

No. 896,803.

E. B. CRAM.

PATENTED AUG. 25, 1908.

RIBBON FEED MECHANISM FOR TYPE WRITING MACHINES.

APPLICATION FILED DEC. 9, 1903.

4 SHEETS—SHEET 1.

Fig. 5.

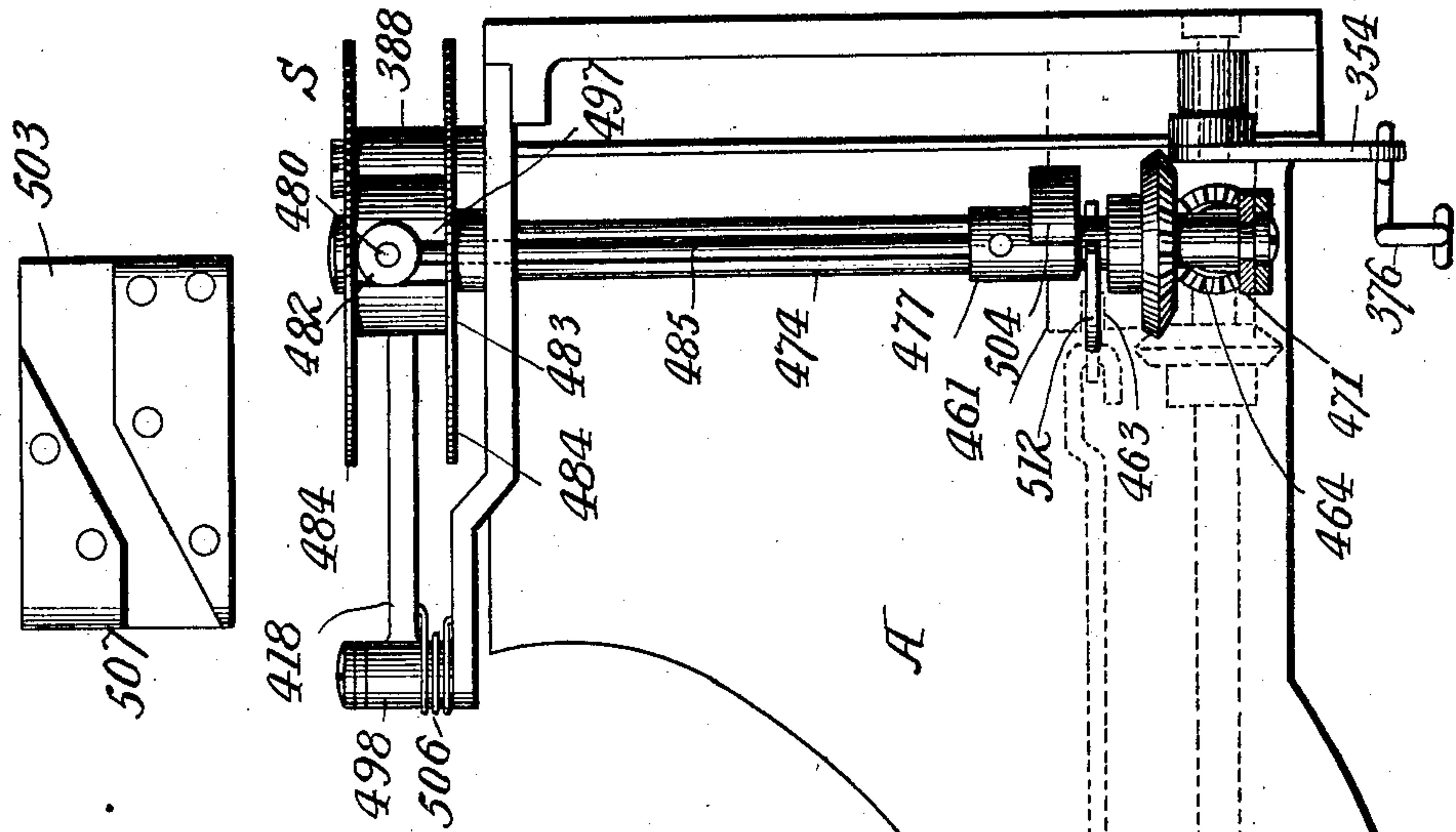


Fig. 6.

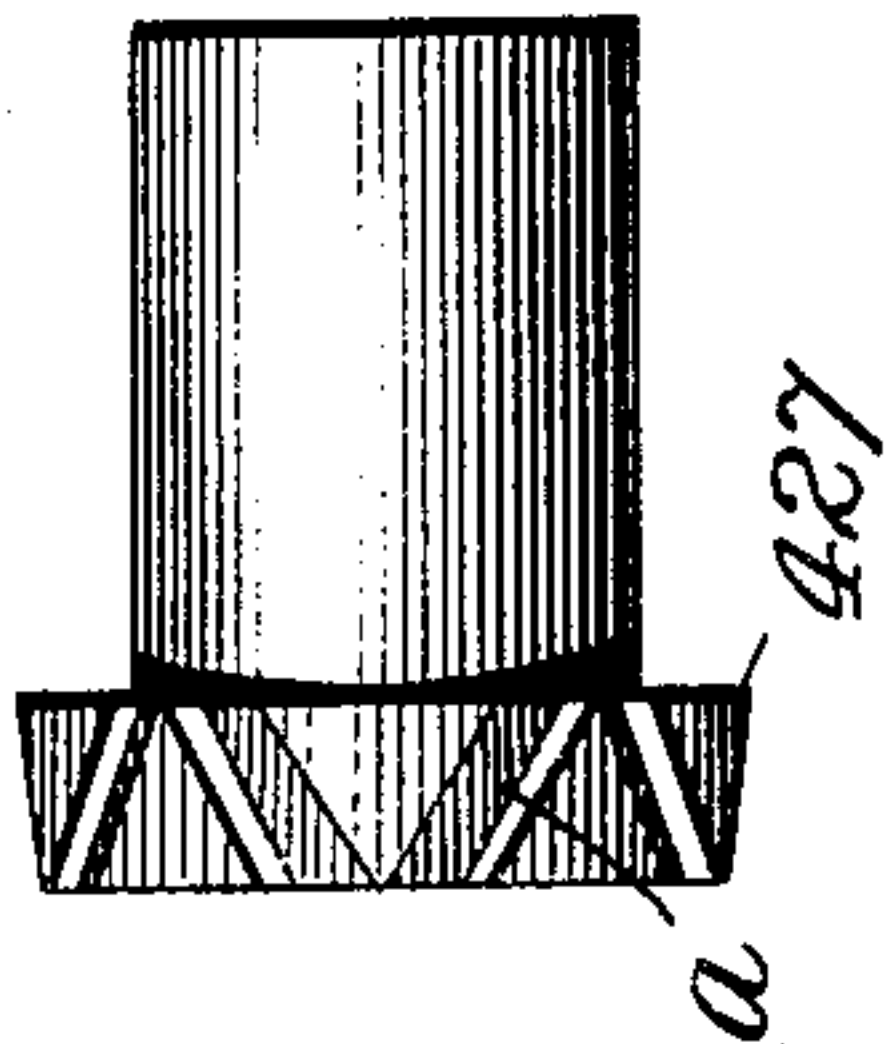
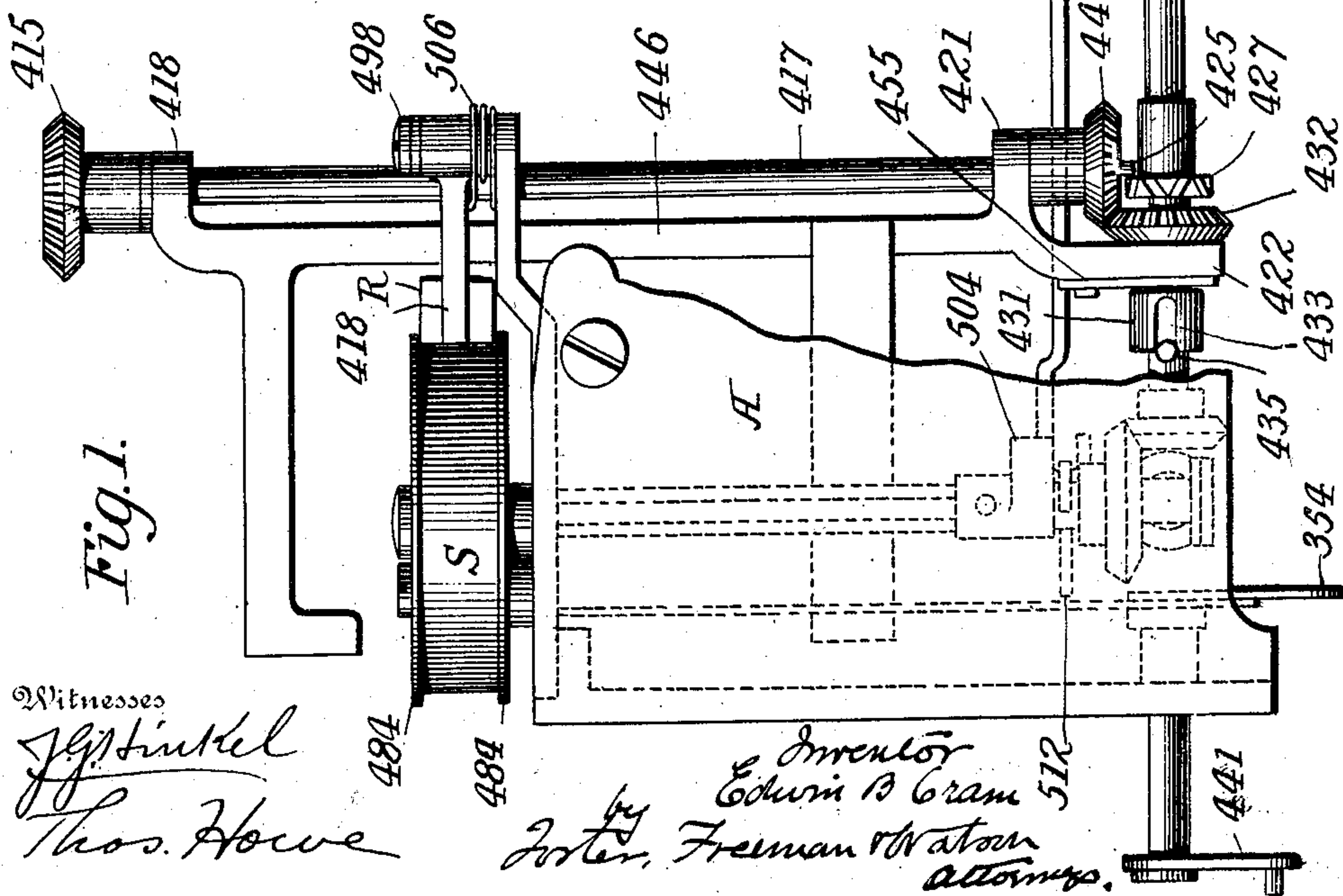


Fig. 1.



Witnesses

J. J. Hinkel
Thos. Howe

Inventor
Edwin B. Cram
by Foster, Freeman & Watson
Attorneys.

No. 896,803. E. B. CRAM. PATENTED AUG. 25, 1908.

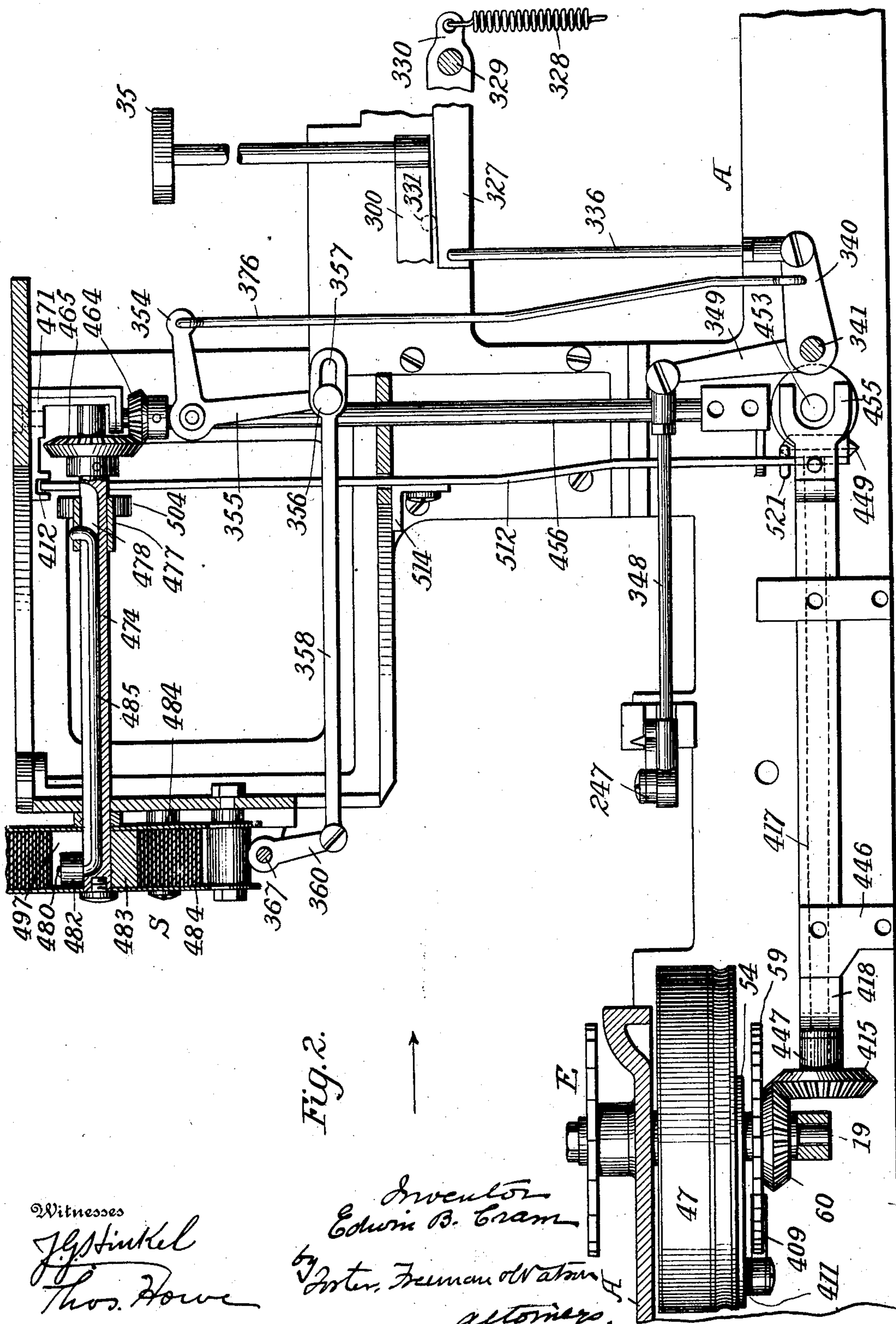
PATENTED AUG. 25, 1908.

E. B. CRAM.

RIBBON FEED MECHANISM FOR TYPE WRITING MACHINES.

APPLICATION FILED DEC. 9, 1903.

4 SHEETS—SHEET 2.



Witnesses

Witnesses
J. J. Stinkel
Thos. Howe

Inventor
Edwin B. Gram
by Foster, Freeman & Watson
attorneys.

No. 896,803.

E. B. CRAM.

PATENTED AUG. 25, 1908.

RIBBON FEED MECHANISM FOR TYPE WRITING MACHINES.

APPLICATION FILED DEC. 9, 1903.

4 SHEETS—SHEET 3.

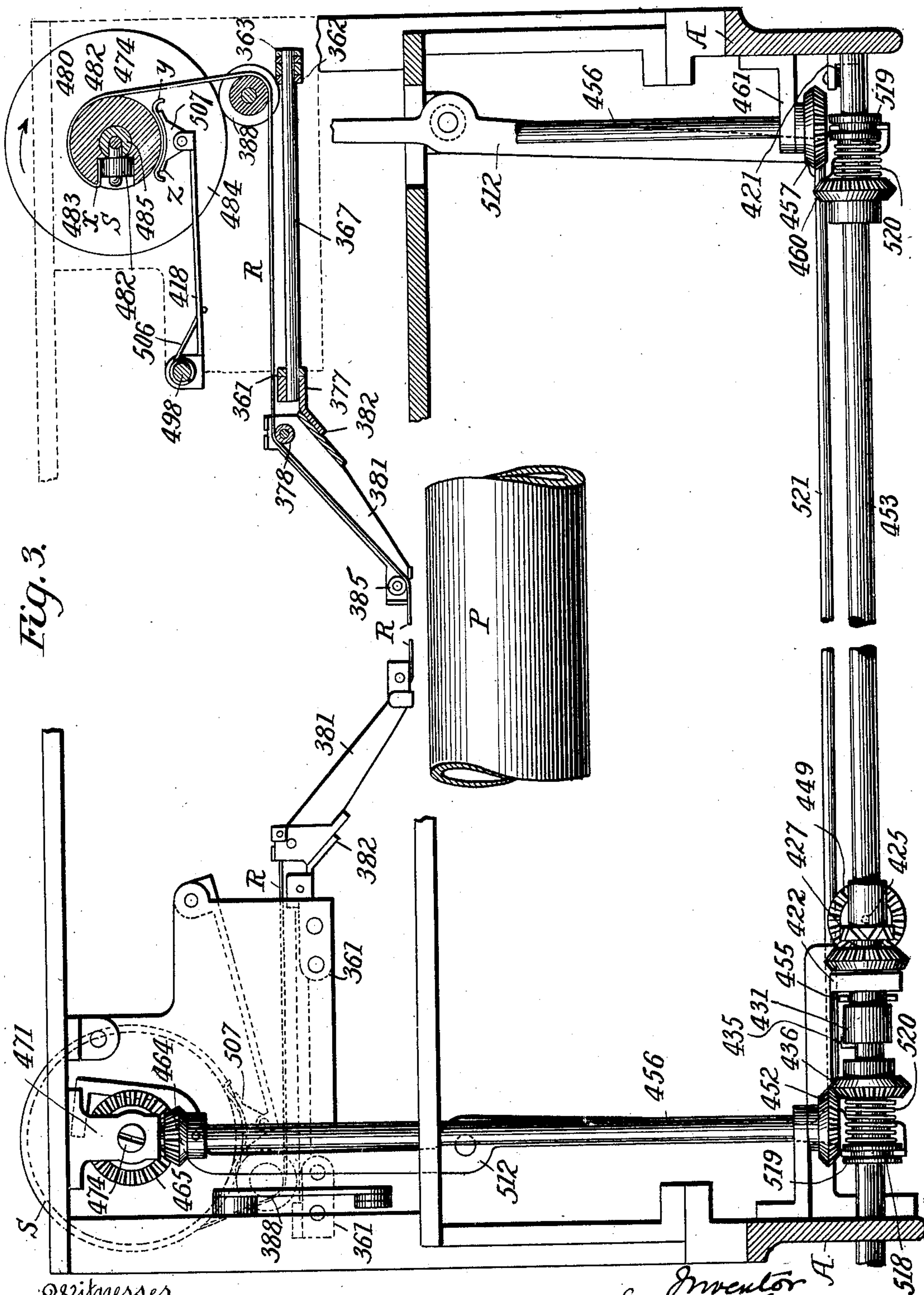


Fig. 3.

Witnesses
J. G. Stinkell
Thos. Howe

Inventor
Edwin B. Cram
by Foster, Freeman & Watson Attorneys.

No. 896,803.

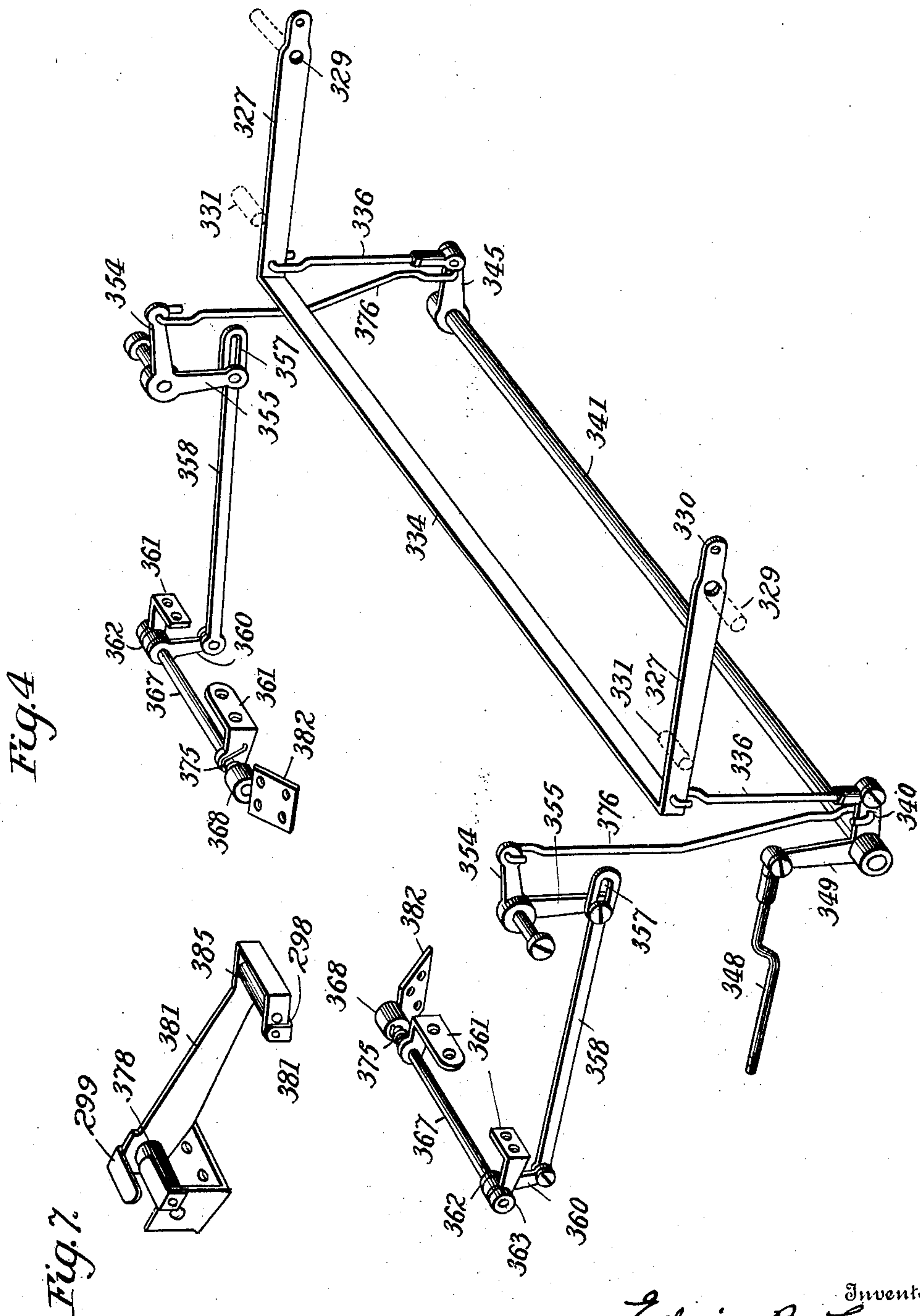
E. B. CRAM.

PATENTED AUG. 25, 1908.

RIBBON FEED MECHANISM FOR TYPE WRITING MACHINES.

APPLICATION FILED DEC. 9, 1903.

4 SHEETS—SHEET 4.



Witnesses
J. G. Stinckel
Thos. Howe

Inventor
Edwin B. Gram
by
Porter, Sherman & Watson
Attorneys

UNITED STATES PATENT OFFICE.

EDWIN B. CRAM, OF BROOKLYN, NEW YORK, ASSIGNOR TO NEW YORK ADDING TYPEWRITER COMPANY, OF ORANGE, NEW JERSEY, A CORPORATION OF MISSOURI.

RIBBON-FEED MECHANISM FOR TYPE-WRITING MACHINES.

No. 896,803.

Specification of Letters Patent.

Patented Aug. 25, 1908.

Application filed December 9, 1903. Serial No. 184,452.

To all whom it may concern:

Be it known that I, EDWIN B. CRAM, a citizen of the United States, and resident of Brooklyn, Kings county, New York, have
5 invented certain new and useful Improvements in Ribbon-Feed Mechanism for Type-Writing Machines, of which the following is a specification.

This invention relates to ribbon feed mechanism for typewriting machines, and particularly for that class of such machines in which the printing is visible as it progresses. In such machines it is necessary to move the ribbon over and away from the printing
10 point as well as to feed the ribbon longitudinally from one spool to another.

The objects of the present invention are to provide mechanism for effecting the lateral movement of the ribbon, said mechanism being operated by the dog operating mechanism which controls the step by step movement of the paper carriage; to provide mechanism for feeding the ribbon longitudinally, which mechanism is operated by
20 the motor which moves said carriage, and also to provide mechanism by which the longitudinal feed of the ribbon may be automatically reversed when said ribbon has been wound off one spool onto the other.

The invention will be fully described hereinafter, reference being had to the accompanying drawings, in which—

Figure 1 is a top plan view of a portion of a typewriting machine with my invention applied thereto; Fig. 2 is a side elevation partly in section; Fig. 3 is an elevation partly in section and partly broken away, looking from the left of Fig. 2; Fig. 4 is a perspective view of the devices for moving
40 the ribbon laterally, detached from the machine; Fig. 5 is an enlarged plan view of the cam shoe which engages the ribbon spools; Fig. 6 is a detached detail view, enlarged, of the collar with cam grooves in its periphery, which is employed to shift the gearing of the ribbon spools to reverse the direction of travel of the ribbon; Fig. 7 is a perspective view of a ribbon support detached.

The frame A of the machine is suitably
50 constructed to support the operating parts including the carriage (not shown) upon which the usual cylindrical platen P is mounted, a ribbon R, rotatable ribbon spools S alternately driven from the rotatable shaft

453, which is also movable endwise to disconnect it from one spool and connect it to the other, means for shifting the shaft endwise, a motor E for driving the shaft 453 and also shifting the carriage in the usual step by step manner, movable ribbon supports 381
60 whereby the ribbon is moved over and away from the printing point, a rock shaft 341 operatively connected to supports 381 and also to the dog 247 for controlling the carriage movement, and a bail 334 for operating the rock shaft, extending transversely of the machine beneath the key levers or stems 300 of keys 35 (Fig. 2 shows one key and stem) for operating the typewriting mechanism (not shown), and adapted to be operated on the
70 depression of any of the keys.

Referring to Figs. 2 and 4, the bail 334 is provided with arms 327 which preferably are integral with the bail and are pivoted on pins 329 supported by the frame A. Each arm
75 has a tail piece 330 to which one end of a spring 328 is secured, the other end being secured to the frame. These springs hold the bail yieldingly in its elevated position against stops 331 projecting from the frame. The rock shaft 341 turns in bearings on the frame, and an arm 345 is rigidly connected to said shaft near one end thereof, and a bell crank lever is rigidly connected to said shaft near its other end. Links 336 connect the
85 respective arms 327 with the arm 345 and the arm 340 of the bell crank lever. The other arm 349 of the bell crank lever is connected to a rod 348, the other end of which is connected to the dog 247 for controlling the step by step movement of the carriage which, however, forms no part of the present invention and need not be particularly described or illustrated.

It is essential that the depression of the bail shall be positive and uniform each time a key is operated regardless of the position of the key stem or lever which depresses it, in order to properly effect the movements of the dog and the ribbon. If the bail were supported at one end only it is evident that unless it were extremely large, the depression of a key at some distance from its support would cause bending and improper operation of the bail while by connecting each end of
100 the bail to an arm rigidly connected to the rock shaft, as described, a rigid frame is formed so that the bail will be depressed uni-

formly throughout its length no matter at what point in its length the key lever strikes it.

From each of the arms 340 and 345 a rod 376 extends upwardly and is connected to an arm 354 of a bell crank lever, said levers being pivotally supported on pins fixed in the frame of the machine, one on each side thereof. As the mechanism now to be described is alike on both sides of the machine a description of that on one side will be sufficient. The other arm 355 of the bell crank lever is provided with a pin at its outer end extending through a slot 357 in a connecting bar 358. The other end of this bar is connected to an arm 360 rigidly secured to a rock shaft 367 which is supported in brackets 361 secured to the frame of the machine. To prevent endwise movement of the shaft, the hub 362 of the arm 360 bears against the bracket on one side, and a collar 363 rigidly connected to the shaft bears against the other side of the bracket. Near the other end of the shaft 367 a collar 368 is rigidly secured upon the shaft and a spring 375 is coiled on the shaft and connected at one end to the collar 368 and at the other end to the adjacent bracket 361, and the tendency of the spring is to hold the parts in the positions shown in Figs. 2 and 4. The collar 368 is provided with a lip 382 extending downwardly at an angle to the collar.

Referring especially to Figs. 3 and 7, 381 is a ribbon support rigidly secured at one end to the lip 382 and extending therefrom at an angle to bring its lower end in proximity to the platen P. The support carries a guide roller 378 for the ribbon R at its upper end and another guide roller 385 at its lower end. The lower ends of the two supports 381 are separated from each other a sufficient distance to permit the ribbon R to be carried into contact with the platen when struck by a type. The ribbon passes from one spool S under a guide roller 388, over the roller 378 and under the roller 385 of one support, thence under the roller 385 of the other support, over its roller 378, under another guide roller 388, and on to the other ribbon spool. Secured to each support 381 are the threading clips 299 and 298 to permit the ribbon to be placed upon the guide rollers within the clips but prevent it from accidentally leaving the support. The springs 375 tend normally to hold the supports and ribbon away from the platen toward the front of the machine so that the printing may be seen. When a key is depressed, the bail 334 will move in a direction to swing the supports and ribbon over the platen and when the bail rises the springs 375 tend to return the supports and ribbon to normal position. It is not necessary or desirable that the ribbon be shifted from the printing point each time a key is released in rapid printing and therefore the

springs 375 are made of such strength that an interval of time is required to move the ribbon, the interval being such that there will be a very slight movement of the ribbon during ordinary operation but if there is a pause the ribbon is shifted to reveal the printing point. To permit the carriage dog operating devices to return to normal position independently of the supports and ribbon, a lost motion device between the dog and ribbon operating devices is provided, such as the slots 357 in the connecting rods 358.

I will now describe the mechanism for feeding the ribbon longitudinally and for automatically reversing the direction of its feed. The motor E is shown as having a spring actuated barrel 47 rotatable upon a shaft 19 supported in the machine frame, which barrel moves the carriage in one direction in the usual manner. An arm 54 is rigidly connected to the barrel 47 and carries at its outer end a pawl 409, the end of which is yieldingly held in engagement with the teeth of a ratchet wheel 59 by a spring 411. The ratchet wheel turns on the shaft of the spring barrel and a bevel gear 60 also mounted to turn on the shaft is pinned to the ratchet wheel so that both turn together. When the barrel operates to move the carriage to the left of the machine, the pawl 409 will turn the ratchet wheel and gear 60 in the same direction as the barrel, but when the carriage is returned to the right of the machine to wind the spring barrel the pawl 409 will slip over the teeth of the ratchet wheel 59.

The shaft 417 turns in bearings of a bracket 446 of the frame. The bracket 446 has an arm 422 which forms a bearing for the hub 431 of the bevel gear 432, which hub has a circumferential groove which receives a fork 455, Fig. 3, on the arm 422, to prevent endwise movement of the hub. The hub also has a longitudinal slot 433 which receives a pin 435 projecting from the shaft 453, which passes loosely through the hub 431. One end of the shaft 453 has a crank 441, that the shaft may be turned by hand when necessary.

Each spool S is geared by gears 464, 465 to a vertical shaft 456, and gears 452 and 457, Fig. 3, at the lower ends of the latter engage gears 436 and 460 on a horizontal rotating and sliding shaft 453, and this shaft is driven from the motor E, shown as having a spring actuated barrel 47 connected by a band to the platen carriage (not shown) as usual, the said motor turning the shaft 453 through the medium of a shaft 417 and gears 60 and 415 at one end and gears 449 and 432 at the other. When the gear 436 on the shaft 453 is engaged with the gear 452, the gear 460 will be disengaged from the gear 457, and vice versa.

It is necessary to provide some means for moving the shaft 453 endwise to effect the

reversal of the ribbon feed from spool to spool, and I prefer to have automatically operated devices, substantially like those to be now described.

5 On the shaft 453, near each end a collar 519 is loosely mounted and provided with a circumferential groove 518 into which the forked lower end of a vertical lever 512 extends. These levers are pivoted respectively to the machine frame and their lower ends are connected by a rod 521 so that when one lever is positively moved, as will be hereinafter described, the other will also be moved to the same extent. Each lever 512 is guided at its lower end by a slot 463 in a bracket 461 and at its upper end by a slot 412 in a bracket 471. Springs 520 are coiled around the shaft 453 between the collars 519 and the bevel gears 436 and 460 respectively. The ribbon spools are alike in construction and the devices for operating the levers 512 are alike on each side of the machine, so it will be necessary to describe one only.

Each ribbon spool has a core 483 preferably of wood, to which are attached the metal plates 484, in any suitable manner. The core is cut away to form a recess 497 and the shaft 474 passes through the plates 484 and the core, and is rigidly connected to them. The shaft 474 has a longitudinal groove 478 which communicates with the recess 497, and a rod 485 having its ends bent at substantially a right angle lies in the groove, and one bent end is connected to a sleeve 477 sliding on the shaft 474 and having a cam 504 rigidly connected to it. The other bent end of the rod 485 has a block 482 securely fastened to it, and this end of the rod projects beyond the block and forms a pin 480. The block 482 lies in the recess 497 of the spool core and it and the pin 480 are normally covered by the ribbon on the spool. The pin 480 may be stationary and project beyond the recess at all times or it may be movable and lie normally within said recess and be carried outward by the weight of the block 482 when the ribbon is unwound from the spool. Normally the cam 504 is at one side of the lever 512, see Fig. 2, and the cam, the spool and the shaft 474 may all turn together without acting on the lever.

For each spool there is a shoe 507 pivotally connected to the end of an arm 418 pivotally supported at its other end on a pin 498 which is fast in the frame of the machine, and a spring 506 coiled on said pin, with one end connected to the frame and the other engaging the arm 418, holds the shoe yieldingly against the ribbon when the latter is on the spool. The shoe is curved to conform to the core 483, and is provided in its face with a cam track 503. (See Fig. 5.)

Assuming now that the ribbon is being wound on to the spool at the left of Fig. 3 and that the ribbon is attached to the spool

on the right of Fig. 3 at x and that there is still one layer of the ribbon on this spool, when the pin 480 has moved in the direction of the arrow to y , Fig. 3, there will be no ribbon between the shoe 507 and the pin 480; the latter will therefore enter the cam track 503, the block 482 bearing on the face of the cam, and as the spool continues to turn, the pin 480 will traverse the cam track until it reaches the position indicated by z at which point the pin leaves the cam track. The track will cause the rod 485 to move endwise and carry the cam 504 behind the lever 512 and, as the shaft 474 will still continue its rotation, it will act on said lever and rock it to move the collar 519 to compress the spring 520 on the shaft 453. The spring 520 being compressed, it will tend to move the gear 436 and shaft 453, rigidly connected to it, to the right in Fig. 3. This will operate to push a cam collar 427, which is fixed to shaft 453, against a pin 425 projecting from the center of the shaft 417, so that the pin will enter a cam track upon the periphery of the collar 427. See Fig. 6. The cam tracks are such that as shaft 453 is revolved, the collar will be carried with the shaft until the pin is beyond the other side of the collar, shifting the shaft endwise and moving the gear 436 out of engagement with the gear 452, and the gear 460 into engagement with the gear 457. When this has been accomplished the spool at the left of Fig. 3 will stop while the spool on the right will be positively driven as long as the shaft 453 remains in the shifted position.

When the empty spool begins its reverse movement the cam track 503 in the shoe 507 will act upon the pin 480 of the rod 485 and move the latter longitudinally to carry the cam 504 out of engagement with the lever 512, and as the spool continues its rotation and winds ribbon on it, the ribbon will come between the end 480 and shoe 507 and the cam 504 will remain inoperative until pin 480 is again uncovered. The shoes 507 in addition to their cam function also act as brakes for the spools to prevent them from over-running, and thus keep the ribbon taut between the spools.

At one end of the shaft 453 is a friction spring 421 supported by the frame and bearing upon said shaft to prevent its movement unless positively driven.

Without limiting myself to the precise construction and arrangement of parts shown, I claim:

1. In a typewriting machine, the combination of a motor for moving the carriage, a pair of ribbon spools, an endwise movable shaft rotated by said motor, gearing driven by the said shaft for rotating said spools independently, means automatically operated when the ribbon is unwound from one spool for imparting a limited endwise movement

to said shaft, and means operated by the rotation of said shaft for imparting a further longitudinal movement to said shaft to disconnect it from the gearing for rotating the filled spool and connect it with the gearing for rotating the empty spool, substantially as set forth.

2. In a typewriting machine, the combination of a motor for moving the carriage, a pair of ribbon spools, an endwise movable shaft rotated by said motor, gearing driven by the said shaft for rotating said spools independently, means automatically operated when the ribbon is wound off one spool for imparting a limited endwise movement to said shaft, and a cam mechanism operated by the rotation of said shaft for imparting a further longitudinal movement to said shaft to disconnect it from the gearing for rotating the filled spool and connect it with the gearing for rotating the empty spool, substantially as set forth.

3. In a typewriting machine, the combination of a motor for moving the carriage, a pair of ribbon spools, an endwise movable shaft rotated by said motor, gearing driven by the said shaft for rotating said spools independently, a cam mounted on said shaft, a relatively stationary pin at the side of the shaft, and means automatically operated when the ribbon is wound off one spool for imparting a limited endwise movement to said shaft to bring said cam into engagement with said pin, whereby as the shaft rotates a further longitudinal movement will be imparted thereto to disconnect it from the gearing for rotating the filled spool and connect it with the gearing for rotating the empty spool, substantially as set forth.

4. In a typewriting machine, the combination of a motor for moving the carriage, a pair of ribbon spools, an endwise movable shaft rotated by said motor, a collar on said shaft having a cam track in its periphery, a relatively stationary pin, gearing adapted to be driven by said shaft for rotating the spools independently, and devices for moving said shaft endwise to engage the collar with said pin, whereby the shaft is further positively moved to disconnect it from gearing for rotating one spool and to connect it to the gearing for rotating the other spool, substantially as set forth.

5. In a typewriting machine, the combination of a motor for moving the carriage, a pair of ribbon spools, an endwise movable shaft rotated by said motor, a collar on said shaft having a cam track in its periphery, a relatively stationary pin, gearing adapted to be driven by said shaft for rotating the spools independently, and springs for moving said shaft endwise to engage the collar with said pin whereby the shaft is further positively moved to disconnect it from gearing for rotating one spool and to connect it

to the gearing for rotating the other spool, substantially as set forth.

6. In a typewriting machine, the combination of a motor for moving the carriage, a pair of ribbon spools, an endwise movable shaft rotated by said motor, a collar on said shaft having a cam track in its periphery, a relatively stationary pin, gearing adapted to be driven by said shaft for rotating the spools independently, and devices automatically operated for moving said shaft endwise to engage said collar and said pin, whereby the shaft is moved positively endwise to disconnect it from gearing for rotating one spool and to connect it to the gearing for rotating the other spool, substantially as set forth.

7. In a typewriting machine, the combination of a pair of ribbon spools, a longitudinally movable power shaft adapted to be connected with either of said spools, a pin carried by each spool and normally covered by the ribbon, means operated by said pin when it is uncovered for imparting a limited longitudinal movement to said power shaft, and means operated by the rotation of said power shaft for imparting a further longitudinal movement thereto to disconnect one of the said spools from said shaft and connect the other of said spools with such shaft.

8. In a typewriting machine, the combination of a pair of ribbon spools, a pin carried by each spool and normally covered by the ribbon, a cam shoe adapted to engage with said pin when it is uncovered, means for rotating said spools independently, and means operated by said cam shoe and pin for disconnecting one of said spools from its rotating means and connecting the other of said spools to a rotating means, substantially as set forth.

9. In a typewriting machine, the combination of a pair of ribbon spools, a power shaft common to both spools and movable to engage the driving devices of either spool, means controlled by the ribbon for imparting an initial shifting movement to said power shaft, and means operated by said shaft for continuing such shifting movement to disconnect said shaft from the driving devices of one spool and connect it with the driving devices of the other spool.

10. In a typewriting machine, the combination of a pair of ribbon spools, a power shaft common to both spools and movable to engage the driving devices of either spool, means adapted to be automatically operated when the ribbon is unwound from either spool for imparting a limited shifting movement to said power shaft, and means operated by said power shaft for continuing such shifting movement to disconnect said shaft from the driving devices of one spool and connect it with the driving devices of the other spool.

11. In a typewriting machine, the combination of a pair of ribbon spools, a power shaft common to both spools and movable to engage the driving devices of either spool, a
5 spring adapted to be put under tension by the unwinding of the ribbon from one of the spools to cause a limited movement of the connections between the power shaft and spools, and means operated by said shaft for
10 continuing such shifting movement to disconnect said shaft from one spool and connect it with the other spool.

12. In a typewriting machine, the combination of a pair of ribbon spools, devices for
15 rotating each spool including a bevel gear connected with the spool spindle, a power shaft, bevel gears on said shaft adapted to mesh with said spool spindle gears, means controlled by the ribbon for imparting an
20 initial shifting movement to the power shaft, and means for positively continuing such shifting movement to disconnect one of the gears on said shaft from the associated spool spindle gear and connect the other gear on
25 said shaft with the other spool spindle gear.

13. In a typewriting machine, the combination of a pair of ribbon spools, a longitudinally movable power shaft adapted to be connected with either of said spools, springs
30 connected with said shaft, means adapted to be operated by either spool when the ribbon is unwound therefrom for putting one of said springs under tension and causing said spring to move the power shaft longitudinally, and
35 means operated by the power shaft for continuing such longitudinal movement of said shaft to disconnect one of said spools therefrom and connect the other spool therewith.

14. In a typewriting machine, the combination of a pair of ribbon spools, a longitudinally movable power shaft, gearing adapted to connect said shaft with either of the ribbon spools, two springs surrounding said shaft and each connected therewith at one
45 end, means adapted to be operated by either spool when the ribbon is unwound therefrom for compressing one of said springs and thereby moving the power shaft longitudinally a limited distance, and means operated
50 by the power shaft for continuing such longitudinal movement thereof to disconnect one of the spools therefrom and connect the other spool thereto.

15. In a typewriting machine, the combination of a pair of ribbon spools each having
55 a core provided with a recess, a ribbon connected at its ends to the respective cores to be wound thereon to close said recesses, gears for rotating said spools independently, a motor, a shaft for each spool having a longitudinal groove communicating with the recess in the core of its spool, a rod supported
60 in said groove and movable endwise therein, a weight on one end of the rod, normally supported in said recess by the ribbon wound on

the core, said weight having a pin 480, a shoe normally pressed toward the core and having a cam track to receive said pin when the weight is released and to move said rod endwise as the spool continues its rotation, and
70 means operated by said moving rod for disconnecting said motor from the gearing for rotating one spool and connecting it to that for rotating the other, substantially as set forth.

16. In a typewriting machine, the combination of a pair of ribbon spools each having a core with a recess and a shaft having a longitudinal groove communicating with said recess, a ribbon connected to said cores to be
80 wound thereon and to close said recesses, means for rotating said spools in opposite directions, a rod supported in the groove in the shaft and having a weighted pin at the end in said recess normally retained therein by
85 the ribbon, and means operated by the movement of said rod when its pin is released for reversing the direction of feed of the ribbon, substantially as set forth.

17. In an automatic device for reversing
90 the feed of typewriter ribbons, a pair of spools, each having a core with a recess and a shaft having a groove communicating with said recess, a ribbon connected at its ends to said cores to be wound thereon, a rod supported in each groove and movable longitudinally therein and having a pin at its end, said pins being normally retained in the recesses by the ribbon on the cores, cam tracks
95 to receive the respective pins when released by the ribbon, to move the respective rods endwise, and means operated by the movement of one of the rods for reversing the direction of feed of the ribbon, substantially as set forth.

18. In a typewriting machine, the combination of a pair of spools each having a shaft, a cam supported on the shaft to rotate therewith and move longitudinally thereof, a
100 driven shaft having endwise movement, gears 452, 457 for rotating said spools independently, means for gearing said gears alternately with the driven shaft, a pair of levers connected at their lower ends to the driven shaft, and their other ends being respectively
115 adjacent to the respective cams on the spool shafts, and devices automatically operated for moving said cams alternately into engagement with said levers whereby each in turn is operated to move the driven shaft endwise
120 and disconnect it from the gear for rotating one spool and connect it to that for operating the other spool, substantially as set forth.

19. In a typewriting machine, the combination of a shaft 453 supported to turn in
125 bearings and move endwise therein, and having two separated bevel gears fixed thereon, a pair of shafts 456 extending at right angles to the shaft 453, each having a bevel gear adapted to be engaged by one of the bevel
130

gears on the shaft 453, a pair of ribbon spool gearings between the shafts 456 and the respective spools for rotating the latter, a cam collar fast on the shaft 453, a relatively stationary pin adjacent to said collar, a movable collar on the shaft 453, a spring interposed between said movable collar and a fixed projection on the shaft 453, means for actuating the movable collar to move the shaft 453 and hold the cam collar elastically against said pin, and means for rotating the shaft 453, substantially as set forth.

20. In a top strike typewriting machine, the combination of a platen, two ribbon supporting arms mounted on rock shafts arranged to rock about an axis extending longitudinally of the platen, means for normally holding said arms in position to expose the printing point on the platen, a universal bar, and connections between said bar and the shafts of the ribbon supporting arms whereby said arms will be rocked to move the ribbon over said printing point whenever a key of the machine is operated.

21. In a top strike typewriting machine, the combination of a platen, two rock shafts mounted in suitable bearings above the platen, a ribbon supporting arm secured to each of said shafts, means for normally holding said shafts and arms in position to expose the printing point on the platen, a universal bar, and pin and slot connections between arms on said rock shafts and devices movable by the universal bar, substantially as and for the purpose described.

22. In a top strike typewriting machine, the combination of a platen, two ribbon supporting arms mounted on rock shafts arranged to rock about an axis extending longitudinally of the platen, springs for acting to hold said supports in position to expose the printing point on the platen, a universal bar, and connections between said bar and the shafts of the ribbon supporting arms whereby said arms will be rocked to move the ribbon over said printing point whenever a key of the machine is operated.

23. In a typewriting machine, the combination of a platen, an inking ribbon, pivotal supports through which the ribbon passes, means for normally holding said supports and ribbon away from the platen, a pivotally supported bail adapted to be depressed by any key of the typewriter, a rock shaft supported below the bail, arms rigidly connected to the rock shaft, rods connecting the ends of the bail with the respective arms, and connections between the arms on the rock shaft and the respective ribbon supports, whereby

when any key is depressed to depress the bail the supports will be moved uniformly to bring the ribbon into printing position over the platen.

24. In a typewriting machine, the combination of a depressible bail having arms at right angles thereto, said arms being pivotally supported, springs for normally holding the bail elevated, a rock shaft below the bail, arms rigidly connected to the rock shaft, rods connecting the respective bail arms to the respective arms on the rock shaft, a platen, an inking ribbon, supports through which the ribbon passes, independent rock shafts to which the supports are connected, springs tending to hold the supports and ribbon away from the platen, a bell crank lever on each side of the machine, rods connecting the said levers with the respective rock shaft arms, an arm on each support, and rods connected at one end to the respective supports and having a slot and pin connection at their other ends to the respective bell crank levers, whereby when the bail is depressed the supports and ribbon are moved toward the platen, and the bail can return independently of the return of the supports and ribbon, substantially as set forth.

25. In a typewriting machine, the combination of a platen, two rock shafts, ribbon supporting arms mounted on said shafts, springs extending around said rock shafts and acting to hold the ribbon supporting arms in position to expose the printing point on the platen, a universal bar, and connections between said bar and rock shafts whereby the ribbon supporting arms will be shifted to move the ribbon over said printing point whenever a key of the machine is operated.

26. In a typewriting machine, the combination of a platen, two rock shafts, ribbon supporting arms mounted on said shafts, and extending beyond the adjacent ends thereof, springs extending around said rock shafts and acting to hold the ribbon supporting arms in position to expose the printing point on the platen, a universal bar, and connections between said bar and rock shafts whereby the ribbon supporting arms will be shifted to move the ribbon over said printing point whenever a key of the machine is operated.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWIN B. CRAM.

Witnesses:

W. FRANK CARTER,
WM. G. McCARTY.