

No. 747,687.

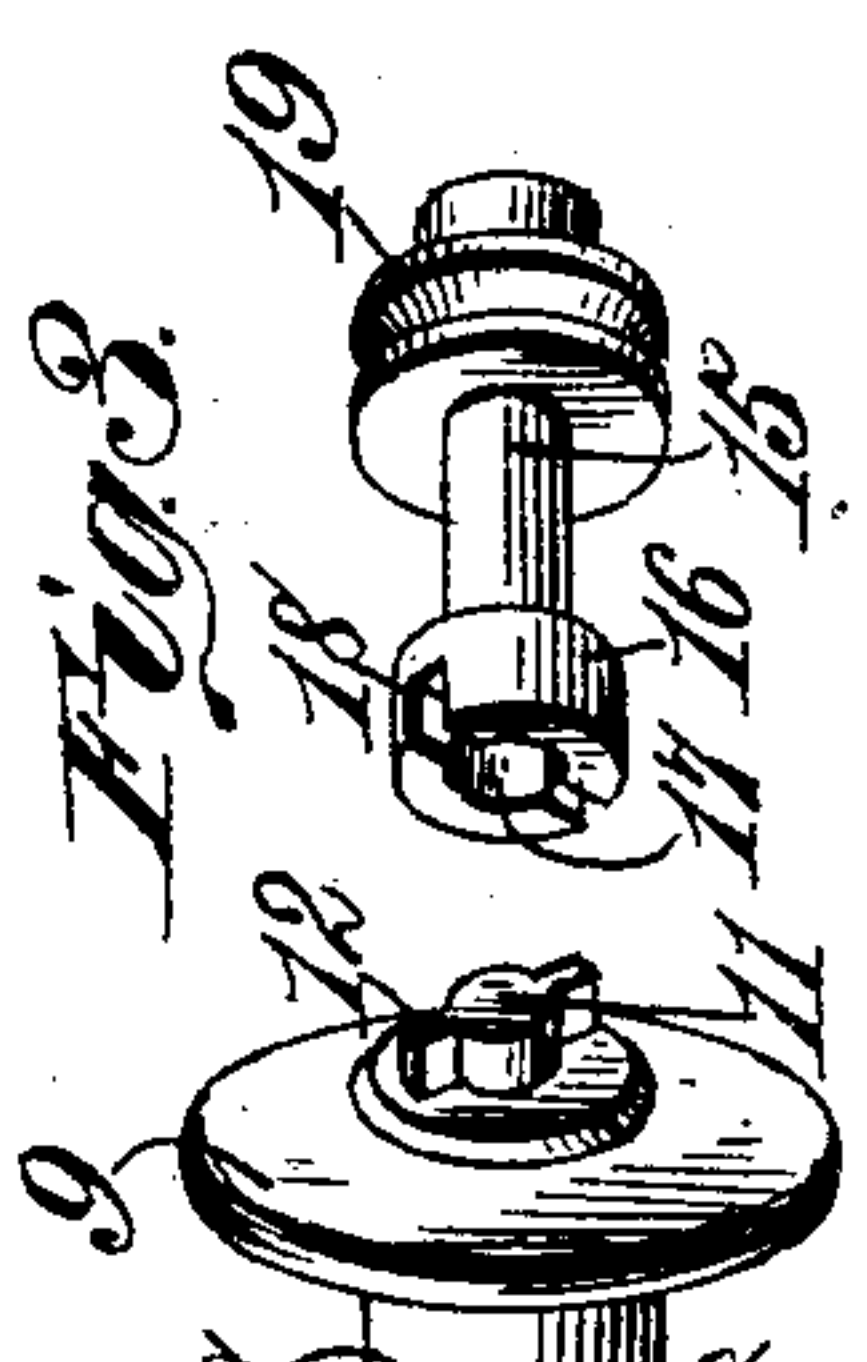
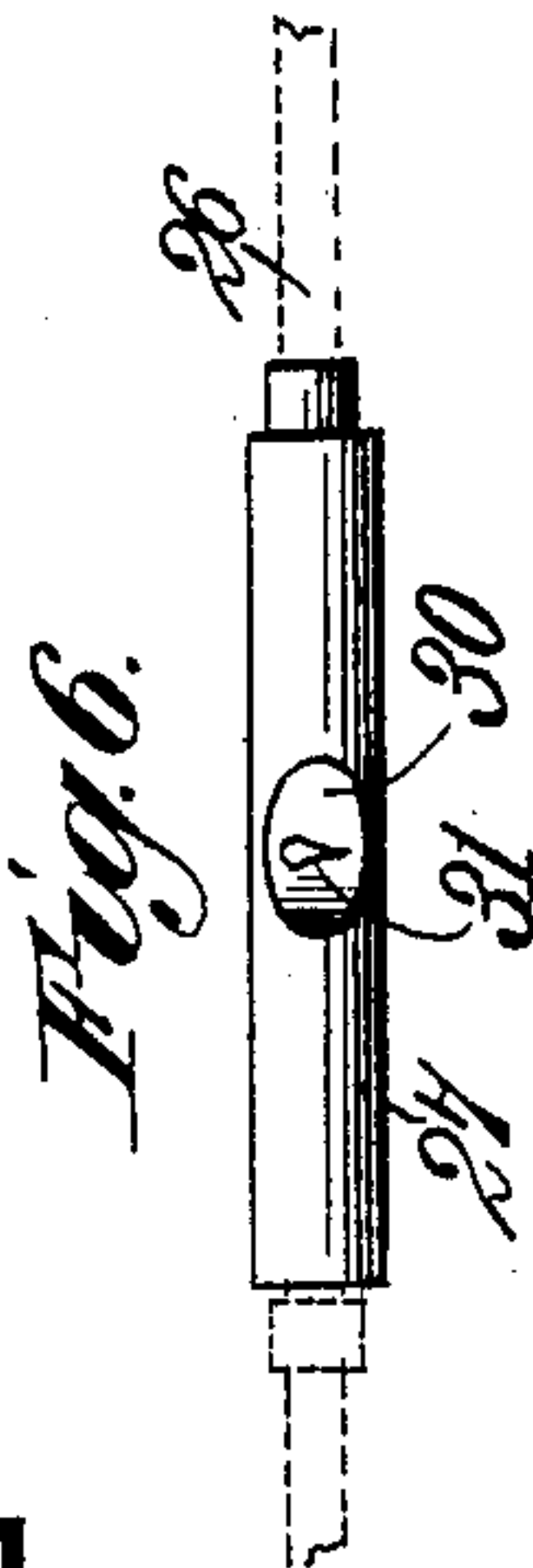
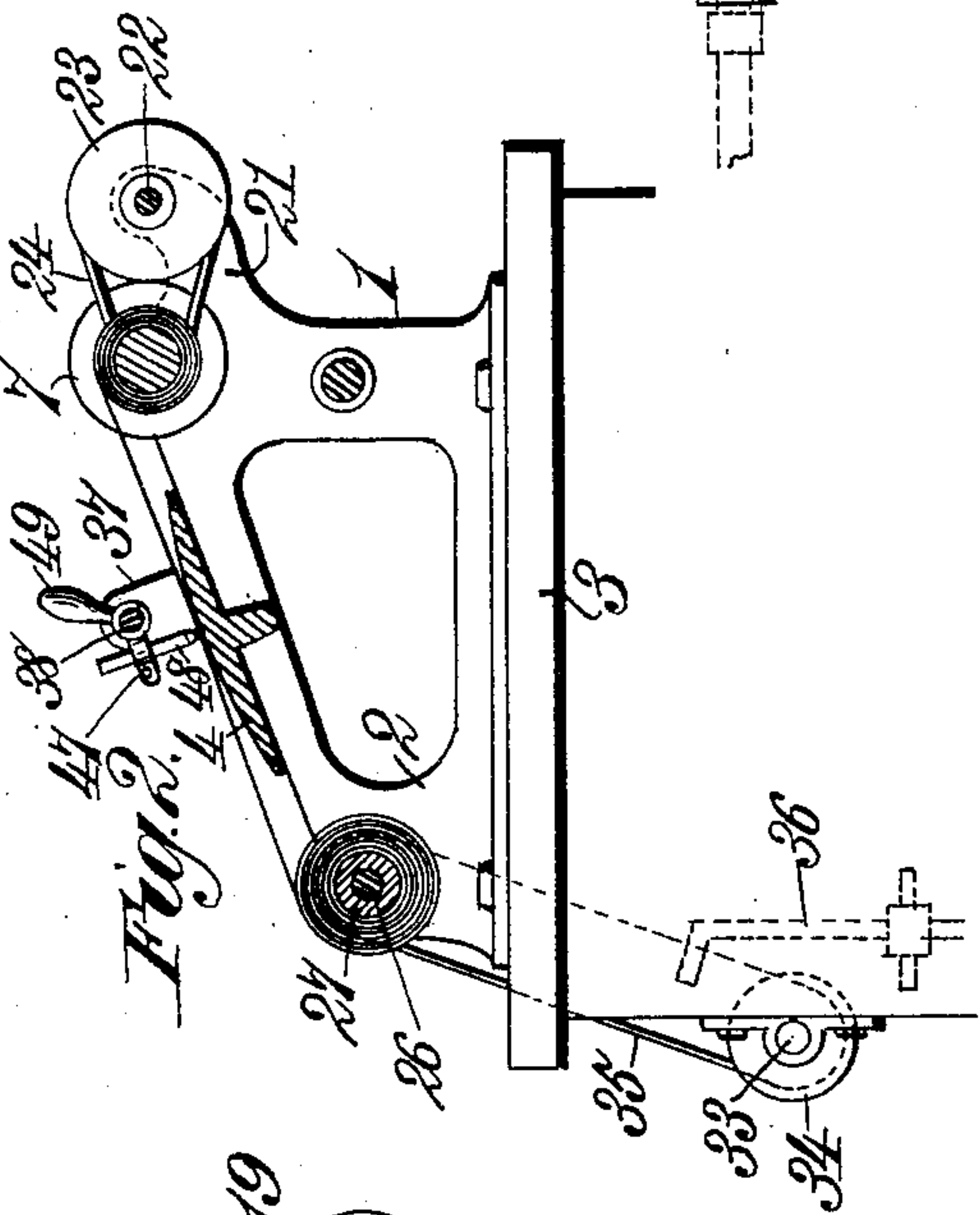
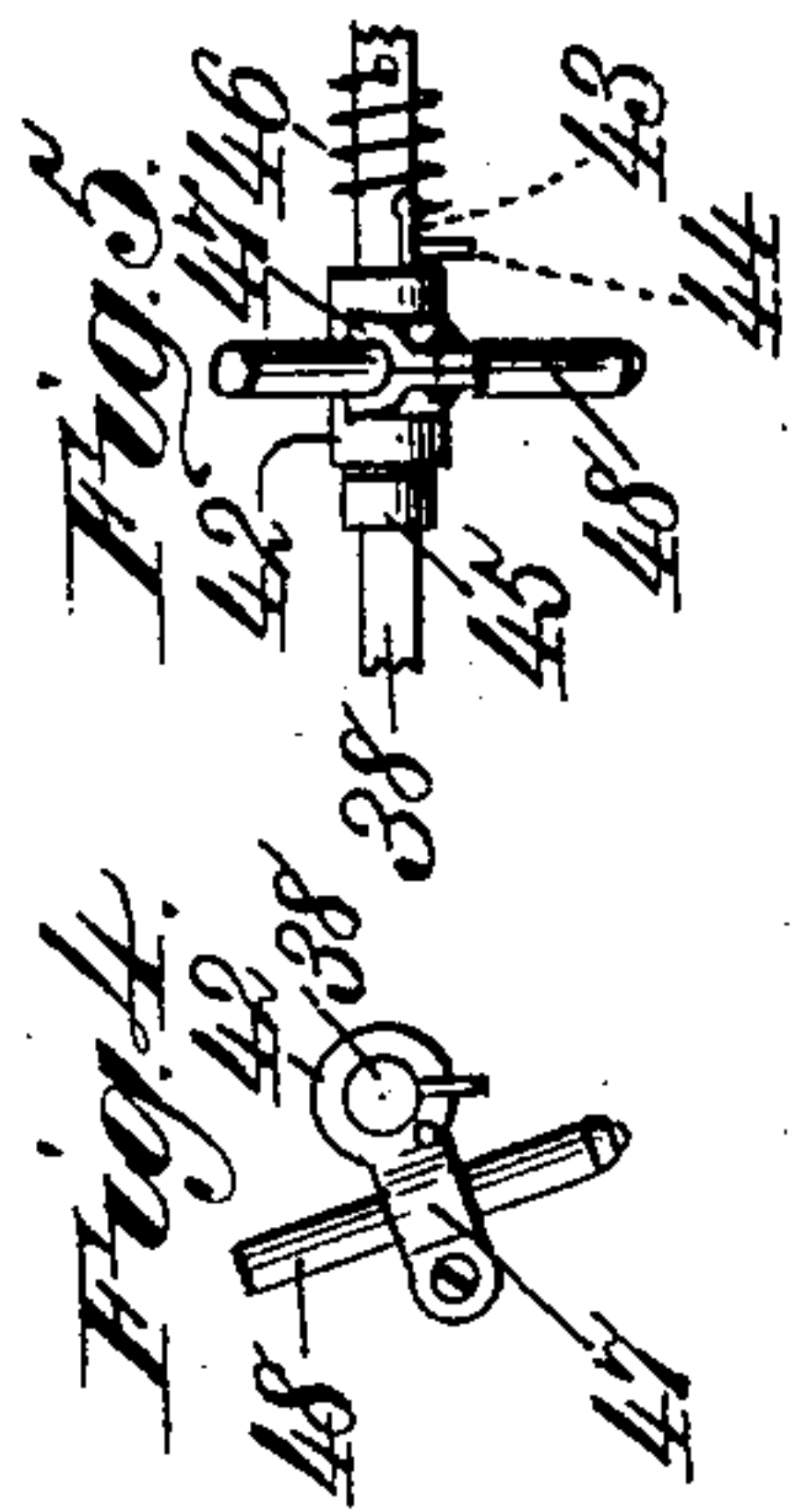
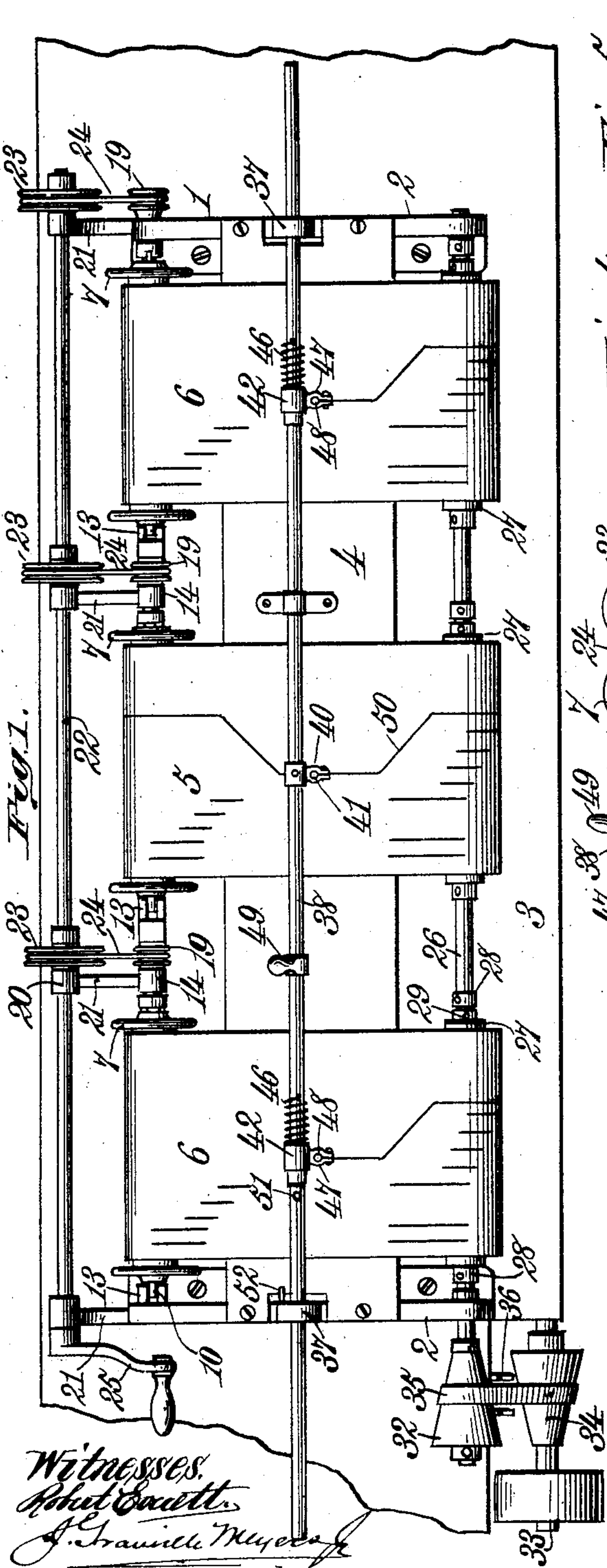
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G. H. DAVIS.

APPARATUS FOR DUPLICATING INDICATOR LINES ON MUSIC SHEETS.

APPLICATION FILED MAR. 26, 1902.

NO MODEL.



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UNITED STATES PATENT OFFICE.

GEORGE HOWLETT DAVIS, OF WEST ORANGE, NEW JERSEY.

APPARATUS FOR DUPLICATING INDICATOR-LINES ON MUSIC-SHEETS.

SPECIFICATION forming part of Letters Patent No. 747,687, dated December 22, 1903.

Application filed March 26, 1902. Serial No. 100,145. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HOWLETT DAVIS, a citizen of the United States, residing at West Orange, in the county of Essex and State of New Jersey, have invented new and useful Improvements in Apparatus for Duplicating Indicator-Lines on Music-Sheets, of which the following is a specification.

This invention relates to apparatus for duplicating the indicator-lines on music-sheets for mechanical musical instruments. In various different types of mechanical or self-playing musical instruments the music-playing mechanism is controlled by a perforated sheet of paper known in the art as a "music-sheet," and it is now usual to mark on such sheets lines to indicate to the operator the proper times and places to manipulate certain controlling devices for the purpose of imparting to the music being played certain characteristics—such, for example, as the tempo, expression, and the forte and pianissimo effects. In manufacturing such music-sheets it is the usual practice to first produce an original sheet that is correctly perforated to accurately sound all the notes of the composition to be played in their regular sequence and with the proper duration of each note. After the original music-sheet has thus been prepared a line or plurality of dots representing a line is marked thereon to indicate to the operator the manner in which the controlling devices are to be manipulated to impart to the music the desired effect or effects before referred to. The original music-sheet thus produced is afterward used as a pattern from which duplicate sheets are prepared for controlling an indefinite number of instruments.

It is the object of the present invention to provide novel, simple, and efficient mechanism for simultaneously, rapidly, and accurately reproducing on a number of perforated music-sheets the indicator-lines marked on the original sheet; and to this end my invention consists in the features and in the construction, combination, and arrangement of parts hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a top plan view of my appara-

tus. Fig. 2 is a vertical transverse sectional view of the same. Fig. 3 is a detail perspective view illustrating the manner of connecting the music-sheet rolls to the rewinding mechanism. Figs. 4 and 5 are detail views illustrating the manner of supporting in place the marking devices, and Fig. 6 is a detail view of one of the take-up rolls.

Referring to the drawings, the numeral 1 indicates the frame of the machine, which may be of any suitable and preferred construction and which in the present instance is shown as comprising two side or end members 2, each of which consists of a vertical skeleton plate, the two plates being arranged parallel to each other and rigidly secured to a table or bed 3. Rigidly attached at its opposite ends to the upper edges of the frame-plates 2 is an inclined platen 4, the upper side of which may be slightly curved or convex, as most clearly shown in Fig. 2 of the drawings, and over which the pattern music-sheet and the music-sheets to be marked are adapted to travel, the pattern music-sheet being indicated by the numeral 5 and the music-sheets to be marked by the numeral 6. Each of said sheets is rolled about a roll or spool 7, known in the art as a "delivery-roll" and of well-known construction, said delivery-rolls each consisting of a cylindrical bobbin 8, provided at each end with an annular flange 9 and also provided at one end with a cylindrical spindle 10 and at the other end with a spindle 11, having laterally-projecting wings, ribs, or feathers 12. The spindle 10 of each of the delivery-rolls 7 is journaled in an open bearing 13, formed on or attached to the frame of the machine, and the feathered spindle 11 is removably fixed in a clutch constructed as follows: Forming a part of or attached to the frame of the machine is a plurality of bearings 14, in each of which is journaled a short shaft 15. (See Fig. 3.) On one end of said shaft is formed a cylindrical head 16, provided centrally with a cylindrical socket 17, from which radiate lateral slots or recesses 18. On the other end of the shaft 15 is fixed a pulley 19. The delivery-rolls, with the music-sheets wound thereon, are secured in place in the machine by inserting the spindle 11 of each roll in the socket 17 of one of the clutches 16 in such manner that the wings or

feathers 12 will seat themselves in the slots or recesses 18 of the clutch. The opposite spindle 10 of the roll is then dropped into one of the open bearings 13. When the rolls 5 have thus been inserted in place, they are adapted to freely rotate, but not independently of the shafts 15 and pulleys 19. Journaled in suitable bearings 20, formed in brackets 21, attached to or forming part of 10 the frame of the machine, is a shaft 22, on which are fixed pulleys 23, each of said pulleys being arranged opposite one of the pulleys 19, and each pair of said pulleys 23 and 19 being connected together by a belt or cord 15 24. A crank or handle 25 is fixed on one end of the shaft 23, by means of which the latter and all the pulleys 23 may be simultaneously turned for the purpose hereinafter explained.

20 Journaled in suitable bearings formed in the lower or front portion of the frame of the machine is a shaft 26, on which are arranged a plurality of sleeves 27, constituting take-up rolls. Each of said take-up rolls consists 25 of a hollow cylindrical sleeve slightly longer than the width of the music-sheet, and each of said take-up rolls is adapted to rotate between collars 28, fixed on the shaft 26, said collars operating to prevent endwise movement of the take-up rolls. Each take-up roll 30 is provided at one end with a set-screw 29, by means of which it may be fixed to the shaft 26, so as to be caused to rotate with the latter. Formed centrally in the periphery of 35 each of the take-up rolls is a groove or recess 30, and fixed in the roll in said groove or recess is a hook 31, to which the end of the music-sheet may be hooked. In practice the ends of the music-sheets are trimmed or 40 tapered off nearly to a point, and in said tapered end is formed a perforation or eyelet adapted to be engaged by the hook 31 to attach the sheet to the take-up roll. In making the perforated music-sheets the first perforation, or that perforation intended to 45 sound the first note of the composition to be played, is not always placed exactly the same distance from the end of the music-sheet. Hence when the ends of the music-sheets are attached to the take-up rolls the 50 set-screws 29 are loosened, so that said rolls will be loose on the shaft 26. The take-up rolls are then turned on the shaft 26 until the first perforations in all the music-sheets will be in alinement, or, in other words, will 55 all be exactly the same distance from the axis of the shaft 26. The set-screws are then tightened up, securely fixing them to the shaft 26. On one end of the shaft 26 is fixed 60 a cone-pulley 32, and fixed opposite the latter on a driving-shaft 33 is a similar cone-pulley 34. The driving-shaft 33 is driven from any suitable source of power, and the two pulleys 32 and 34 are connected together 65 by a belt 35. A belt-shifter 36 of any ordinary or preferred construction is provided for shifting the belt 35 on the cone-pulleys,

whereby the speed at which the shaft 26 and the take-up rolls are rotated may be at any time instantly altered, thus enabling the operator to regulate at will the speed at which 70 the music-sheets travel.

Journaled in bearings 37 on the frame of the machine is a shaft 38, and fixed on said shaft at a point over the pattern-sheet 5 is a 75 collar 39, carrying a laterally-projecting clamp 40, in which is clamped a stylus or tracer 41 of any suitable type or construction. Loosely arranged on the shaft 38 over each of the music-sheets 6 to be marked is a collar 42, (most 80 clearly shown in Figs. 4 and 5 of the drawings,) each of said collars 42 having a limited rotary movement independently of the shaft 38, such movement being limited or controlled by a pin 43, which projects laterally 85 from one end of the collar and which is adapted to abut a pin 44, which projects radially from the shaft 38. Each of the collars 42 is prevented from moving endwise in one direction on the shaft 38 by the pin 44 and in 90 the opposite direction by a collar 45, fixed on said shaft. Attached to each of the pins 43 is one end of a coiled spring 46, the other end of which is attached to the shaft 38. Said springs exert a constant force tending to rotate the collar 42 in a given direction for the 95 purpose presently to be made apparent. Projecting laterally from each of the collars 42 is a clamp 47, in which is adjustably clamped a marker 48, which may conveniently consist of a pencil, pen, brush, or marking device of any suitable or preferred construction, the particular marking device employed for the purpose forming no part of the present invention. The springs 46 keep the 105 collar 42 turned in a direction and in such manner as to cause the ends of the markers 48 and the stylus 41 to bear with a light yielding pressure on the music-sheets. The shaft 38 is not only capable of rotating in the bearings 37, but may also be freely moved longitudinally therein and for such purpose is provided with a handle 49.

The operation of the machine is as follows: Let it be assumed that the delivery-rolls carrying the music and pattern sheets have been 115 placed in position and the ends of said sheets have been attached to the take-up rolls in the manner described; also, that the driving-shaft has been set in motion to put the machine in operation. Then as the shaft 26 and 120 the take-up rolls rotate the music-sheets will be wound up onto the take-up rolls and unwound from the delivery-rolls, traveling over and in contact with the upper side of the platen 4. The operator grasps the handle 49 125 and moves the rod 38 longitudinally back and forth in its bearings in such manner as to cause the stylus 41 to closely follow or trace the indicator-line 50 on the pattern-sheet 5 as the latter travels forward beneath 130 the stylus. It is obvious that the markers 48 being carried by the same rod on which the stylus is fixed they will be caused to ex-

actly simulate or follow every movement of the stylus, and hence will accurately and faithfully reproduce on the music-sheets 6 the indicator-line 50 delineated on the pattern-sheet 5. When music and pattern sheets have been completely unwound from the delivery-rolls, the handle 25 is turned in the proper direction to rotate the said rolls in a reverse direction and simultaneously re-
 10 wind all the music-sheets and the pattern-sheets on the delivery-rolls, when the latter will be in readiness for insertion in the musical instruments to be played. By turning the rod 38 in the proper direction by means
 15 of the handle 49 all the markers and the stylus may be simultaneously lifted off the music and pattern sheets, and in order to limit such movement I prefer to provide the shaft 38 with a radially-projecting pin 51
 20 and one of the bearings 37 with a laterally-projecting pin 52, the relative arrangement of said pins being such that when the shaft 38 has been turned back sufficiently far to raise the markers and stylus from off the
 25 sheets and then moved longitudinally the requisite distance the pin 51 will abut the pin 52 and prevent any further rotation of said shaft.

I have shown the machine adapted for
 30 marking but two music-sheets at a time; but it will be manifest that it may be arranged for simultaneously marking any number of music-sheets desired, and in practice the machines are constructed for simultaneously
 35 marking a large number of music-sheets.

Having described my invention, what I claim is—

1. In an apparatus of the character described, the combination with a support, of
 40 delivery-rolls removably journaled in bearings on one side of said support, take-up rolls on the other side of said support, means for rotating the take-up rolls, a stylus and a marker arranged over said support, means
 45 for moving the stylus and marker in unison and for maintaining them in fixed relation during such movement, and means for rotating the delivery-rolls for the purpose specified.

2. In an apparatus of the character described, the combination with a support, of
 50 delivery-rolls removably journaled in bearings at one side of said support, a shaft journaled at the other side of the support, take-up rolls rotatably adjustable on said shaft independently of each other, means for rotating
 55 said shaft, a stylus and a marker arranged over said support, and means for moving the stylus and marker in unison over said support and for maintaining them in fixed relation during such movement.

3. In an apparatus of the character described, the combination with a support, of
 60 delivery-rolls removably journaled in bearings at one side of said support, a shaft journaled at the other side of the support, take-

up rolls rotatably adjustable on said shaft independently of each other, means for rotating said shaft, a stylus and a marker arranged
 70 over said support, means for moving the stylus and marker in unison over said support and for maintaining them in fixed relation during such movement, and means for rotating the delivery-rolls for the purpose specified.
 75

4. In an apparatus of the character described, the combination with a support, of
 80 delivery-rolls removably journaled in bearings at one side of said support, take-up rolls at the other side of the support, means for rotating the take-up rolls, a rotatable and longitudinally-movable rod arranged over
 85 said support, a marker and a stylus carried by said rod, and means for supporting the rod in a rotatably-adjusted position to hold the stylus and marker above and out of contact with the support.

5. In an apparatus of the character described, the combination with a support and
 90 means for moving a marked pattern-sheet and a blank sheet in unison over said support, of a rotatable rod movable transversely to said sheets, a stylus carried by said rod and arranged to rest on the pattern-sheet, a
 95 marker rotatably arranged on said rod, and a spring arranged to yieldingly hold the marker in contact with the blank sheet, substantially as described.

6. In an apparatus of the character described, the combination with a support and
 100 means for moving a marked pattern-sheet and a blank sheet in unison over said support, of a rotatable rod movable transversely to said sheets, a stylus and a marker carried by said rod and arranged to rest on the pattern
 105 sheet and the music sheets respectively, and means for moving said rod both about and in the direction of the axis, substantially as described.

7. In an apparatus of the character described, the combination with a support and
 110 means for moving a marked pattern-sheet and a blank sheet in unison over said support, of a rotatable rod movable transversely to said sheets, a stylus carried by said rod and
 115 arranged to be brought to rest on the pattern-sheet, a marker rotatably arranged on said rod, a spring arranged to yieldingly hold the marker in contact with the blank sheet, and means for limiting the rotary movement of
 120 the marker on the rod substantially as described.

8. In an apparatus of the character described the combination with a support and
 125 means for moving a marked pattern-sheet and a blank sheet in unison over said support, of a rotatable rod movable transversely to said sheets, a stylus carried by said rod and arranged to be brought to rest on the pattern-sheet, a collar loosely mounted on the rod
 130 above the blank sheet and carrying a holder, a marker held in said holder and a spring ar-

ranged to turn said collar on the rod to yieldingly hold the marker in contact with the blank sheet, substantially as described.

9. In an apparatus of the character described, the combination with a support and means for moving a marked pattern-sheet and a blank sheet in unison over said support, of a rotatable rod movable transversely to said sheets, a stylus carried by said rod and arranged to be brought to rest on the pattern-sheet, a collar loosely mounted on the rod above the blank sheet and carrying-clamp, a marker adjustably held in said clamp, and a spring arranged to turn said collar on the rod to yieldingly hold the marker in contact with the blank sheet, substantially as described.

10. In an apparatus of the character described, the combination with a support and means for moving a marked pattern-sheet and a blank sheet in unison over said support, of a rotatable rod movable transversely to said sheets, a stylus carried by the rod and arranged to be brought to rest on the pattern-sheet, a collar loosely mounted on the rod above the blank sheet and carrying a holder, a marker held in said holder, a spring arranged to turn the collar on the rod to yieldingly hold the marker in contact with the blank sheet, a projection on one end of the collar, and a projection on the rod arranged to engage said first-named projection when the rod is turned in one direction and lift the marker out of contact with the blank sheet, substantially as described.

11. In an apparatus of the character described, the combination with a support and means for moving a marked pattern-sheet and a blank sheet in unison over said support, of a rotatable rod movable longitudinally in fixed bearings transversely to said sheets, a stylus and a marker carried by said rod and arranged to rest on the pattern and blank sheets respectively, means for turning said rod to raise the stylus and marker out of contact with the sheets, and means for limiting such movement of the rod, substantially as described.

12. In an apparatus of the character described, the combination with a support and means for moving a marked pattern-sheet and a blank sheet in unison over said support, of a rod rotatably arranged in fixed bearings and movable longitudinally therein transversely to the sheets, a stylus and a marker carried by the rod and arranged to rest on the pattern and blank sheets respectively, means for turning the rod to raise the stylus and marker out of contact with the sheets, a laterally-projecting pin on one of the said bearings, and a radially-projecting pin on the rod arranged to engage the lateral pin and limit the movement of the rod when the latter is turned to raise the stylus and marker, substantially as described.

13. In an apparatus of the character described, the combination with a support and means for moving a marked pattern-sheet

and a blank sheet in unison over said support, of a rotatable rod movable longitudinally in fixed bearings transversely to said sheets, holders mounted on said rod above the pattern and blank sheets respectively, a stylus and a marker independently adjustable in said holders, and means for moving said rod both axially and longitudinally, substantially as described.

14. In an apparatus of the character described, the combination with a support and means for moving a marked pattern-sheet and a blank sheet in unison over said support, of a rotatable rod movable longitudinally in fixed bearings transversely to said sheets, a stylus and a marker carried by said rod and arranged to rest on the pattern and blank sheets respectively, and a handle fixed on the rod for moving the latter both axially and longitudinally, substantially as described.

15. In an apparatus of the character described, the combination with a support, of delivery-rolls removably journaled in bearings on one side of said support and respectively having wound thereon a marked pattern-sheet and a blank sheet, take-up rolls on the other side of said support, said sheets being attached at their ends to the take-up rolls and passing over said support, means for rotating the take-up rolls to move the sheets over the support, a stylus arranged over the pattern-sheet, a marker arranged over the blank sheet, means for moving the stylus and marker in unison over the sheets and for maintaining them in fixed relation to one another during such movement, and means for rotating the delivery-rolls to rewind the sheets, thereon, substantially as described.

16. In an apparatus of the character described, the combination with a support, of delivery-rolls removably journaled in bearings on one side of said support and respectively having wound thereon a marked pattern-sheet and a blank sheet, take-up rolls on the other side of said support, said sheets being detachably connected at their ends to the take-up rolls and passing over said support, means for rotating the take-up rolls to move the sheets over the support, a stylus arranged over the pattern-sheet, a marker arranged over the blank sheet, means for moving the stylus and marker in unison over the sheets and for maintaining them in fixed relation to one another during such movement, and means for rotating the delivery-rolls to rewind the sheets thereon, substantially as described.

17. In an apparatus of the character described, the combination with a support, of delivery-rolls removably journaled in bearings on one side of said support and respectively having wound thereon a marked pattern-sheet and a blank sheet, take-up rolls on the other side of said support, said sheets being detachably connected at their ends to the

take-up rolls and passing over said support, means for axially adjusting said take-up rolls independently of each other to cause the sheets to register, means for rotating the take-up rolls to move the sheets over the support, a stylus arranged over the pattern-sheets, a marker arranged over the blank sheet, means for moving the stylus and marker in unison over the sheets and for maintaining them in fixed relation to each other during such movement, and means for rotating the delivery-rolls to rewind the sheets thereon, substantially as described.

18. In an apparatus of the character described the combination with a support, of delivery-rolls removably journaled in bearings on one side of said support and respectively having wound thereon a marked pattern-sheet and a blank sheet, a shaft on the other side of said support, take-up rolls loosely mounted on said shaft, means for locking said rolls to the shaft, said sheets being detachably connected at their ends to the take-up rolls and passing over said support, means for rotating said shaft to move the sheets over the support, a stylus arranged over the pattern-sheet, a marker arranged over the blank sheet, and means for moving the stylus and marker in unison over the sheets and for maintaining them in fixed relation to each other during such movement, substantially as described.

19. In an apparatus of the character described the combination with a support, of delivery-rolls removably journaled in bearings on one side of said support and respectively having wound thereon a marked pattern-sheet and a blank sheet, a shaft on the other side of said support, take-up rolls

mounted on said shaft, said sheets being detachably connected at their ends to the take-up rolls and passing over said support, a driving-shaft, cone-pulleys mounted on said shaft, a belt connecting said pulleys, a belt-shifter for shifting the belt, a stylus arranged over the pattern-sheet, a marker arranged over the blank sheet, and means for moving the stylus and marker in unison over the sheets and for maintaining them in fixed relation to each other during such movement, substantially as described.

20. In an apparatus of the class described, the combination with a support, of open bearings arranged on one side of said support, shafts journaled in alignment with said bearings and each provided at one end with a clutch and at its other end with a pulley, delivery-rolls each journaled at one end in an open bearing and fitted at its other end in a clutch, a shaft and means for rotating it, pulleys mounted on said shaft and belted to the first-named pulleys, take-up rolls on the other side of the support, a marked pattern-sheet and a blank sheet respectively wound on the delivery-rolls and detachably connected at their ends to the take-up rolls, a stylus arranged over the pattern-sheet, a marker arranged over the blank sheet, and means for moving the stylus and marker in unison over the sheets and for maintaining them in fixed relation to each other during such movement, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE HOWLETT DAVIS.

Witnesses:

JOSEPH EVANS,
EDWARD SKERMAN.