supporting barrel 27 to engage the lever, as shown in Fig. II. The spring 28 is arranged within the barrel to engage the head 29 of the member 26. The spring is regulated by the screw 30 arranged through the other end of the barrel and provided with a head 31 for the spring and with a finger piece 32 for adjustment. When it is desired to release the pressure on the feed roller for any purpose, as in threading the wire or making ready the machine, the support 18 may be released through the eccentric 33 journaled in the frame, see Figs. II and III, oppositely to the spring actuated member and adapted to be swung into position to force the lever against the actuating spring and thus release the support.

The wire is delivered to the feed rollers by the delivery guide member 34 which is provided with a longitudinal hole centered with the center of the opposed grooves of the feed rollers. As the wire is drawn through this guide member it is supported so as to pass into the rollers on a straight line and all kinks or bends are taken out of the wire. This guide is supported by a holder 35 having a stem 36 projecting into a suitable hole in the frame and secured therein by a set screw 37, see Figs. I, II and V. The guide member is adjustably retained in the holder by a set screw 38. From the feed rollers the wire is delivered through the guide 39. This guide is supported for longitudinal adjustment in the holder 40 by means of the set screw 41, substantially the same as the delivery member 34.

The guide member 39 has tapered ends, its front or forward end being close to the peripheries of the feed rollers, its rear end being close to the mandrel 42 with the center of the guide hole approximately in the plane of the top of the mandrel and the center of the opposed feed roller grooves. The diameter of the guide hole is such that the wire has a sliding fit therein. The function of this guide member is to support the wire between the feed rollers and the mandrel so that it may be pushed or delivered from the feed rollers to the mandrel and tools without bending or kinking.

The first tool 43 is supported for longitudinal adjustment by the holder 44, see Fig. VI, to engage the wire as it is delivered from the guide member across the mandrel. The tool 43 is longitudinally adjustable in its holder 44 and is secured in its adjusted positions by means of the set screw 45. The holder 44 is provided with a stem 46 arranged in a suitable hole in the frame and secured therein by the set screw 47. The second or forming tool 48 is disposed oppositely to the guide member, see Fig. II. Both tools are disposed radially to the mandrel. The tools have wire engaging grooves 49 provided with curved work faces 50, see Figs. IX and X. The tool 48 is adjustably supported for regulating the diameter of the spring and also its pitch and tension. To accomplish this adjustment the tool holder 51 is mounted on the pivot or support 52. This pivot or support is threaded at 53 to engage the frame, see Fig. VII, and is provided with a lock nut 54 on the inner side of the frame. The support or pivot is provided with a finger piece 55 which is secured thereto by the pin 56, lateral movement of the holder on the pivot being prevented by the finger piece and collar 57. The holder is adjusted on its pivot by means of the screw 58 arranged through the arm 59 on the holder to engage a projecting ear 60 on the frame, the screw being threaded through the arm and provided with a suitable finger piece 61. A lock nut 62 is provided for securing the screw 58 in its adjusted position.

The holder 51 is provided with a bore or socket 63 for the tool 48, the tool being secured in its adjusted positions in this socket by means of the set screw 64, see Fig. VII. To provide rotatable adjustment for the tool in its socket the tool is provided with an arm 65 slotted at 66. This arm is engaged by the adjusting eccentric 67 carried by the spindle 68 arranged through ears 69 and 70 on the holder. These ears are spaced apart, the finger piece 71 being arranged between the ears and secured to the spindle by the pin 72. A lock nut 73 is provided for securing the spindle in its adjusted position.

The mandrel 42 is carried by the plate or bracket 74 having a slot 75 therein which is engaged by the screw 76 so that the mandrel is supported for lateral adjustment, and also to provide a convenient means for changing the mandrel, which is sometimes desirable where there is a large variation in the diameter of the spring desired, or where heavier or lighter gages of wire are used.

Where the machine is used on heavy wire it is sometimes desirable to provide a third

tool which is carried by a holder the same as holder 44, the stem of which is arranged in the hole 77 and secured by the set screw 78 arranged in the boss 79. With this arrangement of parts the tools may be adjusted for the particular kind of work desired, that is, for regulating the pitch and tension of the spring. The adjustment for diameter is mainly effected through adjustment of the tool 48 and the tool holder through which the adjusting screw 61 passes. The adjustment for pitch and tension is effected through the adjustment of the supporting screw 52 which secures the rough adjustment, as it might be designated, and the adjustment through the eccentric 67 which provides for very fine and accurate adjustment.

For convenience in manufacture the guide member 39 is formed in sections 80 and 81. The hole is formed by grooving the faces of these sections at 82 which may be done by a suitable milling tool. It is desirable, as stated, that the hole should be an accurate sliding fit as the wire is forced through this hole and it is desired that it should not be kinked. The sections are joined by joint tongues 83 formed on one section and corresponding grooves 84 on the other. These tongues and grooves are formed so that they are drive fit and when the sections are forced together are closely retained thereby.

I have illustrated and described my improved coiling or spring making machine in a simple and practical form in which I have embodied the same. I have not attempted to illustrate or describe various modifications in structural details which I contemplate, as I believe the disclosure made will enable those skilled in the art to which my invention relates to embody or adapt the same as conditions may require. I desire, however, to be understood as claiming my improvements specifically in the form illustrated as well as broadly within the scope of the appended claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:

1. In a coiling machine, the combination of a mandrel comprising a guide member, means for feeding wire across the mandrel, a tool engaging the wire as the wire is delivered across the mandrel, a forming tool disposed oppositely to said guide member, said tools being disposed radially to the mandrel and having wire engaging grooves, a holder for said forming tool, a supporting pivot for said holder, disposed parallel with the mandrel, said pivot being threaded for longitudinal adjustment, and being provided with a lock nut, said holder being provided with a socket for said tool and with spaced ears, a slotted arm on said forming tool, an adjusting eccentric engaging the slot of said arm and provided with a spindle arranged through said ears on said holder, said spindle being threaded and provided with a lock nut engaging one of said ears, a finger piece on said spindle between said ears, a set screw for securing said forming tool in its adjusted positions, and a screw for adjusting said tool holder on its pivot provided with a lock nut.

2. In a coiling machine, the combination of a mandrel comprising a guide member, means for feeding wire across the mandrel, a tool engaging the wire as the wire is delivered across the mandrel, a forming tool disposed oppositely to said guide member, said tools being disposed radially to the mandrel and being provided with non-rotatable work faces rigid therewith and having wire engaging grooves, a holder for said forming tool, a supporting pivot for said holder, disposed parallel with the mandrel, said pivot being threaded for longitudinal adjustment, said holder being provided with a socket for said tool, an arm on said forming tool, an adjusting eccentric engaging said arm, a set screw for securing said forming tool in its adjusted positions, and a screw for adjusting said tool holder on its pivot.

3. In a coiling machine, the combination of a mandrel, means for feeding wire across the mandrel, a tool having a wire engaging groove, a holder for said tool, a supporting pivot for said holder, said pivot being threaded for longitudinal adjustment and being provided with a lock nut, said holder being provided with a socket for said tool and with spaced ears, a slotted arm on said tool, an adjusting eccentric engaging the slot of said arm and provided with a spindle arranged through said ears on said holder, said spindle being threaded and provided with a lock nut engaging one of said ears, a finger piece on said spindle between said ears, a set screw for securing said tool in its adjusted positions, and a screw for adjusting said tool holder on its pivot provided with a lock nut.

4. In a coiling machine, the combination of a mandrel, means for feeding wire across the mandrel, a tool having a wire engaging groove, a holder for said tool, a supporting pivot for said holder supported for longitudinal adjustment, said holder being provided with a socket for said tool and with spaced ears, a slotted arm on said tool, an adjusting eccentric engaging the slot of said arm and provided with a spindle arranged through said ears on said holder, a finger piece on said spindle, means for securing said tool in its adjusted positions, and means for adjusting said tool holder on its pivot.

5. In a coiling machine, the combination of a mandrel supported for lateral adjustment, means for feeding wire across the

mandrel, a tool disposed radially to the mandrel and having a wire engaging groove with a forwardly curved work face, a holder for said tool, a supporting pivot for said holder, disposed parallel with the mandrel, said pivot being threaded for longitudinal adjustment, an arm on said tool, an adjusting eccentric engaging said arm, means for securing said forming tool in its adjusted positions, and a screw means for adjusting said tool holder on its pivot.

6. In a coiling machine, the combination of a mandrel, means for feeding wire across the mandrel, a tool having a wire engaging groove, a holder for said tool, a supporting pivot for said holder supported for longitudinal adjustment, an arm on said tool, an adjusting eccentric engaging said arm, means for securing said forming tool in its adjusted positions, and a screw means for adjusting said tool holder on its pivot.

7. In a structure of the class described, the combination with a frame, of a pair of grooved feed rollers, a pivoted support for one of said rollers, a lever provided with a roller engaging a cam surface on said support, a spring, a supporting barrel for said spring, a spring actuated member projecting from one end of said barrel to engage said lever and provided with a head disposed in said barrel to receive the thrust of said spring, an adjusting screw arranged through the other end of said barrel and supporting the opposite end of said spring, and an eccentric disposed to engage said lever opposite said spring actuated member for holding the lever against the tension of the spring to release the tension roller.

8. In a structure of the class described, the combination with a frame, of a pair of grooved feed rollers, a pivoted support for one of said rollers, a lever provided with a roller engaging a cam surface on said support, a spring, a supporting barrel for said spring, a spring actuated member projecting from one end of said barrel to engage said lever and provided with a head disposed in said barrel to receive the thrust of said spring, an adjusting screw arranged through the other end of said barrel and supporting the opposite end of said spring.

9. In a structure of the class described, the combination with a frame, of a pair of grooved feed rollers, a pivoted support for one of said rollers, a lever engaging said support, a spring, a supporting barrel for said spring, a spring actuated member projecting from one end of said barrel to engage said lever, an adjusting screw for said spring, and an eccentric disposed to engage said lever opposite said spring actuated member for holding the lever against the tension of the spring to release the pressure roller.

10. In a structure of the class described, the combination with a frame, of a pair of grooved feed rollers, one of said rollers being a driving roller, a pivoted support for the other roller, a lever provided with a roller engaging a cam surface on said support, and a tension spring for said roller.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

FRED H. DOERR. [L. S.]

Witnesses:
C. B. DES JARDINS,
M. L. GLASGOW.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."