

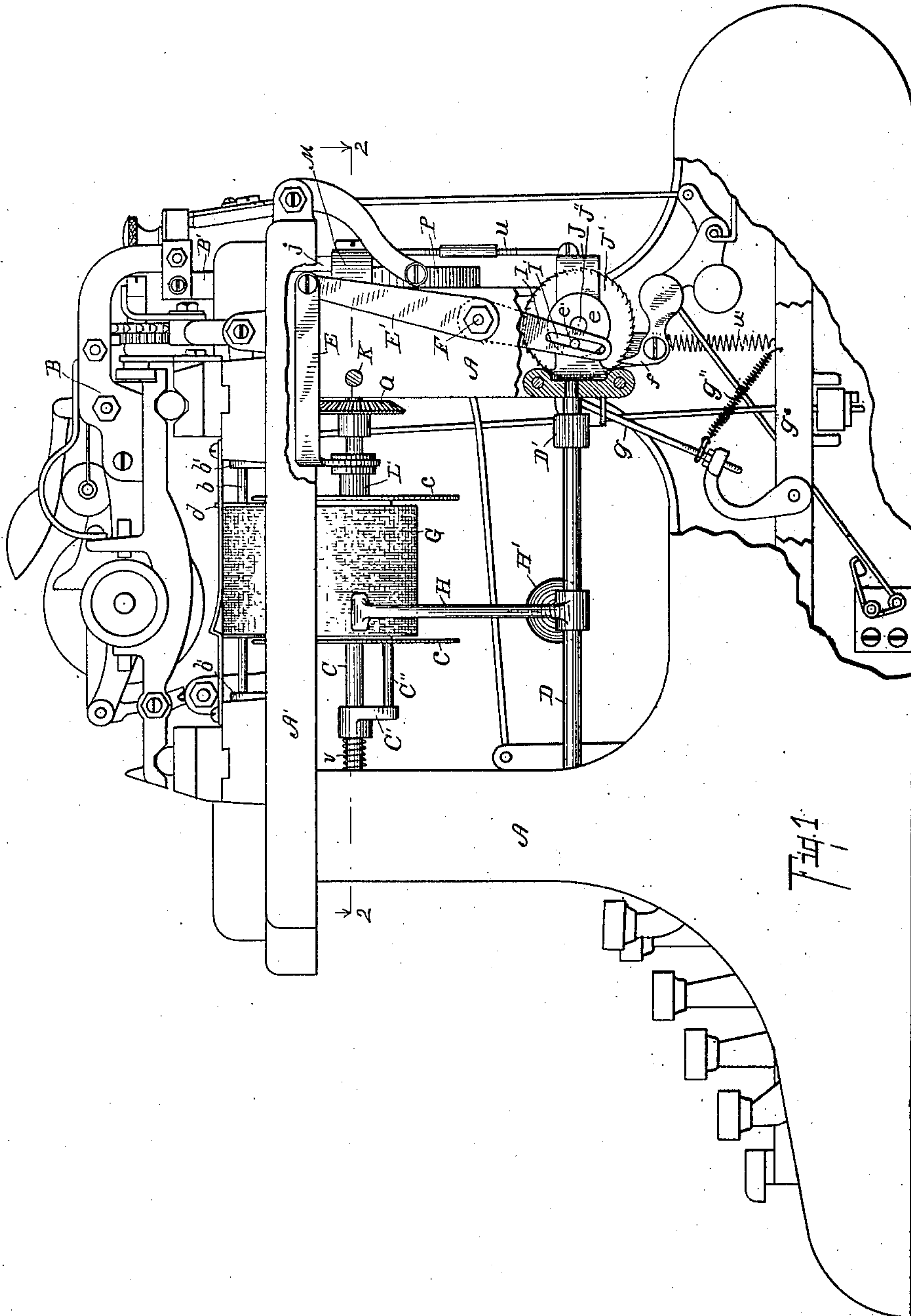
No. 837,554.

PATENTED DEC. 4, 1906.

W. R. FOX & G. J. BARRETT.
RIBBON MECHANISM FOR TYPE WRITERS.

APPLICATION FILED JULY 31, 1902.

4 SHEETS—SHEET 1.



Witnesses:

Ethel A. Teller

Otto B. Carl

Inventors

W. R. Fox & G. J. Barrett

By Fred L. Appell

Att'y.

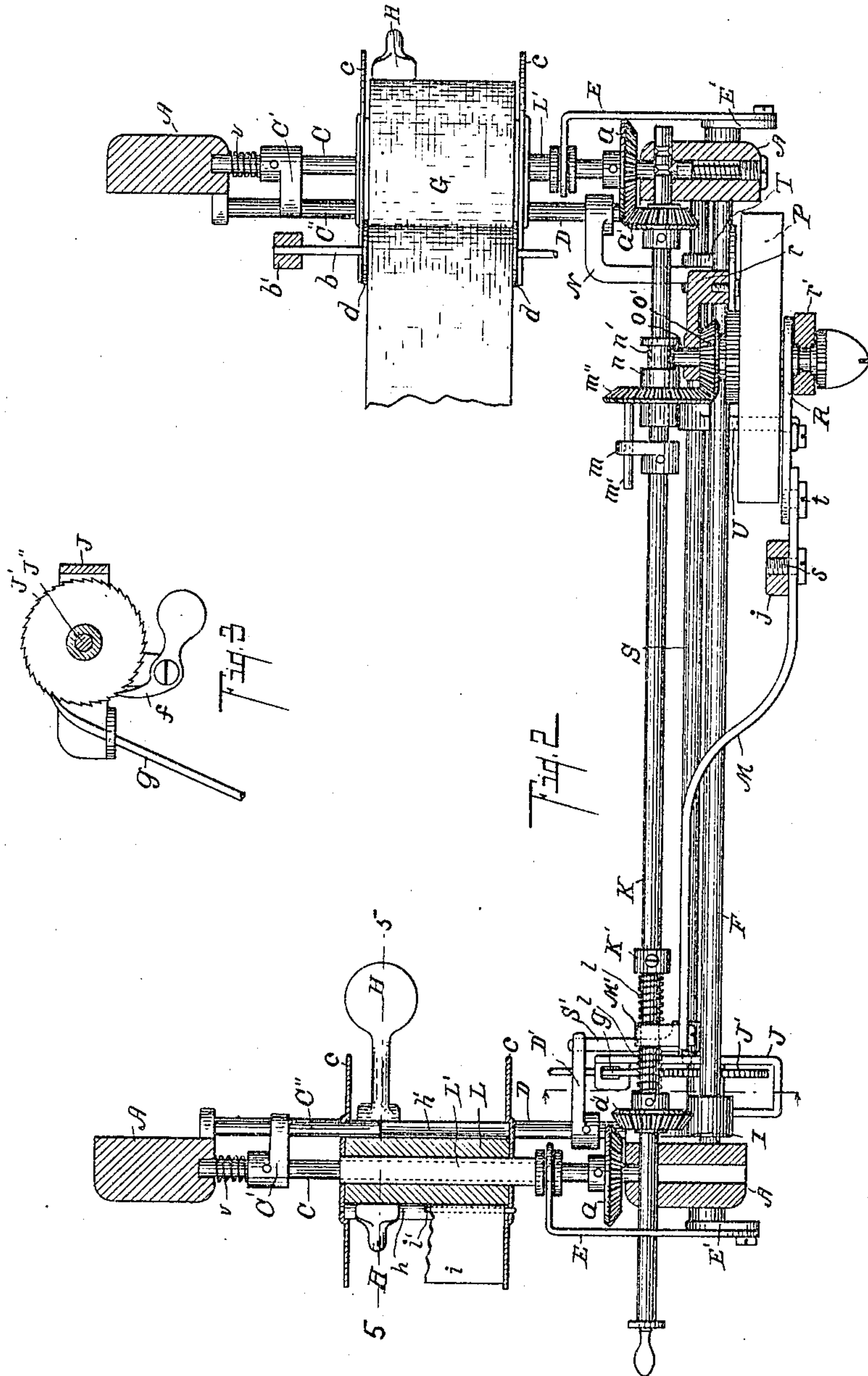
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4 SHEETS—SHEET 2.



Witnesses:

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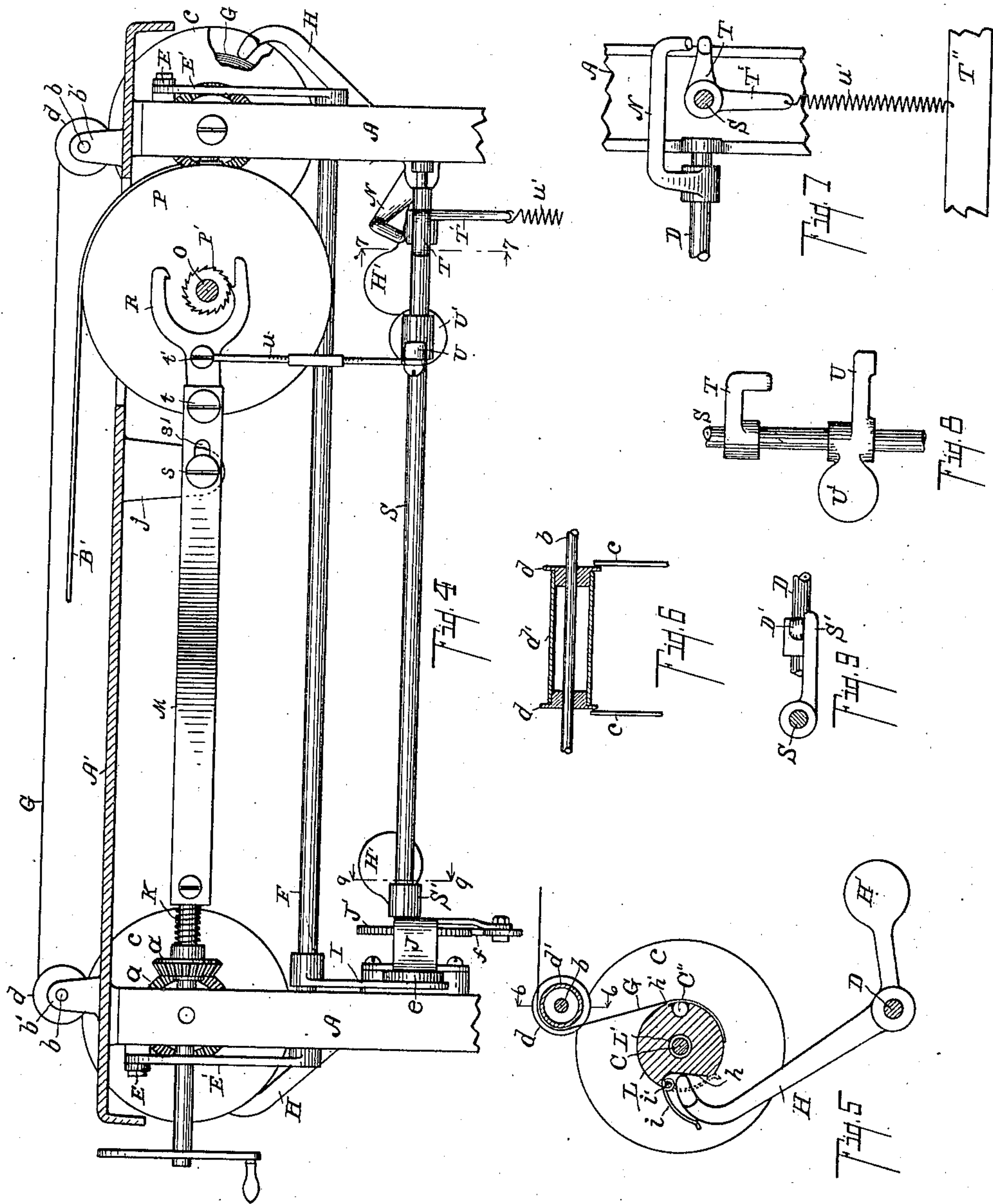
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4 SHEETS—SHEET 3.



Witnesses:

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Att'y.

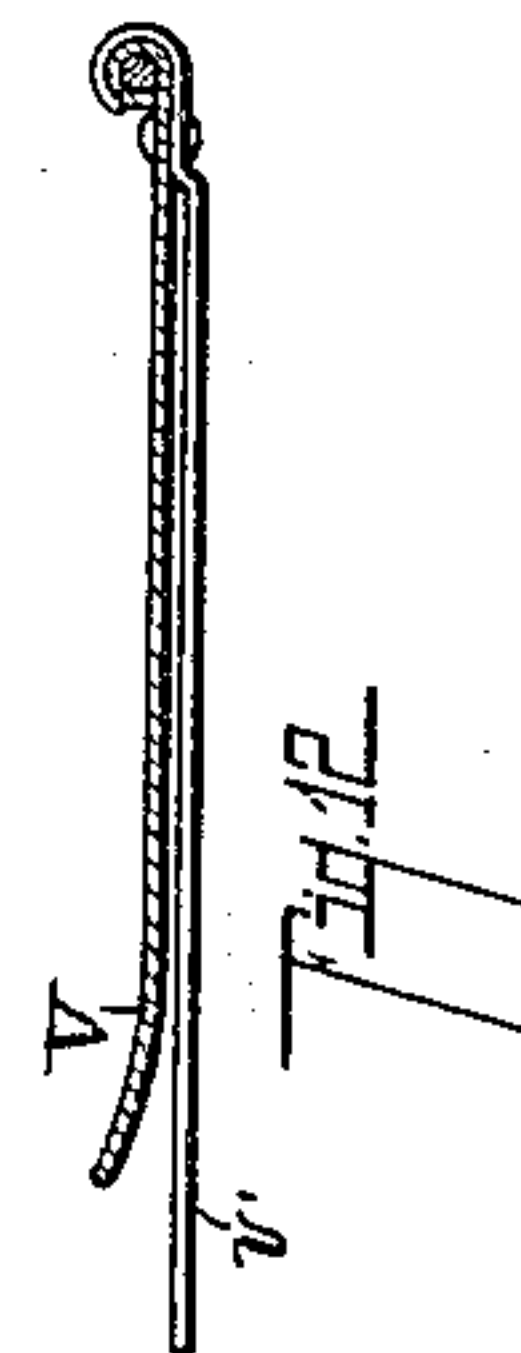
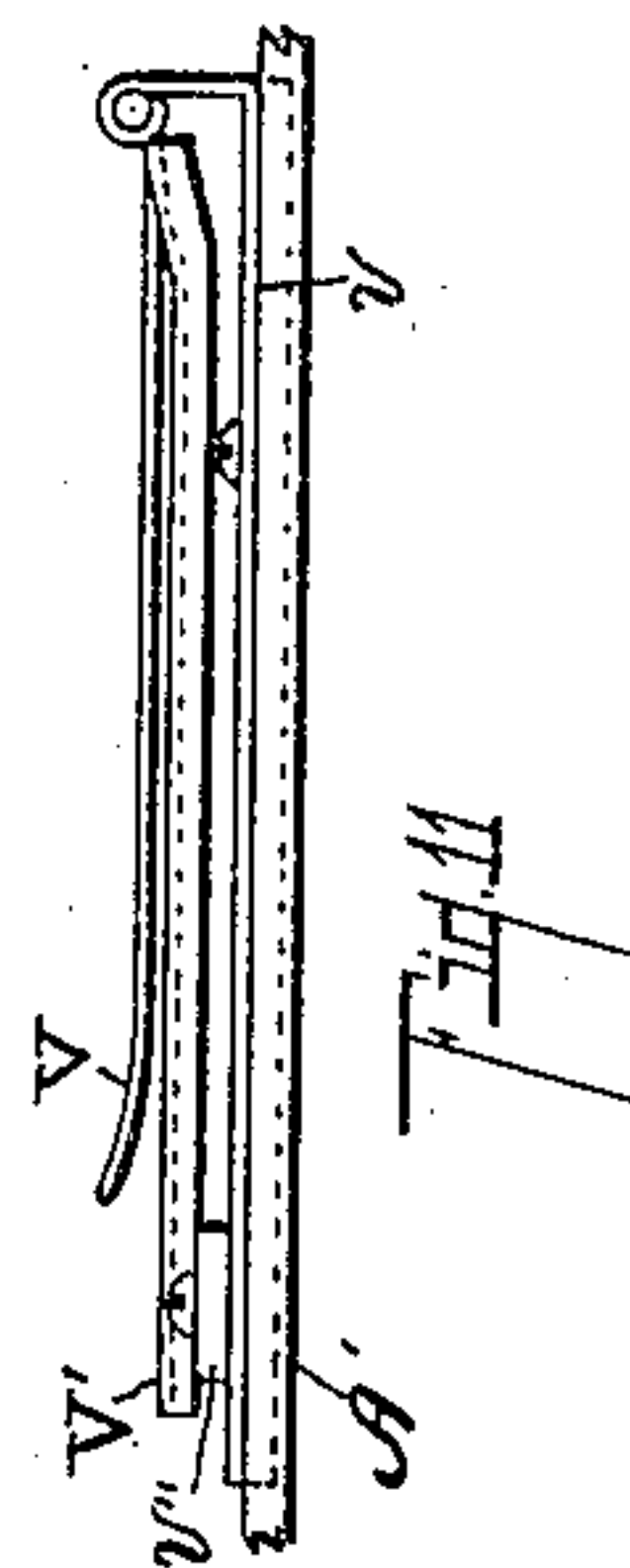
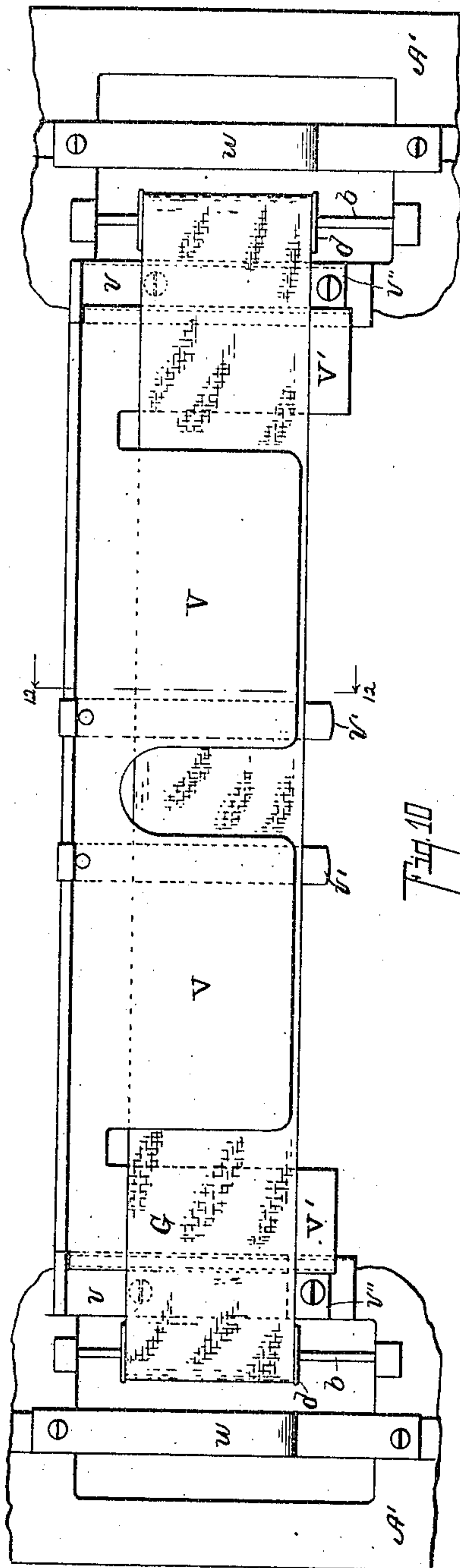
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4 SHEETS—SHEET 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM R. FOX AND GLENN J. BARRETT, OF GRAND RAPIDS, MICHIGAN, ASSIGNORS TO FOX MACHINE COMPANY, OF GRAND RAPIDS, MICHIGAN.

RIBBON MECHANISM FOR TYPE-WRITERS.

No. 837,554.

Specification of Letters Patent.

Patented Dec. 4, 1906.

Application filed July 31, 1902. Serial No. 117,775.

To all whom it may concern:

Be it known that we, WILLIAM R. FOX and GLENN J. BARRETT, citizens of the United States, residing at the city of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Ribbon Mechanism for Type-Writers, of which the following is a specification.

10 This invention relates to improvements in type-writers, and particularly to improvements in the ribbon mechanism for type-writers.

One object of our invention is to provide 15 an improved automatic reverse mechanism for the ribbon which shall accomplish its purpose without any strain on the ribbon mechanism; second, to provide an improved ribbon-guide; third, to provide improved 20 means for moving the ribbon laterally; fourth, to provide improved means for supporting and guiding the spools; fifth, to provide an improved ribbon-guide hinged to swing the ribbon to one side of the type- 25 basket to facilitate the cleaning of the type.

Further objects will definitely appear in the detailed description to follow.

We accomplish the objects of our invention by the devices and means described in 30 the following specification.

A structure embodying the features of our invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 is a detail side elevation of a type- 35 writing machine embodying the features of our improved ribbon mechanism, portions of the frame being broken away to show details of construction. Fig. 2 is an enlarged horizontal detail sectional view taken on a line 40 corresponding to line 2 2 of Fig. 1, showing the location of the various actuating means for the ribbon, portions being shown in full lines and the portions of the type-writer not relating to the ribbon-movement being omitted. 45 Fig. 3 is a detail side view of the feeding-ratchet means for securing the lateral movement of the ribbon. Fig. 4 is a detail transverse sectional view of the rear portion of the machine, parts being broken away to 50 give a clear view of the essential parts of the ribbon mechanism appearing in Fig. 2, other

portions of the type-writer being omitted. Fig. 5 is a detail sectional view through the spool-guide and tripping-weight of our improved mechanism, taken on line 5 5 of Fig. 55 2. Fig. 6 is a detail sectional view on line 6 6 of Fig. 5, showing details and relations of the ribbon-guide. Fig. 7 is a detail sectional view on line 7 7 of Fig. 4, showing the position of the part of the trip mechanism appearing at that point. Fig. 8 is a detail plan 60 view of the right-hand portion of the rock-shaft S with its arms and counterweight as it appears in Fig. 4. Fig. 9 is a detail transverse sectional view on line 9 9 of Fig. 4, 65 showing the position and relations of the trip mechanism at that point. Fig. 10 is an enlarged detail plan view of the hinged ribbon-guide for delivering the ribbon in proper relations beneath the platen and the auxiliary paper-guides at each end. Fig. 11 is an 70 end elevation view of the hinged ribbon-guide, taken from the left hand of Fig. 10, showing the guide and its support and the position of the little buffer V". Fig. 12 is a detail 75 transverse sectional view on line 12 12 of Fig. 10, showing the supporting-fingers v' to each side of the writing-point of the ribbon.

In the drawings all of the sectional views are taken looking in the direction of the little 80 arrows at the ends of the section-lines, and similar letters of reference refer to similar parts throughout the several views.

Referring to the lettered parts of the drawings, A is the general framework of the machine, and A' the top plate, which may be provided with all the usual appurtenances of a type-writer. In the standard of the machine at each side of the machine are supported shafts C, the same being preferably 85 inserted by holes being drilled through the back standards and suitable retaining means provided. On each of these shafts are supported ribbon-spools the construction of which clearly appears in Figs. 2 and 5. The 90 same consist of central wooden cores L with thin sheet-metal flanges c at each side. The spool is carried on a sleeve L', which is adapted to slide back and forth on the shaft C. The spool is prevented from rotation by the 95 pin C'', secured to the arm C', which is pinned to the shaft C. The pin C'' extends through 100

a hole in the flange *c* and into a recess *h'* in the core *L*. In the core *L* is also cut a broad notch *h*. Over this is preferably arranged a little lid *i*, supported on a pivot *i'*, the lid conforming to the periphery of the core *L* and making the same substantially continuous. A suitable collar with a groove is provided on the rear end of the sleeve *L'* to afford engagement for the mechanism by which the spool is reciprocated in its bearing.

Supported on a light rod *b*, rigidly secured to the arm *b'* and parallel with the axis of the spool, is a small guiding-roll consisting of flanged ends *d d*, adapted to fit just within the flanges *c c* of the spool and a light tubular body *d'*. Over this the ribbon passes, the same serving as an idler and guide therefor, and it is carried back and forth by the spool, the flanges of which engage it.

The rock-shaft *D* is at each end of the machine and beneath the spools. This carries an arm *H*, curved at its upper end to rest against the spool and pass freely over it until the ribbon is unwound therefrom, when its point engages under the little lid *i* and throws it back, the arm swinging slightly into the notch. The counterweight *H'* holds this arm *H* into gentle contact with the periphery of the body of the spool as it is wound and unwound and is the means that actuates the arm when the point enters the notch in the spool. On the rock-shaft *D* to the left of Fig. 1 is provided an arm *D'*, the function of which is to trip the reverse mechanism for the ribbon, and at the right hand of Fig. 2 is an arm *N* of a peculiar bent form to serve the purpose of tripping the same mechanism to cause the shift in the opposite direction. (See Fig. 7.)

The ribbon-spools are driven or actuated by the driving-shaft *K*, which carries bevel-gears *a'* at each end oppositely facing. These are arranged to mesh alternately with bevel-gears *a a* on each side of the ribbon-shaft *C*. A bevel-gear *O'* is carried by the shaft *O*, on which the spring-drum *P* for driving the carriage is mounted. The spring-drum is connected by the band *B'* to an arm *B* on the carriage. This gear *O'* meshes with the bevel-gear *m''*, which is carried by the shaft *K*. This gear is always held in proper relation and in mesh with the gear *O'* by the shaft *O*, extending into an annular groove *n'* in the hub *n* of such gearing *m''*. The shaft *K* is free to reciprocate through this gear, so as to enable the gears *a'* at each end to be alternately thrown into engagement with the gears *a* on the ribbon-shafts. Independent rotation of the shaft *K* is prevented by the pin *m'* extending from the gear *m''* through a perforation in the arm *m*, which is pinned to the shaft *K*. This permits the shaft to reciprocate through the gear *m''*, but does not permit independent rotation. Therefore the shaft is rotated whenever the spring-drum is

rotated. From this it will be seen that when the shaft *K* is shifted to one end of the machine the ribbon-spool at that end will be actuated, and when it is shifted to the opposite end it will engage and drive the spool at that end in the opposite direction, releasing the one it first engaged. As the gears are oppositely arranged, the spools will of course be driven in opposite directions, thus winding the ribbon from one spool to the other alternately, as is usual in type-writing machines. Springs *v* are provided on the shafts *C*, so that they are held yieldingly forward to insure proper meshing of the gear. The means for effecting this shifting consists of a ratchet-wheel *P'*, which is secured to the outer back end of the shaft *O*.

R is a double pawl which is forked and embraces both sides of the ratchet-wheel *P'*. The pawl *R* is pivotally connected to a longitudinally-moving pitman *M*. The pitman *M* is supported at the rear of the machine on the lug *j* by means of a shouldered screw *s*, which passes through the longitudinal slot *s'* in the pitman. At the other end of this pitman *M* is a lateral-projecting stud or arm which embraces the driving-shaft *K*. *K'* is a collar rigidly secured to this shaft, and between this collar *K'* and the stud *M'* and between the said stud *M'* and the gears *a'* (at the left of Fig. 2) are interposed coiled springs *l l*. The object of these springs is to form a longitudinal yielding connection between the pitman and the reversing or driving shaft *K*.

Beneath the shaft *K* and suitably supported in bearings in the rear posts of the frame is a rock-shaft *S*. To the left of the frame an arm *S'* projects inwardly and is in position to be actuated by the arm *D'* on the rock-shaft *D* at that end of the machine already described. An arm *T* projects in the opposite direction on the shaft *S* toward the right-hand end of the machine, and the arm *N* extends inwardly and rearwardly and then downwardly from the rock-shaft *D*, so as to contact with this arm *T*, so that when the rock-shaft *D* is actuated the arm *N* will contact with the arm *T* and rock the shaft *S* in the opposite direction. An arm *T'* extends down from the rock-shaft *S*, and to this is connected a spring *u'*, which puts tension on the same and holds the rock-shaft normally and yieldingly in the central position. An arm *U*, provided with small counterweights *U'*, extends rearwardly from the shaft *S*, and a pitman *u* extends from this arm upwardly and pivotally connects at *t'* to the pawl *R*, already described.

We have enumerated all of the parts of the improved ribbon-reversing mechanism. It will be seen that the operation of the device is substantially as follows: We will say that the spool at the left-hand end of the machine as it is illustrated in Fig. 4 becomes unwound. The upper end of the arm *H* is

allowed to drop into the depression *h*. This allows the counterweight *H'* to rock the shaft *D* downward in that direction. The arm *D'* thus drops into contact with the arm *S'* of the rock-shaft *S*, rocking the shaft *S* downward in that direction. This throws the arm *U* upward, which through its connection throws the double pawl *R* upward, causing the teeth to engage with the under side of the ratchet-wheel *P'*. This serves to engage the same with the ratchet-wheel and forces the pitman *M* to the left, which carries with it the shaft *K*, causing the left-hand gear *a'* to engage the gear *a*, and thus wind the ribbon onto the left-hand spool. It will be seen that this is accomplished without any force being exerted by the spool or ribbon. The spool is notched merely to allow the weight *H'* to drop a little, which trips the mechanism, and the reversing is effected by the force generated by the spring-drum. When the movement of the spool is reversed, the lid *i* closes the recess *h* in the spool, and the ribbon is wound upon that spool until it is entirely unwound from the opposite spool, where a similar operation takes place by the mechanism described there, with the exception that the arm *N* on the rock-shaft *B* at the right end of the machine is extended to the opposite side of the rock-shaft *S*, and, when it is acted upon, rocks the shaft *S* in the opposite direction, which causes the upper tooth to engage the top side of the ratchet *P'* and shift the driving-shaft in that direction. The ratchet-teeth *P'* and the pawl-teeth are so shaped that when the shifting is accomplished they disengage automatically, the teeth of the pawl moving beyond the range of action of the ratchet-wheel. We accomplish the transverse movement of our ribbon preferably from the spacer-bar. The rock-shaft *F* is supported at the rear of the machine, from which arms *E'* extend upwardly at each end and are provided with links *E*, which extend forwardly and embrace annular grooves in the collars on the sleeves *L'*, which carry the ribbon-spools. An arm containing a longitudinal slot *I'* extends downwardly from the shaft *F* and embraces a wrist-pin *e'* on a disk *e*, carried by a ratchet-wheel *J'* on the pin *J''* on a bracket *J*. A detent-pawl *f* prevents backward movement of the ratchet, and the actuating-pawl *g* is connected to the spacer-bar lever *g'* and is held in normal engagement by a spring *g''*, whereby on every movement of the spacer-bar a step-by-step movement will be imparted to the ratchet *J'*, which, of course, owing to the connection of the arm *I*, rocks the shaft *F* and carries the ribbon-spools back and forth, thereby imparting movement to them and moving them laterally across the printing-space, whereby the complete surface of the ribbon will be utilized for writing purposes.

Back toward the rear ends of the spool-axle and to the frame-top *A'* is hinged our improved ribbon-guide, the same being supported by piece *v*, which is secured to the top of the top plate *A'* and has a pivot like a hinge at the back, on which the ribbon-guide is hinged. The ribbon-guide is made up of forwardly-extending end pieces *V' V'*, which extend preferably beyond the farthest point of the lateral movement of the ribbon. The central plates *V V* are separated from the parts *V' V'* by suitable slots and are arranged to extend over the top of the ribbon, a considerable space being left at the center for the ribbon to be driven upward by the impact of the type into contact with the platen above. These parts *V V* and *V' V'* are preferably formed from a single sheet of metal. Beneath the parts *V V* and to each side of the central recesses or apertures are fingers *v' v'*, on which the ribbon rests and over which it plays freely, it being a very satisfactory support for ribbon in this position. The parts *V*, *V'*, and *v'* are not connected together at the front, but are left open, so that the ribbon can be slipped in between them into the proper relation without the necessity of threading through the apertures in the plate, which is now in common practice with many type-writer manufacturers. The forward ends of the parts *V* are slightly upturned to insure the proper deflection of the paper in passing over them and also to afford a broad throat or space for the insertion of the ribbon from the front. It will thus be observed that our improved ribbon-guide serves also in a measure as a paper-guide and prevents unnecessary contact of the paper with the ribbon, also insuring that the ribbon will contact with the paper only at the printing-point. The paper-guide feature of the portions *V* is supplemented by an auxiliary paper-guide *w w* at each end, substantially of the same form as the parts *V*, clearly appearing in Fig. 1 as well as in Fig. 10.

We have described the features of our improved mechanism minutely in detail, because they are in the form which we consider most practical and most efficient. We desire to remark, however, that the details can be greatly varied without departing from our invention.

The particular form of spring and arms and pawls which we have employed can of course be indefinitely varied. We desire to state also that we are aware that while we believe the means we have shown for supporting the spools is especially well adapted for these purposes there are other means which might be provided that would cooperate very satisfactorily with the remaining mechanism. We also desire to remark that our improved reversing mechanism is adapted to different styles of type-writers and that our tripping mechanism might be made use of in

connection with other actuating means than those we have illustrated for shifting the ribbon-actuating mechanism.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a type-writing machine, the combination of a pair of ribbon-spools mounted upon suitable shafts, one at each side of the machine, and movable longitudinally thereon and revoluble therewith; means for revolving the said spools in conjunction with the carriage-spring mechanism; a ratchet *J'* fixed on the shaft *J''*, arranged transversely across the machine toward the rear thereof; a pawl *G* pivotally connected to the word-spacer lever *G'*, arranged to engage said ratchet; a spring *g'* for urging the said pawl into the engaging position; a detent-pawl *f* to engage the teeth of the ratchet; a rock-shaft *F* extending transversely across the machine toward the rear thereof; upwardly-extending arms *E'* toward each end of said shaft; links *E* connected to the upper ends of said arms *E'*, with suitable collars on the said spools; a downwardly-extending arm *I* on said rock-shaft *F*, having a longitudinal slot therein; a wrist-pin *e'* carried by the ratchet *J'* to engage the slot *I'*, coacting together, whereby the upward movement of the spacer-bar rotates the ratchet and through its connections shifts the ribbon alternately at intervals.

2. The combination in the ribbon mechanism for a type-writer of the spool having thin flanges *c c* at each end, the spool being adapted to reciprocate along its shaft; a shaft *b* parallel with the spool-shaft; a spool *d'* with suitable flanges at its end on the shaft *b* extending between the flanges *c c* and adapted to be carried in a longitudinal direction by the said spool, coacting for the purpose specified.

3. The combination of a ribbon-spool longitudinally movable on its shaft; a shaft parallel with said ribbon-shaft and outside of the flanges of the spool; a guide adapted to reciprocate and rotate on the said second shaft with projecting flanges to engage the ribbon-spool, whereby it will be shifted in unison with said spool for the proper guiding of the ribbon.

4. In a type-writing machine, the combination of an inking-ribbon; ribbon-spools mounted on suitable shafts *C*, said spools having cores *L* of wood, or like material, with a groove *h* running lengthwise of the same; rock-shafts *D*; arms *H* having counterbalances *H'* mounted on said shafts said arms being adapted to bear against said spool-cores, and to engage the groove *h* therein; a shaft *K* having oppositely-facing gears *a'* toward each end; gears *a* fixed to said shafts *C*; a drum *P* supported on a suitable shaft to which is secured a beveled

gear *O'*; gear *m''* on said shaft *K* adapted to mesh with said gear *O'* whereby said shaft *K* is revolved; a ratchet-wheel *P'* on said drum; a double pawl *R* having a pitman *M*; a collar *M'* on said shaft *K* secured to said pitman *M*; springs *l* carried by said shaft bearing against said collar a rock-shaft *S*; arms *S'* and *T* on the said shaft *S*; arms *D'* and *N* on the shafts *D D*, adapted to engage the arms *S'* and *T* respectively as the shafts *D* are rocked; an arm *U* having a counterbalance *U'* on the said shaft *S*; a spring *u'* secured to an arm *T'* on the said rock-shaft *S* whereby the same is held normally in one position; a pitman *u* extending from said arm *U* to the said double pawl *R* whereby the said pawls are caused to alternately engage the said ratchet-wheel *P'* to automatically shift the shaft *K*, substantially as described and for the purpose specified.

5. In a type-writing machine, the combination of an inking-ribbon; ribbon-spools mounted on suitable shafts *C*; rock-shafts *D*; arms *H* having counterbalances *H'* mounted on said shafts, said arms being adapted to bear against said spool; a shaft *K* having oppositely-facing gears *a'* toward each end; gears *a* fixed to said shafts *C*; a drum *P* supported on a suitable shaft to which is secured a beveled gear *O'*; a gear *m''* on said shaft *K* adapted to mesh with said gear *O'* whereby said shaft *K* is revolved; a ratchet-wheel *P* on said drum; a double pawl *R* having a pitman *M*; a collar *M''* on said shaft *K* secured to said pitman *M*; springs *l* carried by said shaft *K* bearing against said collar; a rock-shaft *S*; arms *S'* and *T* on the said shaft *S*; arms *D'* and *N* on the shafts *D D* adapted to engage the arms *S'* and *T* respectively as the shafts *D* are rocked; an arm *U* having a counterbalance *U'* on the said shaft *S*; a spring *u'* secured to an arm *T'* on the said rock-shaft *S* whereby the same is held normally in one position; a pitman *u* extending from said arm *U* to the said double pawl *R* whereby the said pawls are caused to alternately engage the said ratchet-wheel *P'* to automatically shift the shaft *K*, substantially as described and for the purpose specified.

6. In a type-writing machine, the combination of an inking-ribbon; ribbon-spools mounted on suitable shafts *C*, said spools having cores *L* of wood, or like material, with a groove *h* running lengthwise of the same; rock-shafts *D*; arms *H* having counterbalances *H'* mounted on said shafts, said arms being adapted to bear against said spool-cores and to engage the grooves *h* therein; a shaft *K* having oppositely-facing gears *a'* toward each end; gears *a* fixed to said shafts *C*; a drum *P* supported on a suitable shaft to which is secured a beveled gear *O'*; a gear *m''* on said shaft *K* adapted to

mesh with said gear O', whereby said shaft K is revolved; a ratchet-wheel P' on said drum; a double pawl R having a pitman M; a collar M' on said shaft K secured to said pitman M; springs *l* carried by said shaft, bearing against said collar; a rock-shaft S; arms S' and T on said shaft S; arms D' and N on the shafts D D adapted to engage the arms S' and T respectively as the shafts D are rocked; an arm U having a counterbalance U' on the said shaft S; a pitman *u* extending from the said arm U to the said double pawl R whereby the said pawls are caused to alternately engage the said ratchet-wheel P' to automatically shift the shaft K, substantially as described and for the purpose specified.

7. In a type-writing machine, the combination of an inking-ribbon; ribbon-spools mounted on suitable shafts C; rock-shafts D; arms H having counterbalances H' mounted on said shafts, said arms being adapted to bear against said spools; a shaft K having oppositely-facing gears *a*' toward each end; gears *a* fixed to said shafts C; a drum P supported on a suitable shaft to which is secured a beveled gear O'; a gear *m*'' on said shaft K adapted to mesh with said gear O' whereby said shaft K is revolved; a ratchet-wheel P' on said drum; a double pawl R having a pitman M; a collar M' on said shaft K secured to said pitman M; springs *l* carried by said shaft bearing against said collar; a rock-shaft S; arms S' and T on the said shaft S; arms D' and N on the shafts D D adapted to engage the arms S' and T respectively as the shafts D are rocked; an arm U having a counterbalance U' on the said shaft S; a pitman *u* extending from said arm U to the said double pawl R, whereby the said pawls are caused to alternately engage the said ratchet-wheel P' to automatically shift the shaft K, substantially as described and for the purpose specified.

8. In a type-writing machine, the combination of an inking-ribbon; ribbon-spools mounted on suitable shafts C; rock-shafts D; arms H having counterbalances H' mounted on said shafts, said arms being adapted to bear against said spools; a shaft K having oppositely-facing gears *a* toward each end; gears *a* fixed to said shafts C; a drum P supported on a suitable shaft to which is secured a beveled gear O'; a gear *m*'' on said shaft K adapted to mesh with said gear O' whereby said shaft K is revolved; a ratchet-wheel P' on said drum; a double pawl R having a pitman M; a collar M' on said shaft K secured to said pitman M; a rock-shaft S; arms S' and T on the said shaft S; arms D' and N on the shafts D D adapted to engage the arms S' and T respectively as the shafts D are rocked; an arm U having a counterbalance U' on the said shaft S; a pitman *u* extending

from said arm U to the said double pawl R whereby the said pawls are caused to alternately engage the said ratchet-wheel P' to automatically shift the shaft K, substantially as described and for the purpose specified.

9. In a type-writing machine, the combination of an inking-ribbon; ribbon-spools mounted on suitable shafts C; rock-shafts D; arms H having counterbalances H' mounted on said shafts, said arms being adapted to bear against said spools; a shaft K having oppositely-facing gears *a*' toward each end; gears *a* fixed to said shafts C; a drum P supported on a suitable shaft to which is secured a beveled gear O'; a gear *m*'' on said shaft K adapted to mesh with said gear O' whereby said shaft K is revolved; a ratchet-wheel P' on said drum; a double pawl R connected to said shaft K; a rock-shaft S; arms S' and T on the said shaft S; arms D' and N on the shafts D D adapted to engage the arms S' and T respectively as the shafts D are rocked; an arm U having a counterbalance U' on the said shaft S; a pitman *u* extending from said arm U to the said double pawl whereby the said pawls are caused to alternately engage the said ratchet-wheel P' to automatically shift the shaft K, substantially as described and for the purpose specified.

10. In a type-writing machine, the combination of an inking-ribbon; ribbon-spools therefor mounted on suitable shafts C; rock-shafts D, having arms H with counterbalances H', said arms being adapted to bear against said spools; a shaft K having oppositely-facing gears toward each end; gears *a* fixed to said shafts C; a drum P supported on a suitable shaft to which is secured a beveled gear O' adapted to mesh with suitable gear on said shaft K, whereby said shaft is revolved; a ratchet-wheel on said drum; pawls connected to said shaft K; a rock-shaft S having arms S' and T; arms D' and N on said shafts D, adapted to engage said arms S' and T respectively as the shafts D are rocked; connections from said rock-shaft S to the said double pawl whereby the pawls thereof are caused to alternately engage said ratchet-wheel to automatically shift the said shaft K, for the purpose specified.

11. In a type-writing machine, the combination of an inking-ribbon; ribbon-spools therefor mounted on suitable shafts C; rock-shafts D having arms H with counterbalances H', said arms being adapted to bear against said spools; a shaft K having oppositely-facing gears toward each end; gears *a* fixed to said shafts C; a drum P supported on a suitable shaft to which is secured a beveled gear O' adapted to mesh with suitable gear on said shaft K, whereby said shaft is revolved; a ratchet-wheel on said drum; pawls connected to said shaft K; connections from said shafts D to said pawls, whereby they

are caused to alternately engage said ratchet-wheel, for the purpose specified.

12. In a type-writing machine, an automatic ribbon-reversing mechanism comprising the combination of revoluble ribbon-spools mounted upon suitable shafts; weighted arms adapted to bear upon said ribbon or spools; pawls adapted to engage a ratchet traveling with the drum, one of said pawls engaging said ratchet from above and the other from below; connections between said weighted arms and said pawls to shift the same and throw them alternately into and out of engagement and connections between said pawls and the ribbon-reversing device, substantially as described.

13. In a type-writing machine, a device for automatically reversing the direction of the travel of the inking-ribbon when the end of the same is reached, comprising weighted arms or trips adapted to bear upon said ribbon or spool; a ratchet-wheel actuated from the carriage-driving drum; pawls adapted to cooperate with the same; connections between said pawls and ribbon-reversing device; and connections between said pawls and said weights, substantially as described.

14. In a ribbon mechanism for typewriters, the combination of ribbon-spools; a reversing-gear therefor; a pitman yieldingly connected to the reversing-shaft to shift the same longitudinally; a ratchet-wheel on the spring-drum for the carriage; a forked pawl embracing said ratchet-wheel for actuating the pitman alternately in opposite directions; connections to a suitable trip released by the operation of the spools for shifting the said pawl to engage the said ratchet-wheel to actuate the pitman to reverse the ribbon mechanism, as specified.

15. In a ribbon mechanism for typewriters, the combination of ribbon-spools; a reversing-gear therefor having the usual longitudinally-movable shaft; connections from said shaft to the spring-drum for the carriage; a tripping device cooperating with the ribbon-spools to couple the connections from the reversing-shaft to the spring-drum of the carriage, for the purpose specified.

16. In a ribbon-movement for typewriters, the combination of ribbon-spools; a reversing-gear therefor having a shifting means; connections from said shifting means to the spring-drum for the carriage; a tripping device cooperating with the ribbon-spools to couple the connections from the reversing means to the spring-drum of the carriage, for the purpose specified.

17. In a type-writing machine, the combination of a ribbon-spool having an enlarged body with a recess in one side thereof; a shifting shaft having gears mounted thereon for actuating the said spools alternately; an arm held yieldingly in contact with the said spool,

the end being arranged to drop into the recess in the side of the spool-body; a shifting mechanism for shifting said shaft; an intermediate trip connected to said arm to throw said shifting shaft into connection with a moving part of the machine, which is independent of the said ribbon-spools, whereby the reverse mechanism will be tripped by the descent of the said yielding arm into the recess in said spool, for the purpose specified.

18. The combination of a ribbon-spool having an enlarged body with a recess in one side thereof; a trip-arm with a portion arranged to rest against said spool and the ribbon thereon, and arranged to drop into the recess in the body thereof when the ribbon is unwound; a reversing mechanism for said ribbon-spool, connected to a moving part of the type-writer operatively independent of the said spools; a connection from said trip-arm to said reversing mechanism, whereby the movement of the said trip-arm in descending into the recess in the spool-body will throw the said reversing mechanism into operation, as specified.

19. In a ribbon mechanism for typewriters, the combination with the top of the machine of a hinged sheet-metal guide having extended portions $V' V'$ at each end, adapted to extend under the ribbon; central portions $V V$ separated from the parts $V' V'$, extending above the ribbon and curved slightly upward at their forward ends, having a space between them for the deflection of the ribbon against the platen; fingers $v' v'$ extending beneath the ribbon at each side of the open central space, which parts are open at the front, coacting for the purpose specified.

20. In a ribbon mechanism for typewriters, the combination with the top of the machine of a sheet-metal guide having extended portions $V' V'$ at each end adapted to extend under the ribbon; central portions $V V$, separated from the parts $V' V'$, extending above the ribbon and curved slightly upward at their forward ends, having a space between them for the deflection of the ribbon against the platen; fingers $v' v'$ extending beneath the ribbon at each side of the open central space, which parts are open at the front, coacting for the purpose specified.

21. In a ribbon mechanism for typewriters, the combination of a ribbon-guide consisting of sheet metal suitably slotted through to the front for the insertion of the ribbon without threading; a hinge to the rear of the same arranged and extending in the direction of the ribbon, whereby the ribbon-guide can be swung up and back for the convenient insertion of the ribbon into the slots, for the purpose specified.

22. In the ribbon mechanism for a typewriter, the combination of a suitable ribbon-guide having plates or fingers engaging the

5 ribbon to support it in position, the upper ones of which are curved slightly upward at their forward ends for the purpose of deflecting the paper; auxiliary paper-guides supported on the frame of the machine, curved slightly upwardly at their forward ends, to each end of the ribbon mechanism, for the purpose specified.

In witness whereof we have hereunto set our hands and seals in the presence of two witnesses.

WILLIAM R. FOX. [L. s.]

GLENN J. BARRETT. [L. s.]

Witnesses:

EDWARD G. MATTER,
G. K. McMULLEN.