

No. 613,055.

Patented Oct. 25, 1898.

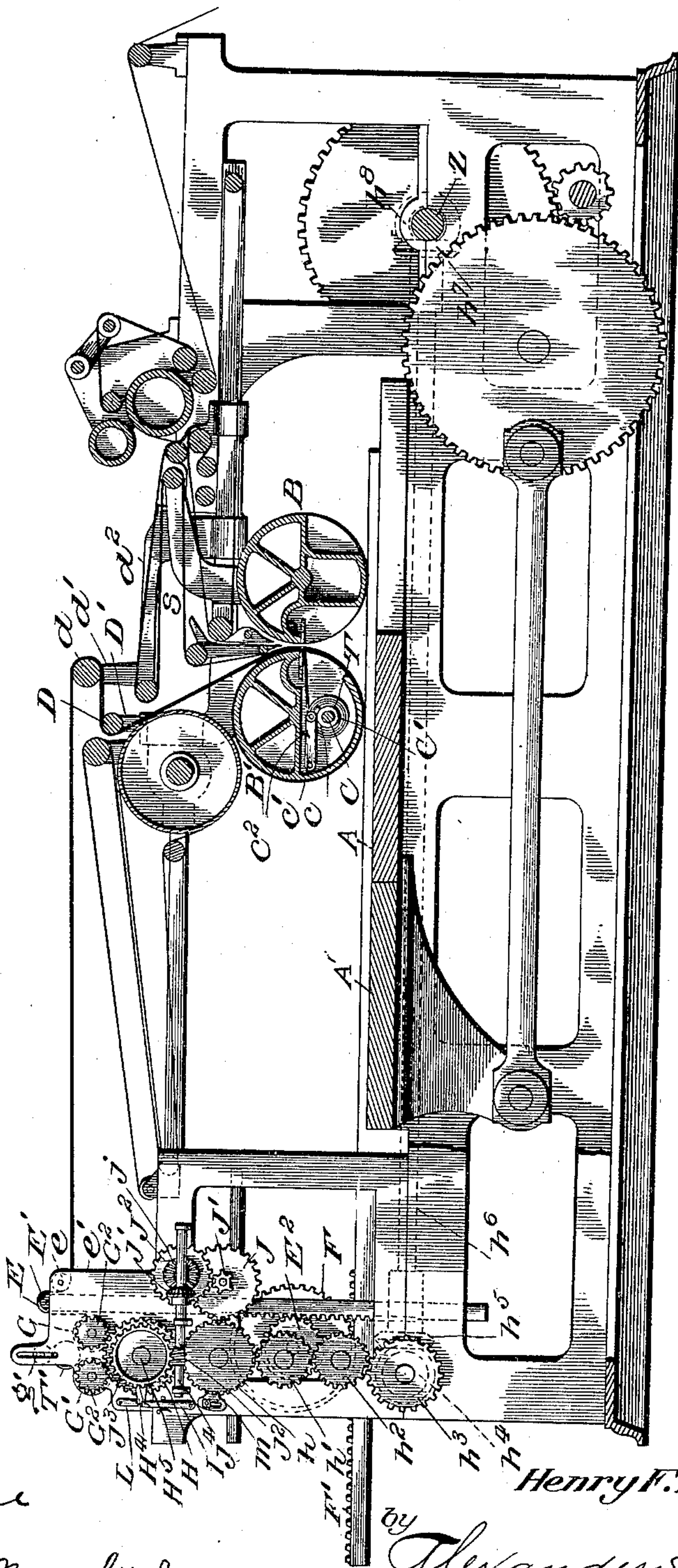
H. F. BECHMAN.
SHIFTING TYMPAN FOR PRINTING PRESSES.

(Application filed Aug. 24, 1897.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



Witnesses

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Inventor

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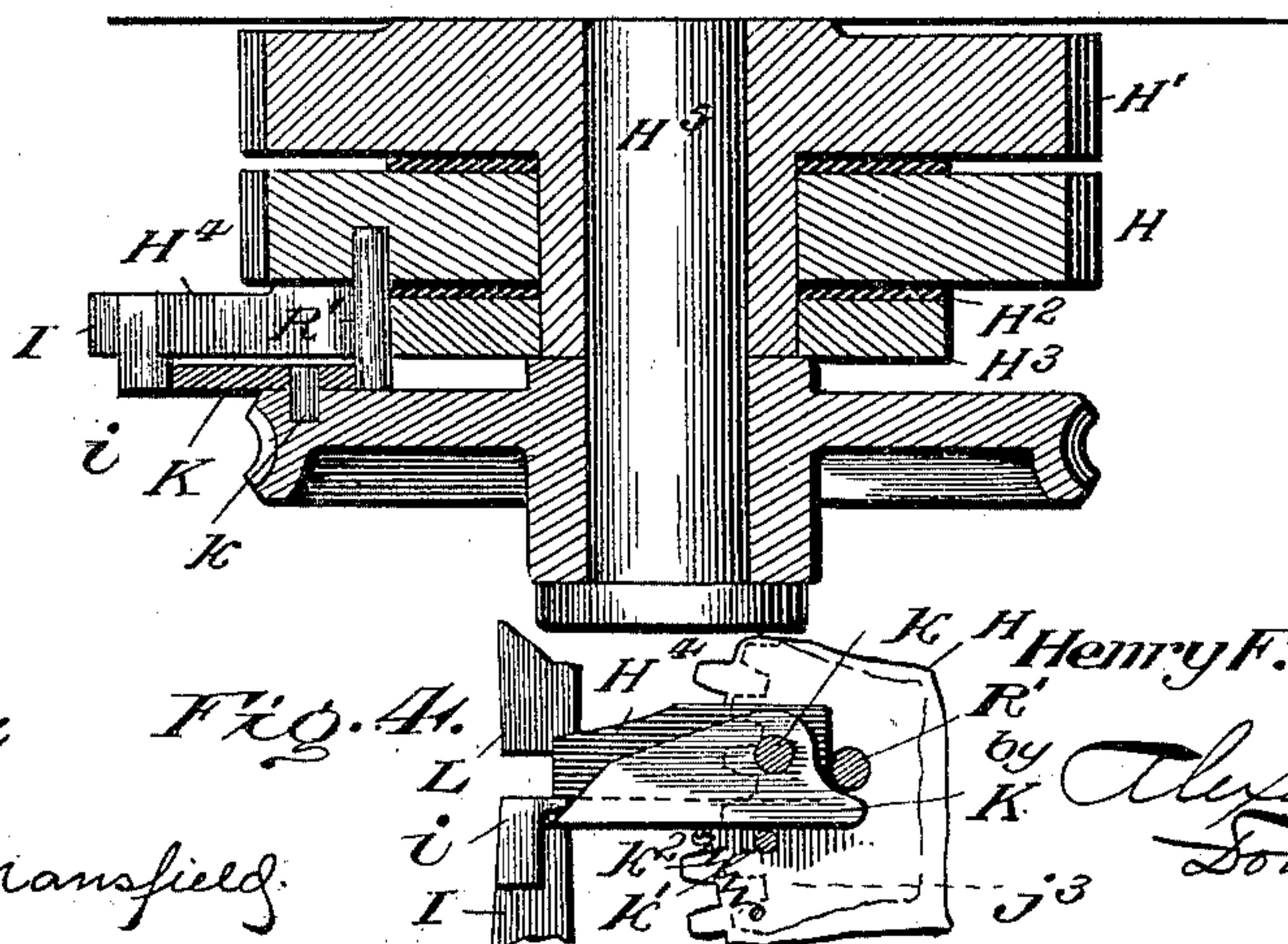
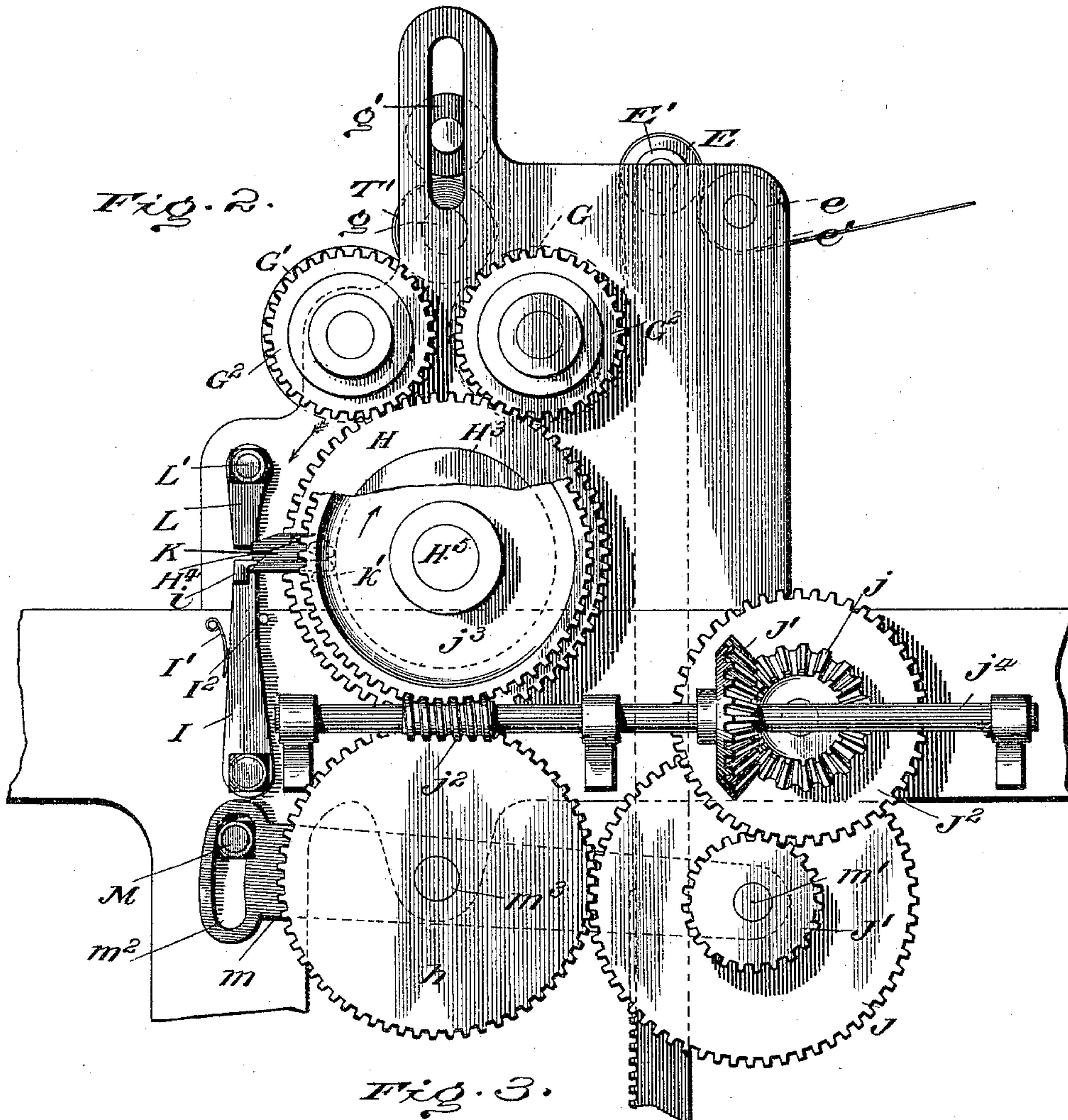
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SHIFTING TYMPAN FOR PRINTING PRESSES.

(Application filed Aug. 24, 1897.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses
James R. Mansfield

FIG. 4.

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UNITED STATES PATENT OFFICE.

HENRY F. BECHMAN, OF BATTLE CREEK, MICHIGAN, ASSIGNOR TO THE
DUPLEX PRINTING PRESS COMPANY, OF SAME PLACE.

SHIFTING TYMPAN FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 613,055, dated October 25, 1898.

Application filed August 24, 1897. Serial No. 649,365. (No model.)

To all whom it may concern:

Be it known that I, HENRY F. BECHMAN, of Battle Creek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Shifting Tym-
5 pans for Printing-Presses; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form
10 part of this specification.

This invention is an improvement in shifting tympan for printing-presses, and is especially adapted to presses in which the cylinders reciprocate; and it is particularly de-
15 signed for use in connection with the perfecting impression-cylinder of the improved book-press for which I filed application for Letters Patent on the 12th day of May, 1897, Serial No. 636,165, but is applicable to other recip-
20 rocating-cylinder presses and also to oscillating-cylinder presses.

The object of the invention is to provide such presses with an endless tympan which
25 can be shifted after one or more impressions, so as to present a new or clean surface to the sheet, thus avoiding smearing or blurring and enabling the press to do the highest grade of printing; and the invention consists in the combinations and constructions of
30 parts summarized in the claims hereto appended.

In the accompanying drawings, which illustrate the invention adapted and applied to my improved book perfecting-press aforesaid,
35 Figure 1 is a side elevation, partly in section, of a book-press constructed in accordance with my aforesaid application for Letters Patent, with the exception that the second or perfecting impression-cylinder is made so
40 as to carry a roll of paper to be used as the shifting tympan and the mechanism for shifting the tympan at regular intervals onto a stationary roll. Fig. 2 is a detail side elevation, partly broken, of the mechanism for shift-
45 ing the tympan at regular intervals and re-winding the tympan upon the stationary roll. Fig. 3 is a detail sectional plan of the said mechanism for shifting the tympan at regular intervals. Fig. 4 is a detail.

50 Briefly, and as described in my aforesaid

application, the beds carrying the forms A A' are reciprocated in one direction, while the pair of oscillating impression-cylinders B B' are reciprocated in the opposite direction, thus shortening the stroke of both bed and
55 cylinders. The sheet is fed to the first cylinder B by an extensible and contractible feed mechanism, which comprises a system of tapes and guide-rollers partly mounted upon the frame and partly upon the moving car-
60 riages of the cylinders. This enables me to feed a sheet to the cylinder B during the travel thereof to the left, during which stroke it is imprinted on the form on bed A, and at the end of such stroke the sheet is released
65 by the grippers of cylinder B and nipped by those of cylinder B', so that upon the return or right-hand stroke of the cylinders the sheet is perfected upon the form on bed A', and during such stroke the perfected sheet
70 is surrendered to the delivery-tapes and subsequently delivered at the left-hand end of the press.

As shown, the cylinder B' is so formed as to accommodate a shaft C, upon which is a
75 roll of tympan-paper T. Upon shaft C is secured a brake-disk C', and pressing against it is the brake-shoe c on the end of an arm c', pivoted to one end of the cylinder, and c² is a spring pressing against arm c' for holding
80 the brake-shoe in place and giving the proper pressure upon disk C'.

The tympan T extends from roll T, as shown, up over a roller D, extending across the press and journaled in bracket D', attached to the
85 impression-cylinder carriers, and thence the tympan is led back over another roller d, extending across the press and journaled in brackets d' upon an extension of brackets d², which are secured to the frame of the ma-
90 chine. Thence the tympan is led back to and under a roller e, journaled in the brackets e' on the rear part of the frame of the press, and then up over a roller E, extending across the press and journaled in duplicate bars E',
95 which are made to rise and fall with the backward and forward movements of the type-beds by means of the racks F', which are extensions of the racks operating the impression-cylinders and which mesh into gears F', securely fas-
100

tened upon the hubs of pinions E^2 , which in turn mesh with teeth upon the edges of the bars, as shown. From roller E the tympan passes down under a roller G, then up, and is wrapped upon a shaft g , which lies upon the roller G and a companion roller G' , as shown. The rolls $G G'$ are employed to rewind the tympan drawn from the roll inside the impression-cylinder B' .

The shaft g and its tympan-paper T' are supported by rolls $G G'$ and are prevented from slipping upon their surfaces by means of the weight-roller g' , and as the tympan-roll T' cannot slip upon the surfaces of rolls $G G'$ it must turn when they turn and rest when they rest.

The rolls $G G'$ are operated in such a manner that they stand idle for a certain number of cycles of the press and then are revolved a definite amount, so that the tympan is always drawn forward or shifted the same amount each time the shifting takes place regardless of the diameter of the roll T' .

Upon the shafts of rolls $G G'$ are pinions G^2 , meshing with a gear H, which is loosely mounted upon the hub of a gear H' , Fig. 3, which is revolved at a uniform speed in one direction only by means of a train of gearing $h h' h^2 h^3$, bevel-gears $h^4 h^5$, shaft h^6 , and bevel-gears h^7 and h^8 , which latter are secured to the main crank-shaft Z. Shaft h^6 is supported in suitable brackets bolted to the side frames.

Although gear H is loosely mounted upon the hub of gear H' , it is driven by means of a friction device from gear H' , being clamped between disks H^2 , of felt, leather, or other suitable material, which are interposed between gears $H H'$ and gear H and a washer H^3 , which is secured to the hub of gear H' . Gear H will thus turn at all times with gear H' , except when prevented by the following means: On one edge of gear H is a stop-lug H^4 , which is adapted to engage a stop-lever I, pivoted on the frame at one side of gear H and normally pressed in position to engage lug H^4 by means of the spring I' , so that the stop-lug H^4 of the gear H will rest upon the end of lever I and prevent the gear from turning. A pin I^2 limits the inward movement of lever I.

The lever I is disengaged from lug H^4 at the proper times by the following means: Gear h also drives a gear J, to which is secured a pinion J' , which drives a gear J^2 on a stud attached to the frame. Secured to gear J^2 is a miter-gear j , which drives a miter-gear j' on a worm-shaft j^4 , journaled in boxes on the main frame, and on shaft j^4 is a worm j^2 , which drives a worm-gear j^3 , loosely journaled on the stud H^5 , on which gears $H H'$ are mounted. The worm-wheel j^3 carries a pin k , upon which is pivoted a dog K, that projects radially from the worm-wheel and is held against the stop-pin k' by the spring k^2 .

The gears $H H'$ revolve in the direction of the tailed arrow, Fig. 2, while the worm-wheel j^3 revolves slowly in the direction of the tail-

less arrow. As the dog K passes lever I it strikes the projection i on the head of the lever and forces it back, so that the stop H^4 is released, whereupon the friction device between gears H and H' causes said gear H to revolve. A pin R' is attached to gear H in position to strike the tail of the dog K and cause its outer end to lift up so as to disengage lever I, which thereupon is quickly returned to its position against the pin I^2 and intercepts the stop H^4 , so as to prevent the gear H making more than one revolution. A dog L is fulcrumed on the stud L' in position to prevent the gear H from turning backward if for any reason the press is "backed up."

In order to regulate the times at which the roll T' will be turned, the gear J' is made removable and interchangeable, and for this reason gears J and J' are mounted upon a stud m' , carried by a lever m , which is fulcrumed on the stud m^3 , on which gear h is journaled. The opposite end of lever m has a slot m^2 , through which passes a fixed bolt M, and the lever can be clamped in position by means of a nut on said bolt. The gear J' is thus easily removable and can be substituted by a gear of greater or less diameter for the purpose of increasing or decreasing the number of revolutions of the worm-wheel j^3 and the consequent shiftings of the tympan.

Operation: One end of the tympan-paper is wound in a roll T upon the shaft C and is led thence out under the grippers of cylinder B' , Fig. 1, then once around said cylinder, then up to and successively around rollers D, d , e , E, and G, and then wound upon shaft g into roll T' . The tympan is shifted or drawn forward only once in a certain number of cycles of the press, and the rolls $G G'$ must therefore remain at rest, except when it is desired to shift the tympan. As the impression-cylinder B' moves to the left in Fig. 1 the type-beds move to the right, and said impression-cylinder has a peripheral travel which is the sum of the travels of the cylinders and beds in opposite directions. The travel of the roller D and movement of roller E are such and so timed in relation to the movements of the cylinders and type-beds that they serve at all times to keep the tension of the tympan uniform and compensate for the alternate tendency to slack and tauten the tympan. Roller D will take up and pay out the tympan-web as is necessary to compensate for the travel of the cylinder and roller E will take up and pay out the tympan-web as is necessary to compensate for the travel of the bed. Once for every certain number of operations of the press the dog K strikes the lever I and disengages it from stop H^4 , allowing the gear H, and consequently the rolls $G G'$ and the roll T' , to turn, thus unwinding the tympan from roll T and winding it upon roll T' , thus drawing forward the tympan, so that a clean portion takes the offset of the sheets printed on cylinder B' .

If it is desired to vary the number of cycles

of the press intervening between successive shifts of the tympan, it can be done by substituting different-sized gears for gear J'.

Some of the principal and most striking characteristics of the invention are that although the beds and cylinders move in opposite directions one tympan-roll is placed in the cylinder and the other upon a stationary part of the press, and provision is made for maintaining a uniform tension of the tympan, although the tympan is wrapped upon the cylinder when the latter is moving away from the stationary roll and is unwrapped when the cylinder is moving toward the stationary roll, which would ordinarily result in rupturing the tympan in the first instance and then slackening it down upon the forms in the second instance.

Another characteristic of the invention is the novel means whereby at predetermined intervals or after one or more impressions a portion of the tympan is shifted from the moving roll to the stationary roll, so as to present fresh surfaces to the imprinted sheets.

Another feature is the fact that the endless tympan passes out between the cylinders in such manner that at one time the tympan is actually interposed between the grippers of the cylinders and yet will be shifted out of the way when the transfer of sheet is to be made.

These and other novel and characteristic features of the invention will be understood and appreciated by those familiar with the art, as will also the fact that the invention is applicable to other styles of reciprocating-cylinder or oscillating-cylinder presses, and I do not intend to limit myself to the particular application of the invention or its particular embodiment herein shown and described.

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

1. The combination of a reciprocating type-bed, an oppositely-reciprocating impression-cylinder, a tympan-roll therein, and a tympan extending from said roll to a stationary roll on the frame of the machine; with mechanism for preserving the tension of the tympan or compensating it for the movements of the cylinder and bed, substantially as and for the purpose described.

2. The combination of an impression-cylinder, a tympan-roll therein, a tympan-roll on the frame of the press and a tympan leading from one of said rolls to the other; with mechanism for automatically and periodically shifting the tympan from one roll toward the other after a certain number of impressions, substantially as and for the purpose described.

3. The combination of a reciprocating impression-cylinder, an oppositely-moving type-bed, a tympan-roll journaled in the cylinder, a tympan-roll upon the frame of the machine, and a tympan extending from one roll to the other; with mechanism for automatically un-

winding the tympan from one roll and winding it upon the other at predetermined intervals and mechanism for compensating the tympan for the movements of the cylinder and bed, substantially as and for the purpose described.

4. The combination of a reciprocating type-bed, an oppositely-reciprocating impression-cylinder, a tympan-roll therein, and a tympan extending from said roll to a stationary roll on the frame of the machine, with mechanism for preserving the tension of the tympan or compensating it for the movements of the cylinder and bed; and mechanism for automatically unwinding the tympan from one roll and winding it upon the other at predetermined intervals, substantially as and for the purpose described.

5. The combination of a movable type-bed, a cylinder, a tympan-roll therein, a tympan-roll upon the frame of the machine, and a tympan-web extending from one of said rolls to the other; with a looping-roll for taking up and paying out slack in the tympan to preserve the tension thereof and compensate it for the movement of the bed, substantially as and for the purpose described.

6. In a printing-press the combination of the impression-cylinder, a tympan having one end in a roll within the cylinder and the other end in a roll exterior to the cylinder, and friction-rolls supporting the exterior tympan-roll, with mechanism for periodically actuating said friction-rolls so as to shift the tympan, substantially as and for the purpose described.

7. In a printing-press the combination of a reciprocating cylinder, an oppositely-reciprocating type-bed, and a tympan having one end in a roll within the cylinder, and the other in a roll exterior to the cylinder; with mechanisms for looping said tympan between the cylinder and exterior roll, so as to compensate for the movements of the bed and cylinder, substantially as and for the purpose described.

8. In a printing-press, the combination of an impression-cylinder, a tympan having one end in a roll within the cylinder and the other end in a roll exterior to the cylinder, and a friction-roll for supporting and rotating the exterior tympan-roll; with mechanism for periodically actuating said friction-roll after a certain number of impressions, so as to shift the tympan, substantially as and for the purpose described.

9. In a printing-press the combination of a reciprocating cylinder, an oppositely-reciprocating type-bed, and a tympan having one end in a roll within the cylinder, and the other in a roll exterior to the cylinder; with mechanisms for looping said tympan between the cylinder and exterior roll, so as to compensate for the movements of the bed and cylinder, and frictional mechanism for winding the tympan upon the exterior roll, substantially as and for the purpose described.

10. The combination of the cylinder, there-

reciprocating type-bed, a tympan-sheet having one end within the cylinder and the other attached to a roll mounted on the frame; with a tympan-looping roller carried by movable bars, and racks and gears whereby said bars are operated by the bed, substantially as and for the purpose described.

11. The combination of a reciprocating bed, an impression-cylinder, a tympan having one end attached to a shaft within the cylinder and the other end attached to a shaft mounted on the frame, and means for intermittently rotating said latter shaft so as to shift the tympan; with the movable bars, a tympan-looping roller carried thereby, a rack moving with the bed, and gearing between said bed-rack and said bars, for the purpose and substantially as described.

12. In a printing-press, the combination of the cylinder, and a tympan having a roll at one end within the cylinder, and a roll at its other end supported on the frame; with a friction-roller supporting the exterior tympan-roll, and a movable type-bed mechanism for driving said roll intermittently, mechanism for looping said tympan between the cylinder and friction-rolls to compensate it for the movement of the bed substantially as and for the purpose described.

13. The combination in a printing-press of mechanism for shifting the tympan, consisting of a gear for driving the tympan-winding devices, means for normally arresting the rotation of said gear; mechanism adapted to cause said arresting means to release the gear, and means for frictionally rotating said gear when released, substantially as described.

14. The combination in a printing-press of mechanism for shifting a tympan, consisting of a gear for driving the rolls for winding the tympan-sheet driven by frictional contact, a stop-lever for normally arresting the rotation of said gear, a wheel provided with a dog or trip adapted to disengage said stop-lever from said gear, and means for rotating said gear when released, and for continuously rotating said wheel, for the purpose and substantially as described.

15. In a printing-press the combination of the cylinder and endless tympan; with a roll for shifting said tympan, a frictionally-driven gear for operating said roll, means for locking said gear, a worm-wheel carrying a releasing device adapted to release the locking device of the said gear once during each revolution of the worm-wheel, and means for continuously rotating said worm-wheel, substantially as and for the purpose set forth.

16. In a printing-press the combination of an impression-cylinder, a tympan having one end within the cylinder and the other attached to a shaft mounted on the frame, a friction-roller for supporting and rotating said tympan-roll, a continuously-driven train of gearing, a frictionally-driven gear interposed between said train and said friction-roller for

operating the latter, a locking device for said frictionally-driven gear, and a releasing device operated from said train of gearing adapted to intermittently release the locking device, for the purpose and substantially as described.

17. In a printing-press the combination of the cylinder, a tympan having its ends connected respectively to a shaft within the cylinder and a shaft mounted upon the frame; a roller for rotating the outermost shaft by frictional contact with the tympan wound thereon, a gear meshing with said roller, and a continuously-driven frictional clutch for rotating said gear; with a locking device for arresting the rotation of said gear, and means, substantially as described, for intermittently releasing said locking device, so that the tympan will be shifted, substantially as and for the purpose described.

18. In a printing-press the combination of the cylinder, a tympan having its ends connected respectively to a shaft within the cylinder and a shaft mounted upon the frame; a roller for rotating the outermost shaft by frictional contact with the tympan wound thereon, a gear meshing with said roller, and a continuously-driven frictional clutch for rotating said gear; with a stop for locking said gear, a continuously-driven slowly-rotating worm-wheel and a trip on said worm adapted to intermittently disengage the stop from the gear, so that the latter is rotated once rapidly for each revolution of the worm, for the purpose and substantially as described.

19. In a printing-press the combination of the reciprocating cylinder, a tympan having its ends connected respectively to a shaft within the cylinder and a shaft mounted upon the frame; a roller for rotating the outermost shaft by frictional contact with the tympan wound thereon, a gear meshing with said roller, and a continuously-driven frictional clutch for rotating said gear; with a locking device for arresting the rotation of said gear, and means, substantially as described, for intermittently releasing said locking device, so that the tympan will be shifted, and mechanism for looping the tympan to compensate for the travel of the cylinder, substantially as and for the purpose described.

20. In a printing-press, the combination with a reciprocating cylinder, and a tympan having a roll at one end within the cylinder and a roll at its other end supported on the frame; with mechanism for rotating said exterior tympan-roll periodically so as to shift the tympan after a certain number of impressions have been taken, substantially as described.

21. The combination of the gear H', the loose gear H and the friction-clutch between said gears, and the lever I adapted to engage and lock gear H, the worm-gear j^3 carrying dog K adapted to disengage lever I from gear H, the worm shaft and gearing for driving worm j^3 , one of said gears being adjustable

and interchangeable so as to enable the speed of gear j^3 to be varied, substantially as and for the purpose described.

22. The combination of the gear H' , the
5 loose gear H driven by friction from the former gear, and provided with stop H^4 , the stop-lever I and the continuously-driven wheel as j^3 carrying a trip adapted to disengage lever I from stop H^4 ; with the friction-rolls G, G' ,
10 driven from gear H , and the tympan-roll operated by rolls G, G' , all substantially as and for the purpose set forth.

23. The combination of the gear H' , the
15 loose gear H and the friction-clutch between said gears, and the lever I adapted to engage and lock gear H , the worm-gear j^3 carrying dog K adapted to disengage lever I from gear H , the worm-shaft and gearing for driving worm j^3 one of said gears being adjustable
20 and interchangeable so as to enable the speed of gear j^3 to be varied; with the friction-roll-

ers G, G' , driven from gear H , and the tympan-roll supported on and driven by friction from rolls G, G' , all substantially as and for the purpose set forth.

24. The combination in a printing-press, of
25 the tympan-shifting mechanism, comprising a gear for driving the tympan-winding mechanism, means for normally arresting the rotation of said gear, a wheel provided with means
30 for disengaging said arresting mechanism from said gear, means for rotating said gear when released, and means for continuously rotating said wheel, for the purpose and substantially as described.

35 In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

HENRY F. BECHMAN.

Witnesses:

FRANK W. DUNNING,
CHAS. H. WHEELLOCK.