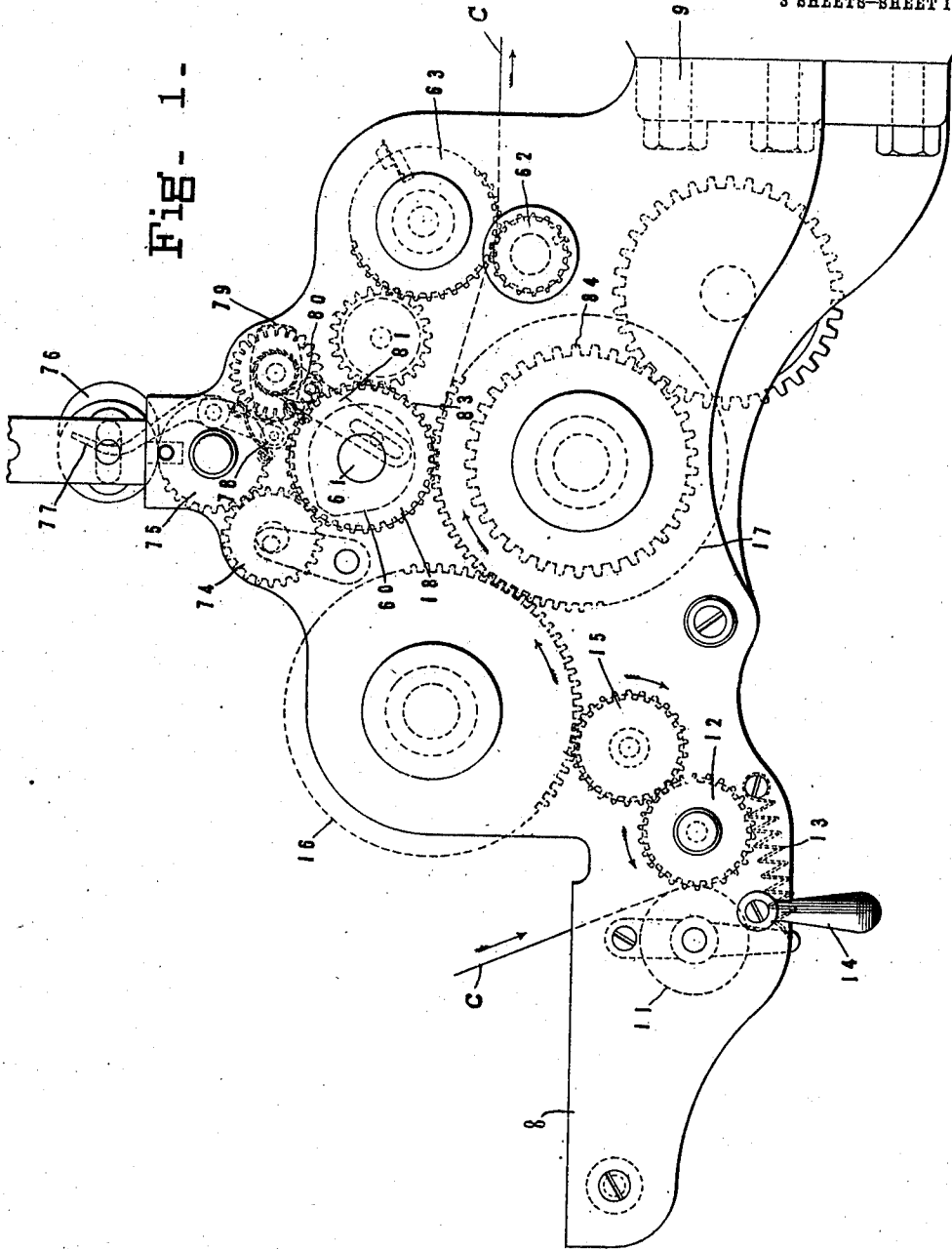


974,428.

3 SHEETS—SHEET 1.



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Norwichey

W. A. Pringle INVENTOR
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974,428.

3 SHEETS—SHEET 2.

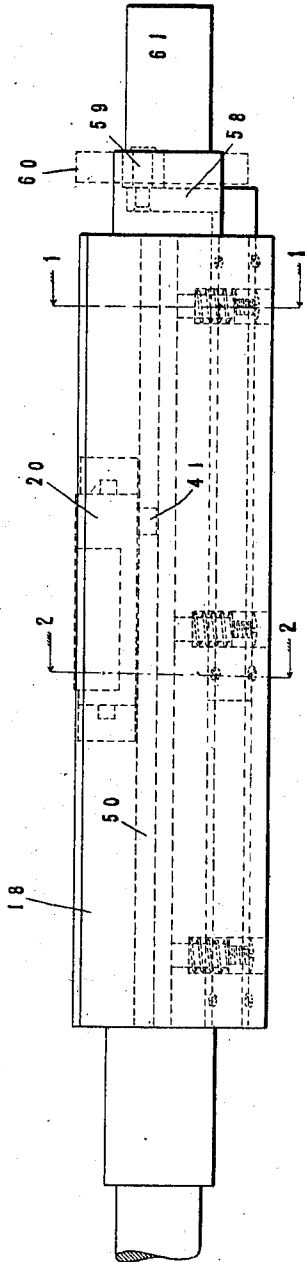
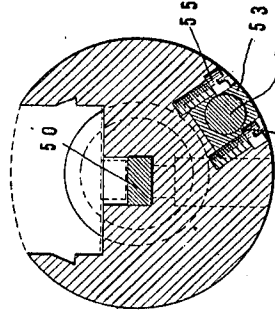
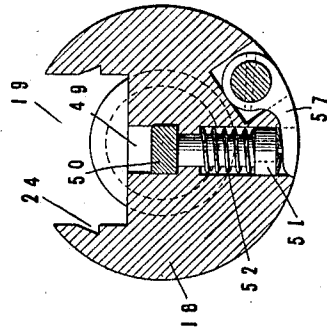


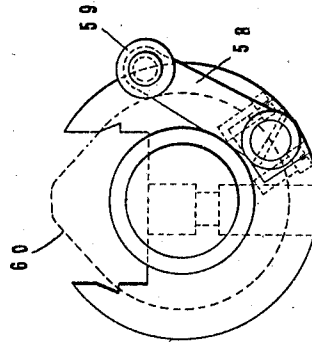
Fig-2.



5
H



4-15



3-10-1

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PRINTING APPARATUS.
APPLICATION FILED DEC. 5, 1908.

974,428.

Patented Nov. 1, 1910.

3 SHEETS-SHEET 3.

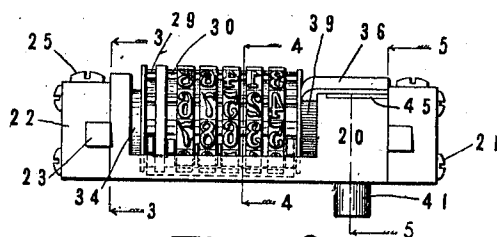


Fig. 6.

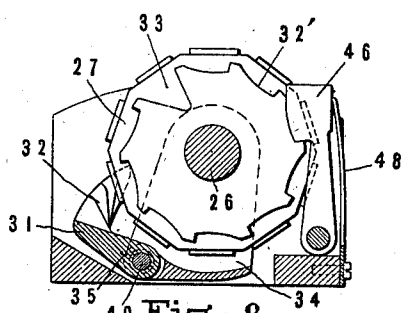


Fig. 8.

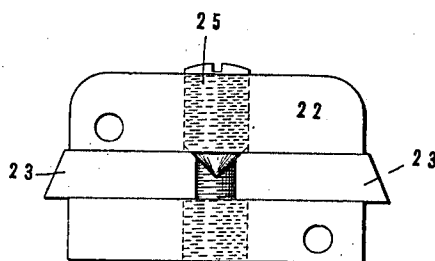


Fig. 7.

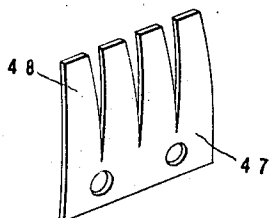


Fig. 12.

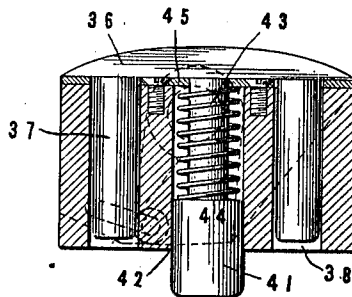


Fig. 9.

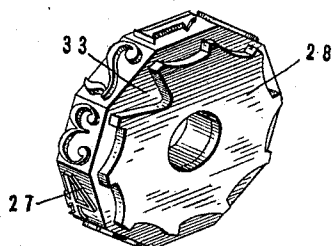


Fig. 10.

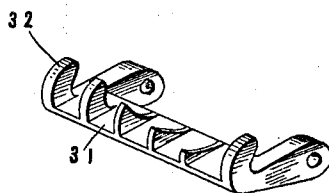


Fig. 11.

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UNITED STATES PATENT OFFICE.

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PRINTING APPARATUS.

974,428.

Specification of Letters Patent.

Patented Nov. 1, 1910.

Application filed December 5, 1906. Serial No. 346,392.

To all whom it may concern:

Be it known that I, WILLIAM A. PRINGLE, residing at Niagara Falls, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Printing Apparatus, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to printing mechanism, and more particularly to mechanism for effecting printing upon traveling webs which are to be cut or folded into separate sheets adapted thereafter to be bound or otherwise fastened together in book form.

One of the objects of the invention is to provide improved means for numbering the sheets which are to be cut from or folded in the web.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

Referring now to the drawings, wherein is illustrated one of the various possible embodiments of my invention, Figure 1 is a view in side elevation of the tissue attachment. Fig. 2 is a view in elevation of a cylinder which carries a numbering head. Fig. 3 is a view of the cylinder in end elevation. Fig. 4 is a view thereof taken on line 1—1 of Fig. 2. Fig. 5 is a similar view on line 2—2 of Fig. 2. Fig. 6 is a view in side elevation of a complete numbering head. Fig. 7 is a vertical sectional view taken on line 3—3 of Fig. 6, looking in the direction of the arrow, showing the means for locking the numbering head to its cylinder. Fig. 8 is a view taken on line 4—4 of Fig. 6. Fig. 9 is a view taken on line 5—5 of Fig. 6, looking in the direction of the arrow. Fig. 10 is a view in perspective of one of the numbering wheels. Fig. 11 is a similar view of the pawl member adapted for rotating the numbering wheels. Fig. 12 is a similar view of the spring devices adapted to aid in holding the numbering wheels stationary after each actuation.

Referring now to the drawings 8 indicates one of a pair of parallel walls which form journal supports for the several rolls of cylinders, said walls being attached to the frame of the printing press in any suitable manner as by clamp bolts 9. Web C upon which the numbering device is to operate is fed from a suitable source of supply between drawing rolls 11 and 12, roll 11 being spring-pressed toward roll 12 by means of the retractile spring 13 and is capable of being swung therefrom to allow the web to be inserted by means of a handle 14. Web C then passes over roll 12 and between it and a similar drawing roll 15, and is received between a printing couple constituted by a plate cylinder 16 and an impression cylinder 17, which effects printing of any desired inscription upon the traveling web. The web is then carried along impression cylinder 17 to be engaged by the numbering devices carried upon a cylinder, which coacts therewith, the construction of which forms a part of the present invention. This numbering mechanism, which is best shown in Figs. 2 to 11 inclusive, comprises a cylinder 18 which has provided therein a longitudinally extending recess 19 adapted to receive a block or head 20 which forms a support for a group of numbering wheels. Head 20 has secured thereto at either end, in the present instance, by means of screws 21, a block 22 within each of which is provided a pair of oppositely disposed locking bolts 23, which slide in laterally extending apertures provided therein. The outer ends of bolts 23 take within notches 24 cut in the walls of a recess 19 of the cylinder, and are adapted to be projected into engagement with the walls of said notches by means of screws 25 having tapering or cone-shaped ends which, when engaging with the inner ends of the locking bolts, force them in an outward direction, thus locking the head securely within the walls of the recess and holding the same immovable against dislodgment by the centrifugal force produced by the rotative movement of the cylinder.

Upon a shaft 26 journaled between the end walls of head 20 are journaled a plurality of numbering devices which comprise in the present instance wheels 27, each of which is provided upon its periphery with a series of raised members or types, ranging from 1

to 0. Each of numbering wheels 27 has upon one of its lateral surfaces an integral ratchet wheel 28, the teeth of which correspond in number with the raised type members upon the periphery of the wheel. Also journaled upon shaft 26, in the present instance, are a pair of idler or dummy ratchet wheels 29 and 30, respectively, the purpose of which will be apparent hereinafter. The dummy ratchet wheels and the numbering wheels are rotated by means of a pawl member 31 provided with a plurality of teeth 32, which gradually increase in length from one end to the other, as shown in Fig. 11 of the drawings, one of said teeth being provided for each of the several ratchet wheels of the numbering wheels, and for each of the dummy ratchet wheels.

The teeth of the several ratchet wheels rest against curved surfaces 32' and provided between one pair of adjacent teeth in each of the ratchet wheels is a relatively deep, substantially V-shaped slot 33, as is clearly shown in Figs. 8 and 10 of the drawings. The purpose of these slots is to allow a tooth of pawl member 31 to enter therein a sufficient depth to permit the adjacent tooth to engage the ratchet wheel of the adjacent numbering wheel, it being understood that the left hand tooth, which is the longest, first operates upon its dummy ratchet wheel until the same has been actuated through a complete revolution, when said tooth, entering the V-shaped recess of that wheel, will permit the next shorter tooth to engage with the next ratchet wheel and move through a distance of one ratchet tooth. At the next actuation of member 31 the tooth, which has previously been received in the V-shaped slot, will be carried therefrom and will ride thereafter through the remainder of the subsequent rotation on the curved surfaces which separate the several teeth of the ratchet wheel. Thus, it will be seen that the second dummy ratchet wheel will be rotated through a space of one tooth upon each complete rotation of the outside ratchet wheel, and that the second ratchet wheel will actuate the first of numbering wheels 27 through a space of one tooth when it has been rotated through a complete revolution. For instance, inasmuch as 10 teeth are provided in the outside dummy ratchet wheel, 10 revolutions thereof will cause one complete revolution of the adjacent dummy ratchet wheel, which being also provided with 10 teeth will, when revolved 10 complete revolutions, allow the next shorter tooth of the ratchet member to engage a tooth of ratchet wheel upon the first of said numbering wheels, and advance the same a single number. This construction, it will be seen, allows a single number to be repeated a predetermined number of times upon a traveling web, the mechanism

in the present instance being set to repeat a single number 100 times. As will be apparent, however, the repetition of a single number may be varied at will by the withdrawal or insertion of the idler or dummy ratchet wheels, thereby allowing a given number to be repeated a greater or less number of times.

Pawl member 31 is pivotally carried upon a pair of hangers 34 journaled upon shaft 26, and is urged toward the numbering wheels by means of a spring 35. At one end of head 20 in the upper portion thereof is provided a plate 36 provided with a pair of depending guide posts 37, which enter vertical recesses 38 extending through the head. Plate 36 is also provided with depending members 39, the lower portions of which are provided with slots within which take the pivots 40 of the pawl member 31, so that when plate 36 is raised by means of a plunger 41 rigidly attached thereto and extending downwardly through an opening 42 provided in the numbering head, pawl member 31 will be carried forward and raised to actuate the numbering wheels. Plunger 41 is retracted to carry plate 36 in a downward direction, and the pawl member to a normal inoperative position, by means of a spring 43 which engages a shoulder 44 of said plunger and exerts pressure against a fixed plate 45 or member screwed to the head beneath plate 36.

Engaging with each of the numbering wheels and dummy ratchet wheels is a pivotally mounted holding member 46, the upper end of which fits exactly the curved surfaces 32' which separate the several teeth. These members prevent a reverse rotation of the ratchet wheels, while allowing a rotation thereof in a normal direction. Holding members 46 are spring pressed toward the several ratchet wheels by means of a plate 47 which carries a plurality of independent springs 48. Members 46 also serve to hold the several numbering wheels in exact registry and determine exactly the position of the types with relation to the traveling web.

Located beneath the depending end of plunger 41 in a longitudinally extending recess 49 of cylinder 18 is, in the present instance, a reciprocating strip 50, which carries a plurality of depending studs or plungers 51, each of which comprises a screw threaded into said strip. These screws extend substantially through the cylinder, and are retracted to the position shown in Fig. 4 to hold strip 50 against the bottom wall of its recess by means of extensible springs 52 coiled about said screws, which exert pressure against the heads thereof, and also against shoulders provided by a contracted opening through which the screws extend.

Located within a substantially square re-

cess cut longitudinally in cylinder 18 is a block 53 within which is journaled a shaft 54, said block being held in position in its recess by means of clamp screws 55 which take against shoulders 56 provided thereon, as clearly shown in Fig. 5 of the drawings. Shaft 54 is provided intermediate its ends with a plurality of fingers 57, each of which is located beneath one of studs 51, and upon the outer end of shaft 54 is an arm 58 provided with an anti-friction roller 59. This anti-friction roller, when cylinder 18 is rotated, rides over a cam 60 fast upon the frame of the machine, through which shaft 61 which carries the cylinder extends. Arm 58 when lifted by cam 60 rocks shaft 54 in block 53, and this shaft when rocked carries fingers 57 into engagement with studs 51 and lifts strip 50 within its recess. Plunger 41 being engaged by strip 50 is forcibly projected upward and actuates the numbering wheels in the manner above described. Thus, the numbering mechanism is caused positively to advance a number upon a predetermined number of rotations of the cylinder.

The web, after being acted upon by the numbering mechanism above described, is perforated by means of mechanism carried by the pair of mating cylinders 62 and 63 between which the web next passes.

The numbering head is inked by means of distributing rollers 74 and 75 which are in turn inked by a ductor 76 which is reciprocated by means of a lever 77, the upper end of which engages the shaft of the ductor. The lower end of lever 77 carries an anti-friction roller 78 which runs over a cam 79 driven by means of pawl and ratchet mechanism. Pawl 80 of the pawl and ratchet mechanism is carried upon an arm 81 the opposite end of which has a slot which takes in a pin provided upon a gear wheel 83 secured upon the shaft 61 of cylinder 18. Impression cylinder 17 is driven by means of a driving gear wheel 84, and the several cylinders and rollers are connected by means of a train of gearing and driven with the required peripheral velocities, as shown in Fig. 1 of the drawings.

Web C may be of tissue paper or paper of any desired thickness, as will be obvious. Web C is also numbered at each rotation of cylinder 18 in a positive manner, as above described, and may also, if desired, be perforated by means of mechanism carried upon cylinders 62 and 63.

While in the present instance I have shown the numbering mechanism as adapted to repeat a single number a predetermined number of times, it will be obvious that by removing the idler or dummy ratchet wheels the mechanism will number the sheets consecutively from 1 up, and that said mechanism may be set to number backward from

any given number. It will accordingly be seen that I have provided mechanism wherein the numbering of the web is effected in an accurate and positive manner, and the construction of the perforating mechanism insures that the web shall not be torn or otherwise mutilated during the perforating operation.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

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

1. In a numbering mechanism for printing presses, in combination, a rotary cylinder, a plurality of numbering wheels carried thereby, actuating means therefor, and means carried by said cylinder for holding said actuating means out of operative relation to said numbering wheels during a predetermined number of rotations of said cylinder.

2. In numbering mechanism for printing presses, in combination, a rotary cylinder, a plurality of numbering wheels carried thereby, means for actuating said wheels in succession, said means being carried by said cylinder, means for holding said first-mentioned means out of operative relation to said numbering wheels during a predetermined number of rotations of said cylinder, and means associated with said actuating means adapted to actuate said holding means during each rotation of said cylinder.

3. In numbering mechanism for printing presses, in combination, a rotary cylinder, a plurality of numbering wheels carried thereby, actuating means therefor carried by said cylinder, movable means adapted to hold said actuating means out of operative relation to said numbering wheels during a predetermined number of rotations of said cylinder and to permit said actuating means to be moved into operative relation with said numbering wheels after said cylinder has completed said predetermined number of rotations, and means associated with said actuating means adapted to actuate said movable means during each rotation of said cylinder.

4. In numbering mechanism for printing

- presses, in combination, a rotary cylinder, a plurality of numbering wheels carried thereby adapted to advance a number upon a predetermined number of rotations of said cylinder, means carried by said cylinder for positively actuating said numbering wheels, and stationary means adapted to actuate said last-mentioned means during each rotation of said cylinder.
5. In numbering mechanism for printing presses, in combination, a rotary cylinder, a plurality of numbering wheels carried thereby adapted to be actuated to advance a number upon a predetermined number of rotations of said cylinder, pawl and ratchet mechanism for actuating said numbering wheels, a plunger for operating said pawl and ratchet mechanism, and means for positively actuating said plunger at each rotation of said cylinder.
6. In numbering mechanism for printing presses, in combination, a rotary cylinder, a head carried by said cylinder, a plurality of numbering wheels journaled in said head, means for actuating said numbering wheels in succession whereby they are caused to advance a number upon said cylinder rotating a predetermined number of times, and means fixed with relation to said cylinder for actuating said afore-mentioned means at each rotation of said cylinder.
7. In numbering mechanism for printing presses, in combination, a rotary cylinder, a numbering head carried thereby, a plurality of numbering wheels rotatively carried by said head, means for actuating said numbering wheels and causing them to advance a number at predetermined intervals, a plunger for operating said actuating means, and means for operating said plunger at each rotation of said cylinder.
8. In numbering mechanism for printing presses, in combination, a rotary cylinder, a head let into said cylinder and securely fastened therein, a plurality of numbering wheels carried by said head, pawl and ratchet mechanism adapted to actuate said numbering wheels whereby they are caused to advance a number at predetermined intervals, a plunger carried by said head adapted to actuate said pawl and ratchet mechanism, and means carried by said cylinder which becomes effective at each rotation thereof to operate said plunger.
9. In numbering mechanism for printing presses, in combination, a rotary cylinder provided with a recess, a head located within said recess, means for locking said head within said recess, a plurality of numbering wheels journaled within said head, pawl and ratchet mechanism adapted to actuate said numbering wheels at predetermined intervals whereby they are caused to advance a number, a plunger carried by said head adapted to actuate said pawl and ratchet mechanism, and a spring for returning said plunger to normal position after each actuation.
10. In numbering mechanism for printing presses, in combination, a rotary cylinder provided with a longitudinally extending recess, a numbering head located within said recess and securely locked to the walls thereof, a plurality of numbering wheels journaled within said head adapted to be actuated to advance a number at predetermined intervals, a plunger for positively actuating said numbering wheels, a spring for returning said plunger to normal position after each actuation, and means which becomes effective to actuate said plunger at each rotation of said cylinder.
11. In numbering mechanism for printing presses, in combination, a rotary cylinder provided with a longitudinally extending recess, a numbering head located in said recess, a plurality of reciprocating bolts adapted to lock said head within said recess, a plurality of numbering wheels carried by said head adapted to be actuated at predetermined intervals to advance a number, pawl and ratchet mechanism for actuating said numbering wheels, a plunger for operating said pawl and ratchet mechanism, and means lying within the recess in said cylinder adapted upon each rotation of said cylinder positively to actuate said plunger.
12. In numbering mechanism for printing presses, in combination, a rotary cylinder provided with a longitudinally extending recess, a numbering head seated in said recess, a plurality of reciprocating bolts adapted to lock said head to the walls of said recess, a plurality of numbering wheels carried by said head adapted to be actuated at predetermined intervals to advance a number, pawl and ratchet mechanism for actuating said numbering wheels, a plunger for operating said pawl and ratchet mechanism, a reciprocating strip lying in said recess beneath said plunger, and means for reciprocating said strip during the rotation of said cylinder.
13. In numbering mechanism for printing presses, in combination, a rotary cylinder provided with a longitudinally extending recess, a numbering head seated within said recess, a plurality of oppositely extending bolts adapted to be moved into engagement with the walls of said recess whereby said numbering head is securely locked therein, a plurality of numbering wheels carried by said head adapted to be actuated at predetermined intervals to advance a number, pawl and ratchet mechanism for actuating said numbering wheels, a spring retracted plunger for operating said pawl and ratchet mechanism, a strip lying in said recess beneath said plunger in operative relation thereto, and means which becomes

operative during each rotation of said plunger adapted to reciprocate said strip.

14. In numbering mechanism for printing presses, in combination, a rotary cylinder having a longitudinally extending recess, a numbering head seated in said recess, a plurality of oppositely disposed bolts extending laterally from said numbering head, means for forcing said bolts into engagement with recesses in the walls of said recess whereby said numbering head is securely locked in position therein, a plurality of numbering wheels carried by said head adapted to be actuated at predetermined intervals to advance a number, pawl and ratchet mechanism for actuating said numbering wheels, a spring retracted plunger for actuating said pawl and ratchet mechanism, a strip lying in said recess beneath said plunger provided with downwardly extending studs, and means engaging said studs adapted to reciprocate said strip at each rotation of said cylinder.

15. In numbering mechanism for printing presses, in combination, a rotary cylinder having a longitudinally extending recess, a numbering head located in said recess and securely fastened to the walls thereof, a plurality of numbering wheels journaled in said head adapted to be actuated at predetermined intervals to advance a number, means for actuating said numbering wheels, a spring retracted plunger for actuating said last-mentioned means, a strip lying in a recess formed in the bottom of said first-mentioned recess, spring retracted studs depending from said strip, a shaft journaled in said cylinder, arms secured to said shaft which take under said studs, an arm secured to the opposite end of said shaft, and a fixed cam adapted to be engaged by and to swing said last-mentioned arm at each rotation of said cylinder.

16. In numbering mechanism for printing presses, in combination, a cylinder provided with a recess, a numbering head set in said recess, blocks secured upon either end of said numbering head, and movable means mounted in said blocks adapted to lock said head within said recess.

17. In numbering mechanism for printing presses, in combination, a cylinder provided with a recess, a numbering head set in said recess, a block secured upon either end of said head, and a plurality of reciprocating locking members mounted in said blocks and adapted to be operated to lock said head within said recess.

18. In numbering mechanism for printing presses, in combination, a cylinder provided with a recess the lateral walls of which are provided with grooves, a numbering head set within said recess, a block secured upon either end of said head, a plurality of locking bolts carried by each of said blocks adapted to be projected into the grooves of said recess to lock the numbering head therein, and means for projecting said bolts.

19. In numbering mechanism for printing presses, in combination, a cylinder provided with a recess the lateral walls of which are provided with grooves, a numbering head set within said recess, a block secured upon either end of said head, a plurality of locking bolts carried by each of said blocks adapted to be projected into the grooves of said recess to lock the numbering head therein, and wedge means adapted to be operated to project said bolts.

20. In numbering mechanism for printing presses, in combination, a cylinder having a longitudinally extending recess the walls of which are provided with grooves, a numbering head positioned within said recess, a block secured to either end of said numbering head, a pair of oppositely disposed locking bolts mounted to reciprocate in said blocks, and a screw-threaded member provided with a wedge adapted to take between the inner end of each of said bolts and project them into the grooves of said recess whereby said numbering head is locked firmly therein.

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

WILLIAM A. PRINGLE.

Witnesses:

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V. J. STAFFORD.