June 19, 1923.

1,459,215

M. H. KERN

WHEEL PRINTING MACHINE

Filed Nov. 6, 1920

Fig. 1.

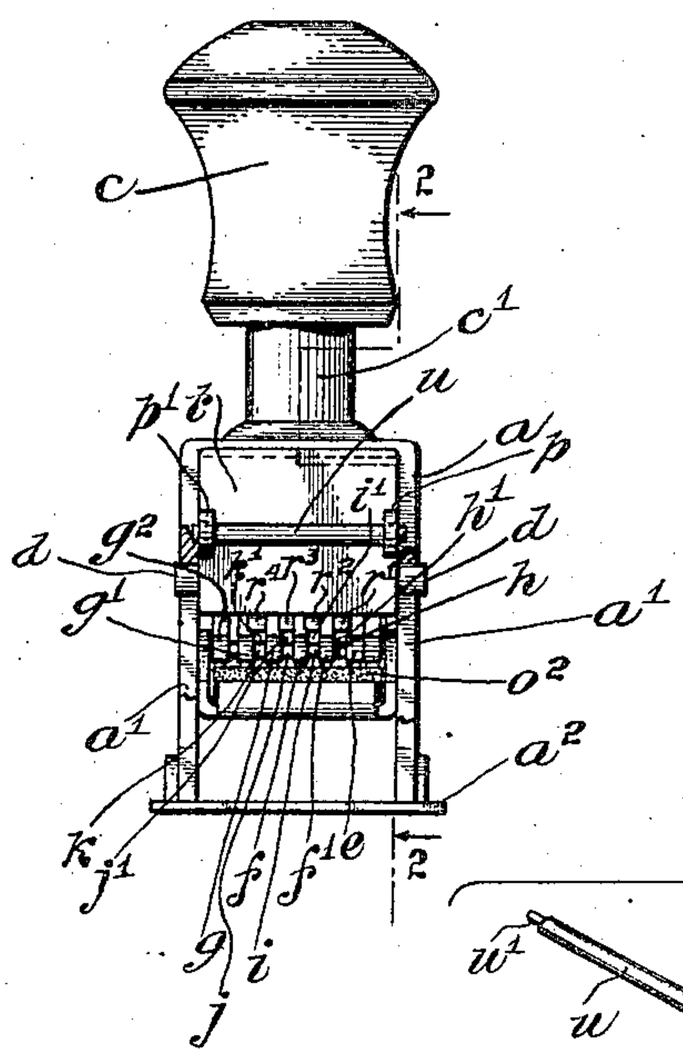


Fig. 2.

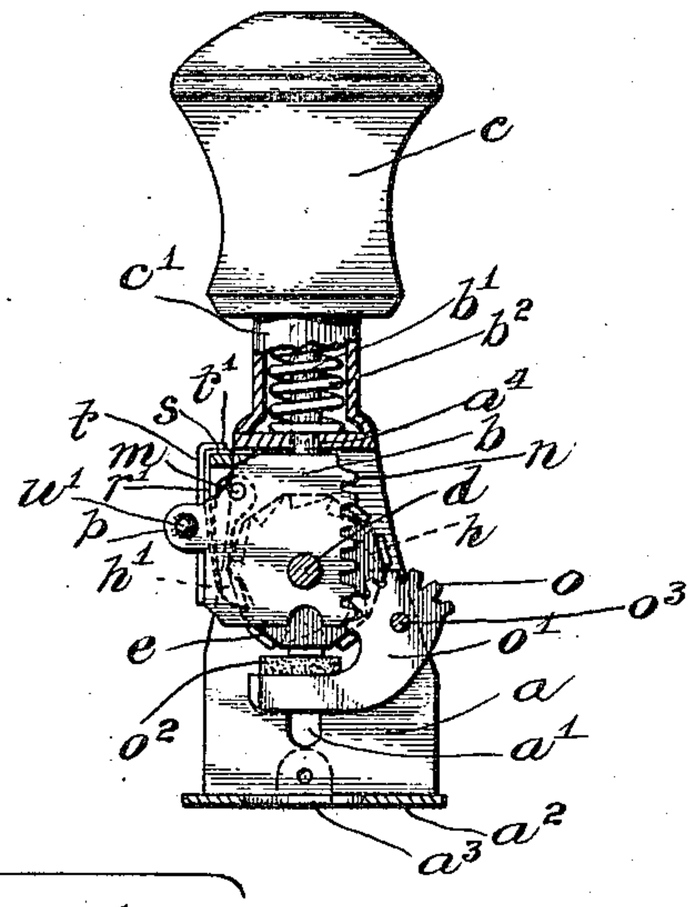
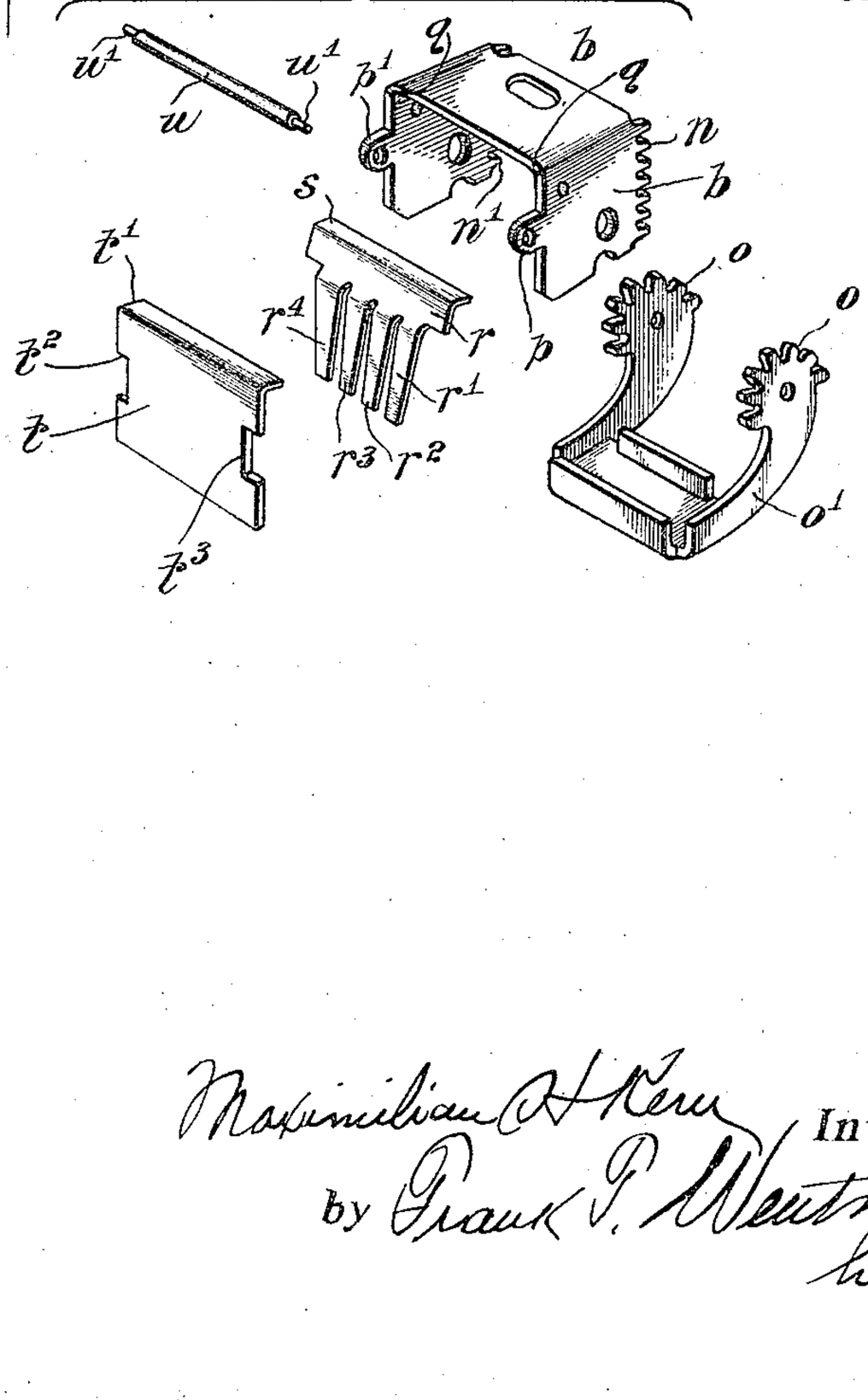


Fig. 3.



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UNITED STATES PATENT OFFICE.

MAXIMILIAN H. KERN, OF RIDGEWOOD, NEW YORK, ASSIGNOR TO ROBERTS NUMBERING MACHINE COMPANY, A CORPORATION OF NEW YORK.

WHEEL-PRINTING MACHINE.

Application filed November 6, 1920. Serial No. 422,236.

To all whom it may concern:

Be it known that I, MAXIMILIAN H. KERN, a citizen of the United States, residing at Ridgewood, in the borough of Queens, city of New York, county of Queens, and State of New York, have invented certain new and useful Improvements in Wheel-Printing Machines, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to wheel printing machines, and more particularly to a type of hand-operated machine known generally in the arts as dating stamps.

Dating stamps of the character to which my invention relates as now extensively used, include a reciprocatory frame carrying a sequence of character wheels, said wheels having associated therewith an oscillatory frame carrying an inking pad, which after each imprint, resulting from a downward movement of the printing wheels, is brought into engagement therewith so as to ink the same preparatory to the next printing operation.

Machines of this type are known as non-automatic, since it is essential, in order to bring various types upon the printing wheel into the printing position, to turn said wheels by hand, accidental rotation of the wheels being prevented by means of detent pawls.

Machines of this character are used by unskilled persons, and heretofore the structural characteristics of such machines have been such that they are easily gotten out of order as a result of lack of skill or lack of care in the user or unnecessary complication in the actuating mechanism in and about the machine.

A machine made in accordance with my invention is so constructed that it is composed of but few parts so associated and combined as to minimize likelihood of such disarrangement or breakage of parts as will interfere with a long continued use of the machine. Furthermore, said parts may be quickly and accurately assembled in the machine, and will permit of the machine being quickly disassembled so that in the event of breakage or wear of parts, they may be quickly and conveniently replaced.

The invention consists in the novel features of construction and combination of parts hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

Referring to the drawings,

Fig. 1 is a front elevation of a wheel printing machine embodying my invention;

Fig 2 is a vertical section on the line 2—2 of Fig. 1; and

Fig. 3 is an exploded isometric view of the wheel yoke and the parts associated therewith, apart from the character wheels and the detent pawls acting thereon.

Like letters refer to like parts throughout the several views.

In the embodiment of my invention shown in the drawings, I employ a main frame *a* having in the opposite sides thereof, vertically extending elongated guide slots *a'* and provided with the usual base plate a^2 having an opening a^3 therein through which the types are adapted to be projected when making an impression. The top of the frame *a* has a guide opening a^4 therethrough, the axis of which is parallel with the slots *a'*.

Mounted within the frame *a* is a reciprocatory printing wheel yoke *b* which is adapted to be actuated by a stem *b'* passing through the opening a^4 against the tension of a spring b^2 acting between an abutment upon said stem and the top of the frame *a*. An ordinary handle grip *c* carried by the stem *b'* is used to actuate the yoke *b*, to either make an impression or bring the printing wheels into position where they may be shifted by hand, as the case may require. The usual protecting housing *c'* incloses the stem *b'* and the spring b^2.

The parts heretofore described are, considered in their broader aspects, old and well known in the art, my invention relating more particularly to the detailed construction of the printing wheel yoke and of the various parts associated therewith, and to the manner of combining these parts with relation to each other and to the frame *a*.

Apart from the ink pad and the swing frame, all of the working parts of the machine are carried by and movable with the yoke *b*, being so constructed, associated and combined as not only to reduce the number of parts to a minimum, but to facilitate the assembling of the structure and ensure a permanency in the relation of parts and a positive co-action therebetween which will minimize likelihood of the disarrangement,

or breakage, of parts while the machine is in use.

Extending from arm to arm of the yoke *b* and projecting beyond the opposite sides thereof so as to enter the slots *a'*, is a fixed bearing pin *d* having rotatably mounted thereon a plurality of groups of printing wheels so constructed and arranged as to indicate any desired subject matter. Ordinarily three such groups are used, the group *e*, the characters upon which indicate succeeding years, the group composed of the individually rotatable wheels *f* and *f'*, each of which has the digits 1 to 0 thereon, and the group *g* and *g'* and g^2 which turn as a unit and have characters thereon which indicate different months of the year.

The group *e* of printing wheels, which may consist of a single wheel or two wheels riveted or otherwise secured together, has associated therewith a ratchet wheel *h* acted upon by a detent pawl *h'*. The wheels *f* and *f'* have associated therewith ratchet wheels *i*—*j* respectively. acted upon by the detent pawls *i'* and *j'*. The group *g*, *g'* and g^2 is provided with a single ratchet wheel *k* acted upon by the detent pawl *k'*.

The various detent pawls are pivotally mounted upon the shaft *m* extending from side to side of the yoke *b* and are yieldingly forced into engagement with their various co-operating ratchet wheels, by a spring construction which will be more fully described hereinafter.

The corresponding edges of the reciprocatory wheel yoke *b* are provided with racks *n*—*n'* meshing with segmental gears *o* upon a swing frame *o'* which carries an inking pad o^2 and is mounted upon a rod o^3 extending transversely of the frame *a* with its ends secured to the side walls thereof. The racks *n*—*n'* extend parallel with the slots *a'* and the axis of the opening a^4 and have solely a rectilineal movement, the small radius of the segmental gears *o* and relatively greater radius of the pocket for the pad o^2 ensuring the desired rapidity of movement of the pad with relation to the character wheels to avoid any wiping action of the pad upon the printing characters upon said wheels. By the use of a plurality of reciprocatory racks co-operating with segmental gears upon the swing frame *o'*, I avoid any possibility of any such irregular stresses upon the swing frame as would tend to cause the bearings thereof to bind with a resultant wear upon same or upon the co-operating racks and gears, while at the same time actuating the inking pad swing frame by a direct gear connection with the printing wheel yoke.

Heretofore in numbering heads and in wheel printing machines, various types and arrangements of springs acting upon the detent pawls have been used, one type of such spring being a comb spring secured to the wheel yoke by means of a plurality of screws. In actual practice such a construction has been found to have the disadvantage that there is irregularity in the tension upon different parts of the spring comb, since the tensioning pressure is applied only at the point of application of the screws; and that the shocks and jars to which mechanisms of this character are subjected, have a tendency to loosen the screws through the resultant vibration.

To obviate this condition, I provide a wheel yoke *b* with pierced lugs *p*—*p'* upon the opposite arms thereof, and with shoulders *q* adjacent each of the side arms formed by a recess in the top bar of said yoke. Mounted upon said frame is a comb spring *r*, the spring teeth *r'*, r^2, r^3 and r^4 of which co-operate with the pawls *h'*, *i'*, *j'* and *k'* respectively. The head of said comb is of a width to exactly fit between the shoulders *q* so as to ensure accuracy in the positioning of said teeth when assembling the machine, said head being provided with a flange *s* adapted to overlap and engage the top of the yoke *b*.

The various teeth *r'* to r^4 are bowed as shown in Fig. 3, and acting thereon is a tension plate *t* having a flange *t'* adapted to be seated upon and engage the flange *s*. Said plate has recesses t^2 and t^3 in opposite side edges thereof adapted to straddle the lugs *p* respectively and thus hold said plate and the spring *r* against displacement radially of the various printing wheels. Co-operating with the lugs *p* and acting upon the plate *t* in a manner to hold the tension of the various spring teeth *r'* to r^4 through said plate, is a pin *u* adapted to pass through the openings in the lugs *p* and having reduced ends *u'* so that a reflex action of said springs, after the application of the pin *u*, will force the plate *t* outwardly of the yoke *b* to the extent of the difference of the radius of the pin *u* and of its reduced ends *u'*, thus causing the shoulders adjacent said reduced ends to engage the lugs and hold said pin against displacement.

The manner of assembling, and the mode of operation of, the herein described printing machine is substantially as follows:—

When assembling the device, the stem *b'* is attached to the yoke *b*, the various pawls *h'*, *i'*, *j'* and *k'* mounted upon said yoke by means of the pin *m*, and said parts assembled in relation to the frame *a* in the usual manner. The character wheels are then mounted within said yoke. the bearing pin *d* being passed through the arms of said yoke, the bearing openings in the various character wheels and the guide slots *a'* in said frame, in which slots the ends of said shaft have a free sliding fit. The swing frame *o'* is then mounted in the frame *a*

by means of the pin o^3, the segments o of said yoke thus being brought into mesh with the rack teeth n formed upon the edge of, and integrally with, the yoke b. The base plate a^2 is then mounted upon the frame a.

The comb spring r is then mounted by means of its flange s upon the top of the yoke b, the sides of the head of said comb engaging the shoulders q, the various detent pawls h', i', j', and k', which have a free sliding movement upon the pin m, having first been properly engaged with their co-operating ratchet wheels h, i, j and k. The tension plate t is then brought into position with the flange t' thereon bearing upon the flange s; and the recesses t^2 and t^3 in said plate straddling the lugs p upon said yoke b. Pressure is applied to the tension plate t in a manner to force it toward the yoke b sufficiently to permit the insertion of the pin u through the openings in the lugs p until the portion of said pin of larger diameter is positioned in its entirety between said lugs, whereupon said pressure is released, thus permitting the reflex action of the spring r to force said plate and said pin outwardly and thus prevent axial displacement of said pin as a result of the engagement of the shoulder thereon with the lugs p.

When the parts are so positioned, the tension plate t will act uniformly upon each of the spring teeth r', r^2, r^3 and r^4 and cause uniform resistance to the turning action of the various character wheels through the pawls cooperating with the ratchet wheels h, i, j and k which cooperate with said pawls respectively.

The manner of mounting said springs is not only expeditious, but prevents any loss of tension in the various springs, or any variance in such tension due to the manner of applying tensioning pressure thereto, or to a disarrangement of parts while the machine is in use.

The construction of the pin u will hold the plate t against movement away from the yoke b, while the engagement of the walls of the recesses t^2 and t^3 with the lugs p, and the engaging flanges s—t', will prevent movement of the spring r in relation to said yoke.

By using the ends of the bearing shaft d as guide trunnions cooperating with the slots a', and by reason of the parallelism in the axis of the opening a^4 and said slots, directly vertical movement of the yoke b and its appurtenances is assured, the curvature of the shaft d permitting a close sliding fit with the walls of the slots a', thus insuring ease of movement of the yoke b as well as reducing the number of parts entering into the mechanism.

With the vertical movement of the yoke b, the rack teeth formed integrally with the side arms of said yoke not only avoid the necessity for complicated mechanisms for oscillating the swing frame o', but give a direct geared connection between said yoke and the segmental gears o carried by said swing frame, and thus avoid any complicated mechanisms for imparting movement to said frame and reduces the number of parts in the inking mechanism and the actuating means therefor, to a minimum.

By a direct vertical movement of the racks n, I secure a perfect mesh of these racks with the gears o, reduce wear to a minimum, and avoid any likelihood of a failure of the ink pad mechanism to properly function due to a stripping of teeth or loss of mesh of the teeth of the rack and gear connection between the yoke and the swing frame. At the same time this construction assures an accurate fitting when assembling these parts, since no adjustment thereof is required in the assembling of the machine, and since all machines produced will be made with the same tools and jigs, uniformity in the product is insured.

By reason of the small radius of the gears o, and the relatively greater radius at which the ink pad o^2 operates, slight initial downward movement of the yoke b will disengage the pad from the printing types of the character wheels without any such rubbing action as will tend to remove the ink therefrom or form streaks thereon. Furthermore, the top of the yoke b may be so set with relation to the frame a that engagement of the pad o^2 with the printing surfaces upon the character wheels will limit the upward movement of said yoke and thus ensure adequate inking of said characters, and at the same time compensate for slight wear upon the ink pad, and thus ensure proper inking, notwithstanding such wear.

It will be observed that throughout the entire structure of the machine, no screws or other appliances which may become loosened as a result of vibration, are employed.

It will also be observed that by using fairly thick gauge stock in the yoke b and forming the racks integrally with said yoke, I secure a sufficiently heavy rack and gear to minimize likelihood of disarrangement thereof through wear without the necessity for increasing the width of the frame a.

By the construction described, a substantial compact wheel printing machine is secured, the various parts of which are so associated and combined as to reduce wear to a minimum and to avoid any such lost motion between parts as will result in such disarrangement of parts as will make the device inoperative, even under the most severe conditions of use.

By employing a plurality of racks n formed integrally with the yoke b and a plurality of segmental gears o formed integrally with the swing frame o', the power

actuating said frame will be applied in a manner to cause uniform wear upon opposite sides of said frame, and avoid any such tilting action as might result in a disarrangement of parts. The location of the bearings of the swing frame closely adjacent the frame *a*, will avoid any such spring as will permit a loss of engagement between said racks and said gears. The structure shown and described will permit this duplication of parts without added cost of production in the parts or additional labor in assembling.

While the spring construction described is particularly adapted for wheel printing machines of the hand-operated, non-automatic type, it is apparent that it is equally applicable to automatic hand or machine-operated machines, and may be applied thereto in the same manner and with the same effects as herein described. It is apparent that there may be various changes in designs and dimensions of the various parts entering into a machine made in accordance with my invention, without departing from the spirit and scope of the invention.

Having described the invention, what I claim as new and desire to have protected by Letters Patent, is:—

1. A wheel printing machine embodying therein a frame having elongated guide slots in the side walls thereof, and a bearing opening, the axis of which is parallel with said slots, in the top thereof, a reciprocatory yoke, a non-rotary bearing shaft carried by, and having the ends thereof projected beyond, said yoke, and slidably mounted in said slots, a plurality of character wheels rotatably mounted upon said shaft, ratchet wheels carried by and rotatable with said character wheels respectively, a detent pawl co-operating with each ratchet wheel, a spring operative upon each pawl, a swing frame pivotally mounted in said first named frame, an ink pad carried thereby and adapted to co-operate with said character wheels, oppositely disposed, vertically extending racks carried by and movable with said yoke, segmental gears carried by and concentric with the axis of said swing frame and meshing with said racks respectively, whereby reciprocatory movement of said yoke will impart an oscillatory movement to said swing frame, actuating means for said yoke embodying therein a stem secured thereto and passing through the bearing opening in the top of said frame, and a spring adapted to raise said yoke and actuate said swing frame so as to engage the ink pad thereon with the printing wheels carried by said yoke.

2. A wheel printing machine embodying therein a frame, a reciprocatory yoke mounted therein, a plurality of character wheels rotatably mounted in said yoke, ratchet wheels carried by and rotatable with said character wheels respectively, a detent pawl co-operating with each ratchet wheel, a plurality of arched teeth carried by and movable with said yoke and co-operating with said pawls respectively, a plate through which tensioning pressure may be simultaneously applied to all of said spring teeth, and means whereby said plate may be fixedly held with relation to said yoke after a tensioning pressure has been applied therethrough to said spring teeth.

3. A wheel printing machine embodying therein a frame, a reciprocatory yoke mounted therein having oppositely disposed, pierced lugs upon the side arms thereof, a plurality of character wheels rotatably mounted in said yoke, ratchet wheels carried by and rotatable with said character wheels respectively, a detent pawl co-operating with each ratchet wheel, a comb spring adapted to pass between said lugs and carried by and movable with said yoke, said spring having a plurality of arched teeth co-operating with said pawls respectively, a plate through which tensioning pressure may be simultaneously applied to all of said spring teeth, and a pin adapted to pass through the openings in said lugs and engage said plate to fixedly hold it in relation to said yoke after a tensioning pressure has been applied therethrough to said spring teeth.

4. A wheel printing machine embodying therein a frame, a reciprocatory yoke mounted therein having oppositely disposed, pierced lugs upon the side arms thereof, a plurality of character wheels rotatably mounted in said yoke, ratchet wheels carried by and rotatable with said character wheels respectively, a detent pawl co-operating with each ratchet wheel, a comb spring adapted to pass between said lugs and carried by and movable with said yoke, said spring having a plurality of arched teeth co-operating with said pawls respectively, a plate through which tensioning pressure may be simultaneously applied to all of said spring teeth, and a pin adapted to pass through the openings in said lugs and engage said plate to fixedly hold it in relation to said yoke after a tensioning pressure has been applied therethrough to said spring teeth, said pin being adapted to pass freely through the openings in said lugs and having reduced ends whereby the shoulders adjacent said reduced ends will, by engagement with said lugs respectively, prevent lateral displacement of said pin.

5. A wheel printing machine embodying therein a frame, a reciprocatory yoke mounted therein having oppositely disposed, pierced lugs upon the side arms thereof, a plurality of character wheels rotatably mounted in said yoke, ratchet wheels carried by and rotatable with said character

wheels respectively, a detent pawl co-operating with each ratchet wheel, a comb spring adapted to pass between said lugs and carried by and movable with said yoke, said spring having a plurality of arched teeth co-operating with said pawls respectively, the head of said comb spring having a flange thereon adapted to pass over and engage the top of said yoke, a plate through which tensioning pressure may be simultaneously applied to all of said spring teeth, said plate having recesses in the side edges thereof adapted to straddle said lugs, and a flange thereon adapted to engage the flange of said comb spring, and a pin adapted to pass through the openings in said lugs and engage said plate to fixedly hold it in relation to said yoke after a tensioning pressure has been applied therethrough to said spring teeth.

6. A wheel printing machine embodying therein a frame, a reciprocatory yoke mounted therein, a plurality of character wheels rotatably mounted in said yoke, ratchet wheels carried by and rotatable with said character wheels respectively, a detent pawl co-operating with each ratchet wheel, a comb spring carried by and movable with said yoke, having a plurality of arched teeth co-operating with said pawls respectively, an angular flange upon the head of said comb adapted to pass over and bear upon the top of said yoke, the edge of said top being recessed to form shoulders adapted to engage, and prevent lateral displacement of, said comb spring, a plate through which tensioning pressure may be simultaneously applied to all of said spring teeth, and means whereby said plate may be fixedly held with relation to said yoke after a tensioning pressure has been applied therethrough to said spring teeth.

7. A wheel printing machine embodying therein a frame, a reciprocatory yoke mounted therein having oppositely disposed, pierced lugs upon the side arms thereof, a plurality of character wheels rotatably mounted in said yoke, ratchet wheels carried by and rotatable with said character wheels respectively, a detent pawl co-operating with each ratchet wheel, a comb spring carried by and movable with said yoke, having a plurality of arched teeth co-operating with said pawls respectively, an angular flange upon the head of said comb spring adapted to pass over and bear upon the top of said yoke, the edge of said top being recessed to form shoulders adapted to engage, and prevent lateral displacement of, said comb spring, a plate adapted to operatively engage said comb spring, hold it in relation to said shoulders, and simultaneously apply a tensioning pressure to all of said spring teeth, and a pin adapted to pass through the openings in said lugs and engage said plate to fixedly hold it in relation to said yoke after a tensioning pressure has been applied therethrough to said spring teeth.

8. A wheel printing machine embodying therein a frame having elongated guide slots in the side walls thereof, and a bearing opening, the axis of which is parallel with said slots, in the top thereof, a reciprocatory yoke, a nonrotary bearing shaft carried by, and having the ends thereof projected beyond, said yoke, and slidably mounted in said slots, a plurality of character wheels rotatably mounted upon said shaft, ratchet wheels carried by and rotatable with said character wheels respectively, a detent pawl co-operating with each ratchet wheel, a spring operative upon each pawl, a swing frame pivotally mounted in said first named frame, an ink pad carried thereby and adapted to co-operate with said character wheels, racks formed integrally with, and upon the correspondingly vertical edges of, the arms of said yoke, segmental gears formed integrally with, concentric with the axis of the arms of said swing frame and meshing with said racks respectively, whereby reciprocatory movement of said yoke will impart an oscillatory movement to said swing frame, actuating means for said yoke embodying therein a stem secured thereto and passing through the bearing opening in the top of said frame, and a spring adapted to raise said yoke and actuate said swing frame so as to engage the ink pad thereon with the printing wheels carried by said yoke.

In witness whereof I have hereunto affixed my signature, in the presence of two subscribing witnesses, this 24th day of September, 1920.

MAXIMILIAN H. KERN.

Witnesses:
T. T. WENTWORTH,
FRIEDA KOEHLER.