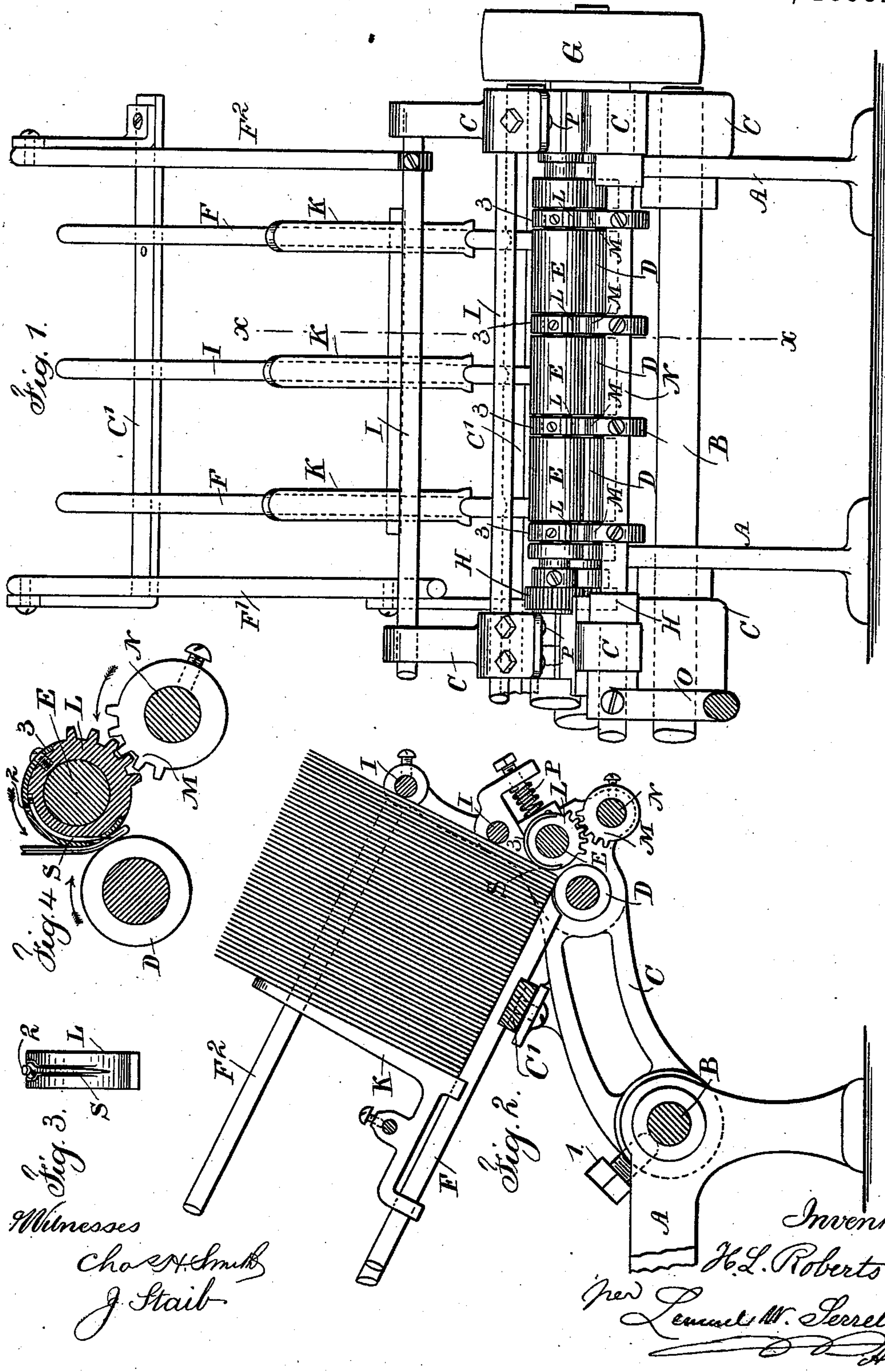


(No Model.)

H. L. ROBERTS.  
MACHINE FOR GATHERING SIGNATURES.

No. 532,706.

Patented Jan. 15, 1895.





# UNITED STATES PATENT OFFICE.

HORACE L. ROBERTS, OF NEW YORK, N. Y.

## MACHINE FOR GATHERING SIGNATURES.

SPECIFICATION forming part of Letters Patent No. 532,706, dated January 15, 1895.

Application filed March 7, 1894. Serial No. 502,628. (No model.)

*To all whom it may concern:*

Be it known that I, HORACE L. ROBERTS, a citizen of the United States, residing in the city, county, and State of New York, have invented an Improvement in Machines for Gathering Signatures, of which the following is a specification.

In binding books it is customary to place the folded sheets or signatures in piles and to gather one signature from each pile in making up the volume. Machines have heretofore been proposed for effecting this object, but a difficulty has arisen in separating one signature from the pile of signatures and delivering the same exactly at the proper time and in the proper position without disturbing the other signatures of the pile.

My present improvement is made with special reference to taking one signature at a time from the pile of signatures and delivering the same without disturbing the other signatures. With this object in view the pile of signatures is placed upon supporting bars which are usually at a greater or less inclination, so that the pile of signatures may slide down toward the point of delivery, and the end signature rests upon a roll and axially over the same, and this roll and an adjacent roll are rotated continuously, but the rotation of such rolls does not tend to grasp and move the end signature because the upper roll rotates against the face of the signature near the back edge thereof while the folded back edge of the signature rests upon the center of the lower roll; and I make use of penetrating points that receive a rocking or partial rotary motion for sticking such points into the paper of the signature and carrying the same downwardly and in between the two rolls that are rotating continuously, and thereby delivering one signature at a time.

In the drawings, Figure 1 is a front elevation. Fig. 2 is a vertical section at about the line  $xx$  of Fig. 1. Fig. 3 represents the parts of the needle holding device detached, and Fig. 4 is a section of the feed rolls and ring segments.

The frame A is of suitable size and shape and it is usually adapted to receive a row of feeding devices so as to be adapted to a number of piles of signatures, and as this machine

is adapted to indefinite multiplication for any desired number of piles of signatures, I have only described and shown the mechanism for acting upon one pile of signatures.

The shaft B is supported by the frame A and forms a pivot upon which the arms C can be swung and held in any desired position by the clamping nuts or screws 1, and the arms C are connected together by cross-bars C' to form a frame, and there are rods F upon which the back edges of the folded signatures rest as such signatures are introduced as a pile and rest upon the rods F, and by swinging the frame formed of the arms C and cross-bars C' upon the shaft B, the inclination of the rods F can be varied to any desired extent, so that the weight of the folded signatures will cause such signatures to slide down the rods F with regularity and uniformity and press slightly against the upper feed roll E, and the lower feed roll D is directly beneath the back edge of the last signature in the pile of signatures.

Any suitable mechanism may be made use of for rotating the rolls D and E continuously at any desired speed. I have represented a pulley at G and gears at H for connecting the shafts D and E and rotating them in unison, and it is advantageous to make use of the cross-rods I above the roll E against which the pile of signatures rests with greater or less pressure according to the size of the signatures and the inclination of the frame and rods F.

A sliding presser K may be employed advantageously upon the rods F for holding the upper signatures in position and for moving such signatures down with regularity by the weight of said sliding presser.

The upper feed roll E is made of sections fastened upon the shaft, and between these sections there are collars L having upon a portion of the periphery teeth engaging the toothed sectors M upon the rock shaft N, which rock shaft may be turned by hand or periodically by any suitable means. I have represented a lever handle O for giving motion to this rock shaft and by the toothed sectors M partially turning the collars L, but it will be noticed that the collars remain stationary as the shaft and roller E are revolved continuously, except when the lever handle



O is moved to partially turn the collars L, and each collar L is provided with a projecting point S or needle, so located in the collar that when the rock shaft N is partially turned, the needles all stick into the signature near the folded or back edge and apply a sufficient force to draw the back edge of the signature down through between the two rolls D and E and the rolls grip the signature and carry it through by virtue of the rotation of the said rolls D and E, and in so doing the signature is separated from and carried off the points of the needles S; and it is advantageous to place these needle points S at an inclination almost tangential to the collars, so that they penetrate the signatures without tearing the same.

I prefer to make the needles each with an eye to set over a pin 2 upon the collar and to clamp the needle in position by an arc-plate 3 that is screwed upon the collar and provided with a hole through which the needle passes, so that by loosening the screw the arc-plate can be removed and a new needle inserted in case of injury to any of the needles, and this arc-plate has a surface that is a continuation or nearly so of the surface of the collar, so that the surfaces of the arc-plates and of the collars are in line or nearly so with the surfaces of the cylindrical segments forming the upper roller E.

By the partial rotation of the rock shaft N at the proper time the collars L are partially rotated by the toothed sectors M, so that the needles S penetrate the paper of the signatures near the fold thereof and carry the first signature in the pile edgewise and in between the feeding rolls D and E; and I remark that it is advantageous to employ springs P to act upon the journal boxes of the roll E, so as to press the rolls D and E toward each other and cause them to properly grip and carry through the signature, and these springs adapt the machine to gathering signatures of different thicknesses of paper or signatures with different numbers of leaves in the signatures.

The rod F' forms a gage against which the tops of the signatures rest, and the adjustable rod F<sup>2</sup> may be placed at the bottom edges of such signatures to hold them in position.

I claim as my invention—

1. In a machine for gathering signatures, the combination with the supports for the pile of signatures, of a pair of delivery rolls, mechanism for constantly rotating the same, penetrating points or needles and means for moving the same to engage the signature near the back fold and pass down with it between the rolls, substantially as set forth.

2. The combination in a machine for gathering signatures, of a holder for a pile of signatures, means for varying the angle at which such holder is sustained, a pair of rollers at the lower angle of the pile of signatures, the lower signature resting against the side of one roll and the folded back edge of the sig-

nature resting upon the center of the other roll, and means for engaging the lower signature in the pile of signatures and carrying the back edge thereof between the rolls, substantially as specified.

3. The combination in a machine for gathering signatures, of a holder for a pile of signatures, means for varying the angle at which such holder is sustained, a pair of rollers at the lower angle of the pile of signatures, the lower signature resting against the side of one roll and the folded back edge of the signature resting upon the center of the other roll, substantially as set forth.

4. The combination in a machine for gathering signatures, of a holder for a pile of signatures, means for varying the angle at which such holder is sustained, a pair of rollers at the lower angle of the pile of signatures, the lower signature resting against the side of one roll and the folded back edge of the signature resting upon the center of the other roll means for continuously revolving the rolls, and intermittently actuated devices for carrying the last signature in between the delivery rolls, substantially as set forth.

5. The combination with a holder for a pile of signatures, of a pair of delivery rolls, means for rotating such rolls continuously, intermittently actuated needles for penetrating the paper of the lower signature and entering the fold of the signature between the delivery rolls, substantially as set forth.

6. The pair of delivery rolls and means for rotating the same, one of the delivery rolls being made in sections, in combination with rings around the shaft of the delivery roll and between the sections, needles upon the rings, and mechanism for imparting to such rings a partial rotary movement to cause the needles to penetrate the paper of the signature and carry the same between the delivery rolls, substantially as set forth.

7. The pair of delivery rolls and means for rotating the same, one of the delivery rolls being made in sections, in combination with rings around the shaft of the delivery roll and between the sections, needles upon the rings, a rock shaft and toothed sectors engaging teeth upon the rings, and means for imparting a motion to the rock shaft to cause the needles to carry the fold of the signature between the delivery rolls, substantially as set forth.

8. The combination with the delivery rolls, one of which is made in sections, of rings between the sections, needles and means for connecting them at one end with the rings, and arc-plates for holding the needles in position and for allowing them to be replaced, substantially as set forth.

Signed by me this 24th day of February, 1894.

HORACE L. ROBERTS.

Witnesses:

GEO. T. PINCKNEY,  
A. M. OLIVER.