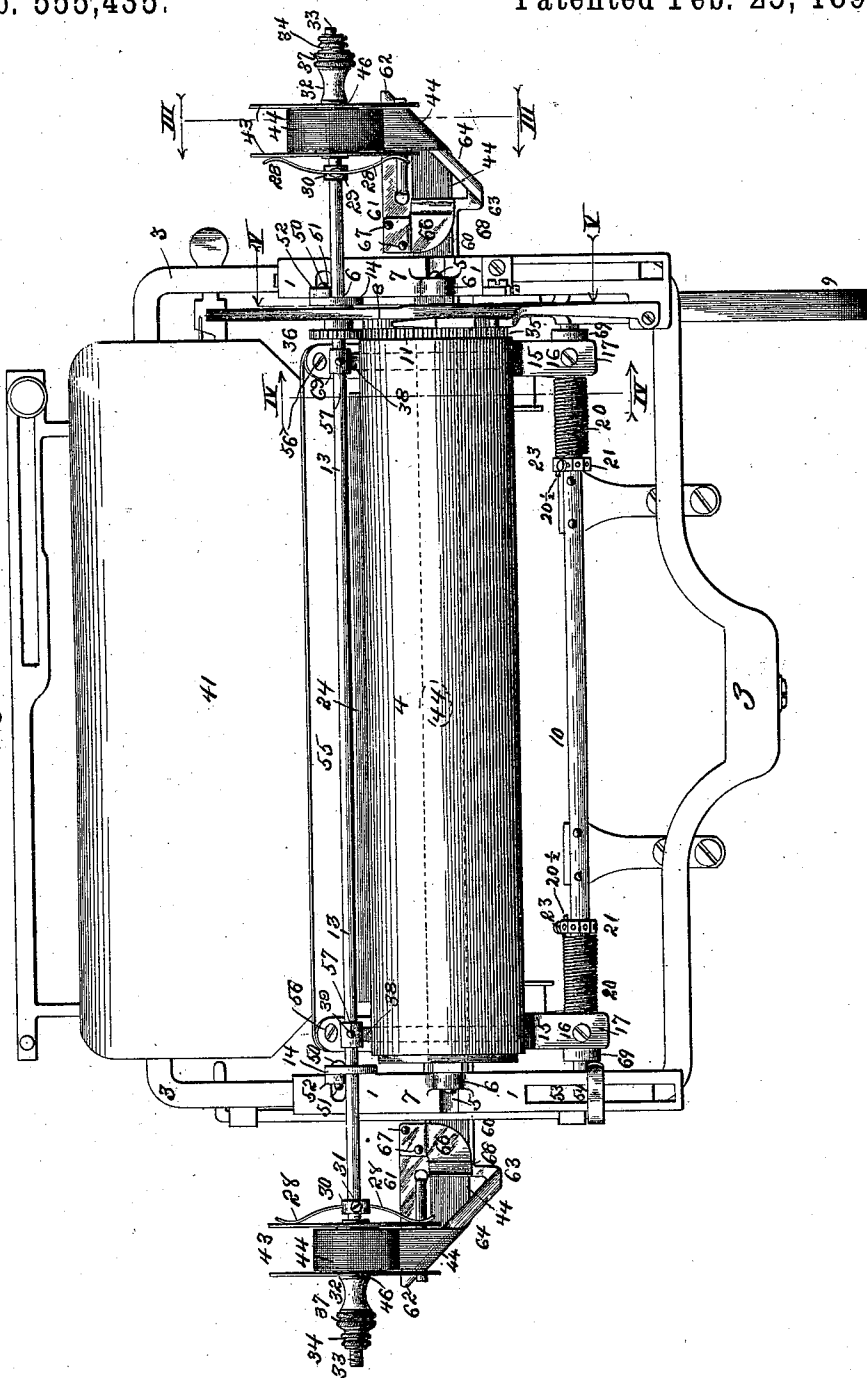


4 Sheets—Sheet 1.

DUPLEX RIBBON MECHANISM FOR TYPE WRITING MACHINES.

Patented Feb. 25, 1896.



Witnesses:
W. H. A.
Walter E. Allen.

Inventor:
John T. Davis.
By Knights Bros. Attys

(No Model.)

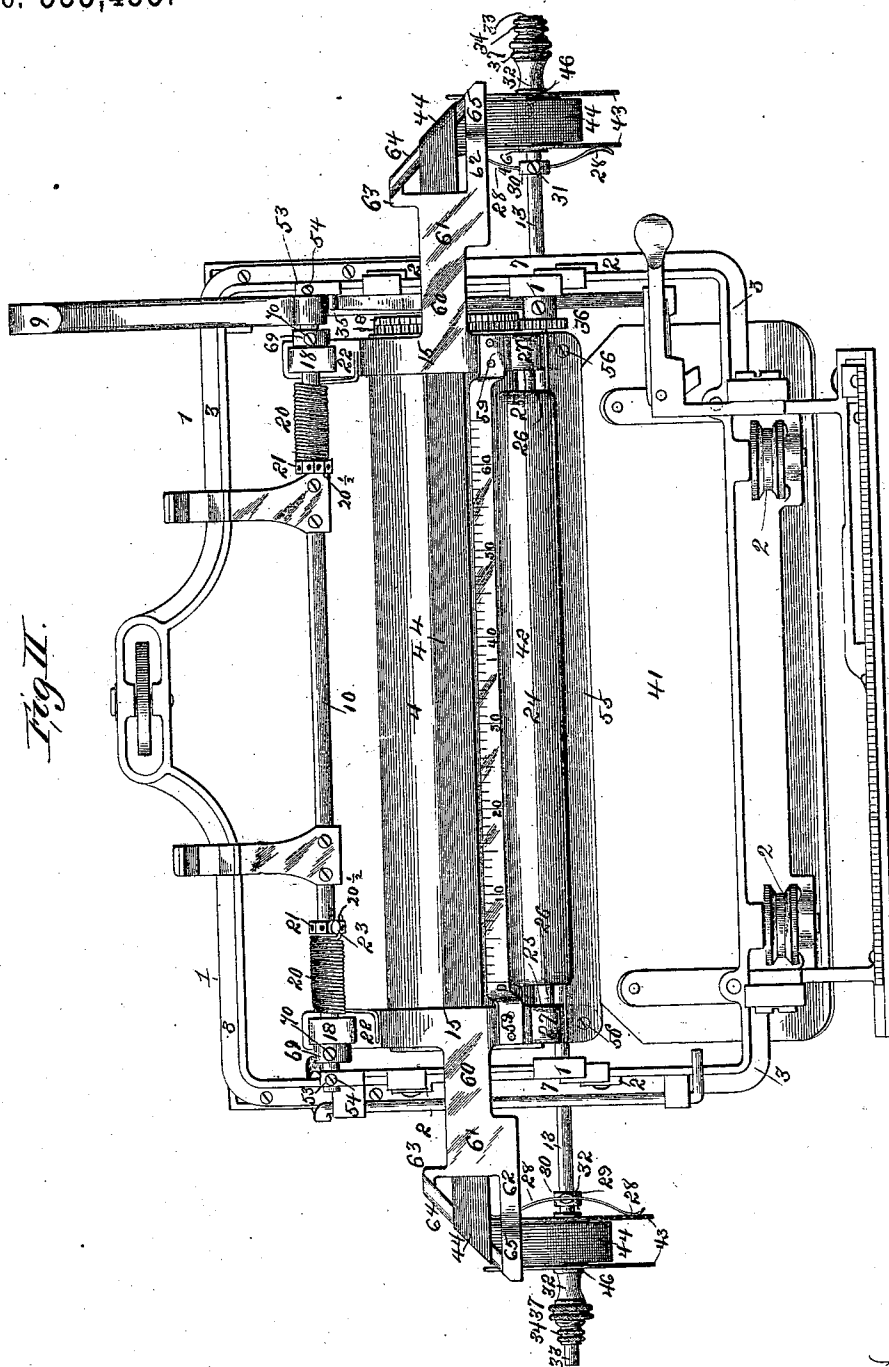
4 Sheets—Sheet 2.

J. T. DAVIS.

DUPLEX RIBBON MECHANISM FOR TYPE WRITING MACHINES.

No. 555,435.

Patented Feb. 25, 1896.



Witnesses:
Wm. H. Allen
Walter E. Allen.

Inventor
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Atty.

J. T. DAVIS.

DUPLEX RIBBON MECHANISM FOR TYPE WRITING MACHINES.

No. 555,435.

Patented Feb. 25, 1896.

Fig. III.

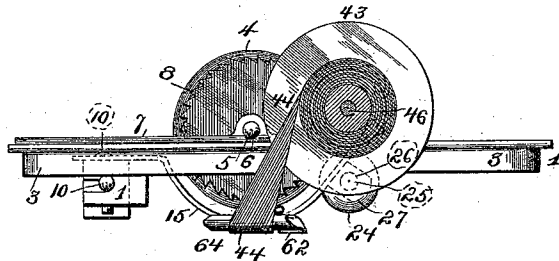


Fig. IV.

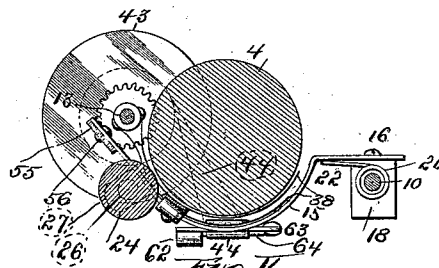


Fig. V.

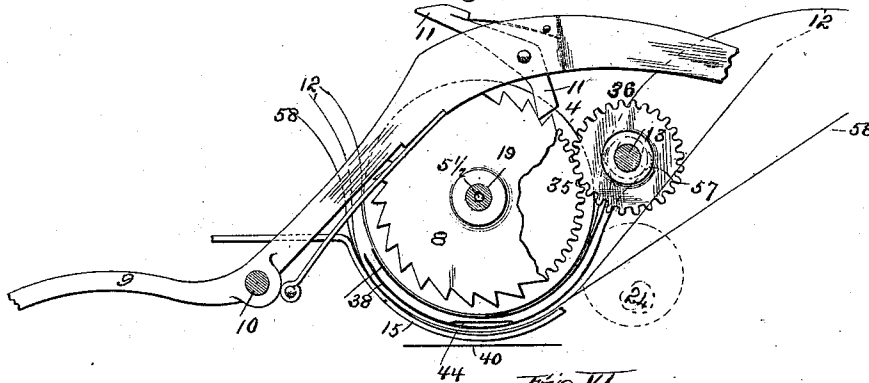
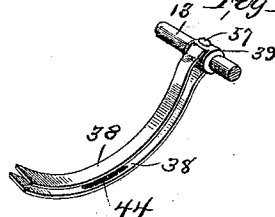


Fig. VI.



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J. T. DAVIS.

DUPLEX RIBBON MECHANISM FOR TYPE WRITING MACHINES.

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Fig. VII.

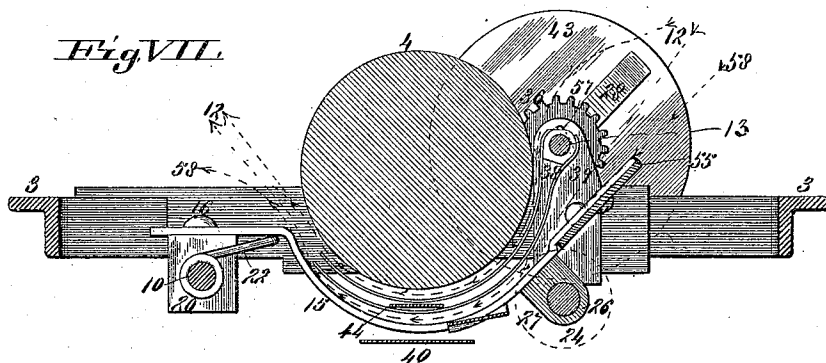


Fig. VIII.

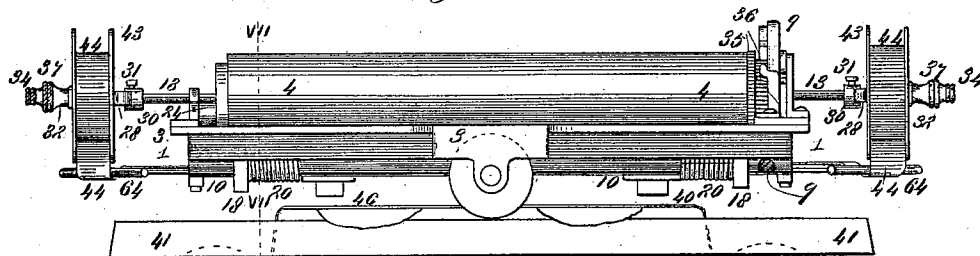
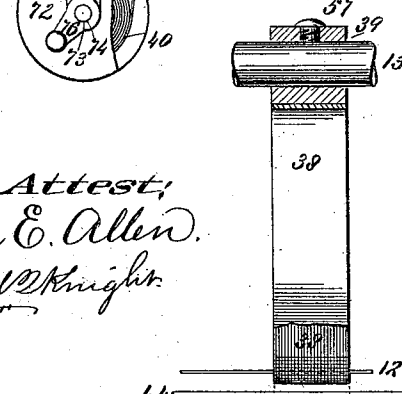
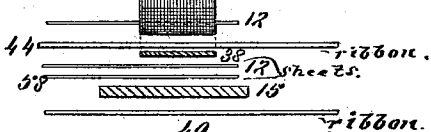


Fig. IX.



Attest;
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Edward D. Knight.

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By Knight Bros.
Attys.



UNITED STATES PATENT OFFICE.

JOHN T. DAVIS, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO
CHARLES J. MOFFETT, OF SAME PLACE.

DUPLEX-RIBBON MECHANISM FOR TYPE-WRITING MACHINES.

SPECIFICATION forming part of Letters Patent No. 555,435, dated February 25, 1896.

Application filed July 18, 1892. Serial No. 440,373. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. DAVIS, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Duplex-Ribbon Multiple-Copy Type-Writing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

10 This invention relates to a type-writing machine, in which, besides the usual ink-ribbon, there is combined a supernumerary ink-ribbon that is automatically fed, and which supernumerary ink-ribbon passes through between two additional or transcript sheets of paper, which are printed to effect a multiple copy or reproduction of the original, or beneath a single sheet to effect a single reproduction, as the case may be, while simultaneously the usual sheet of paper passes beneath said supernumerary parts and surmounts the usual type-ribbon that effects the initial typographic impression when tapped by the type, each tap of the type thus simultaneously
15 printing the respective two or three sheets by the respective transfer of ink from said duplex ink-ribbons; and the invention consists in features of novelty hereinafter fully described and pointed out in the claims.

30 Figure I is a top view of the machine and its carriage and shows the supernumerary ribbon-spools, the supernumerary ink-ribbon, the gear-drive that controls the movement of said ribbon, and the tension that withstands the too-free response to said control. Fig. II is an inverted view of the same and shows the supernumerary spools set at a right angle to the course of the ribbon when printing and shows the means for effecting the angle turn
35 of said ribbon into line with its work. It also shows the paper-guide bands with the coil-springs that support said bands, the printing and drive pressure rollers, and the gear-drive that effects the movement of the supernumerary ink-ribbon spools. Fig. III is a vertical section taken on line III III, Fig. I, and shows the printing-roller, the drive pressure-roller, one of the ink-ribbon spools, and the ink-ribbon mounted on said spool with the means for
40 effecting the angle-turn of said ribbon into line with its work. Fig. IV is a vertical sec-

tion taken on line IV IV, Fig. I, and shows the printing and drive pressure rollers, one of the ink-ribbon spools, and one of the guide-bands or major paper-rests, its spring bearer-
45 support, and the separating-bands that intervene between the transcript-sheets. Fig. V is a vertical section taken on line V V, Fig. I, and shows the printing-roller mounted on its journal-shaft, the drive-gear by which it operates the pay-out of the ribbon-spools, the major and minor paper-rests, the initial and supernumerary ink-ribbon, the course of the transcript-sheets, and the rocking lever mounted on the rest-band bearer-shaft. Fig. VI is a
50 perspective detail of the combined paper-guide rod and spool-bearer and shows the separating-bands or minor upper paper-rests and also shows a detail of the supernumerary ink-ribbon passing between said bands. Fig. VII is an enlarged vertical section taken on line VII VII, Fig. VIII, and shows the printing-roller, the secondary drive gear-wheel, the paper-guide rod and supernumerary-spool holder, one of the supernumerary
55 spools, the rest-band bearer-shaft, the major guide-band paper-rest, the spring bearer-arms that support said rests, the minor supernumerary duplex guide-band paper-rests, the triplicate letter-sheets, shown in broken lines, the usual ink-ribbon, and the supernumerary ink-ribbon. Fig. VIII is an elevation
60 of the machine and shows the usual ink-ribbon and spools with the pendent-hung shafts on which said spools run. It also shows the printing-roller, the supernumerary spool-carrier shaft, the operative geared connection of said roller to said shaft, the supernumerary ribbon-spools, the ribbon mounted on said spools, the angle guide-transposing arm that
65 diverts the course of said supernumerary ribbon, and the tension-springs that maintain an elastic friction-hold of said supernumerary spools; and Fig. IX is an enlarged rear elevation, the upper part in section, and shows the supernumerary spool and paper-guide-carrier rod, the hub or collar mounted thereon, the set-screw that secures said mount, the duplex paper-guide rests secured to said collar, with part of the rear rest broken away to
70 disclose its coadjutant forward rest. It also shows respective details and sections of the

following parts, enumerating them in their consecutive surmounting positions: the lower ink-ribbon, the primary paper-guide rest, the primary impression-sheet, the lower supernumerary sheet, the transverse section of the rear member of the duplex paper-guide rest, the supernumerary ink-ribbon, the forward paper-guide rest, the upper supernumerary sheet, and the surmounting portion of the rear member of the duplex guide-rest.

Referring to the drawings, 1 represents the usual carriage which runs on the antifriction-rollers 2, that are journaled in the frame 3, and which carriage bears all the leading features of this device.

4 represents the printing-roller, the individual screw journal-bolts 5 of which have their bearings in the journal-boxes 6, which rise integrally from the end bars 7 of said carriage, and said individual journal-bolts engage in their screw-socket seats $5\frac{1}{2}$ in the main journal-shaft 19, on which said roller is mounted.

8 represents the usual ratchet-wheel that is rigidly secured to the drive end of the printing-roller, and 9 is the rocking line-spacing lever that is journaled on one end of the paper-rest band-bearer shaft 10, which shaft also couples together in front the end bars 7 of the carriage 1, by its rigid attachment in the open journal-boxes 53, in said end bars by means of the set-screws 54. The said rocking line-spacing lever carries a pivoted spring-pawl 11, that engages with the teeth of the rotary ratchet-wheel 8 of the printing-roller to turn said roller and line-space the printing-sheets 12 in the course of printing, which sheets are carried around or partly around said printing-roller. The movement of said sheets with their coadjutory sheet is hereinafter specifically described.

13 represents a paper-guide rod and spool-bearer, which is mounted near each end in the journal-pedestals 14, which journal-pedestals are secured to the end bars 7 of the carriage by the screw-bolts 50, the screw-tips of which bolts are firmly held in their perforate screw-seats 51 in the integral screw-box lugs 52 that project from said end bars 7 of the aforesaid carriage. The said paper-guide rod 13 also effects the rear coupling of the end bars 7 of said carriage and carries the supernumerary ink-ribbon spools, which are adjustably mounted near its extreme ends with the ribbon-discharge of said spools at a right-angled course to that of its ultimate working direction, which latter course is transversely across said transcript-sheets 12.

15 represents the lower guide-bands or major paper-rests, which are secured to their bearer-shaft 10 by the set-screws 16, which screws pass through said bands and engage in their screw-seats 17 in the bearer-lugs 18, which lugs are mounted on said shaft 10, on which they have free bearings.

20 represents spiral springs, one end of which is secured to the perforate set-collars

21 by lugs $20\frac{1}{2}$, secured in their seats in said collar, that are mounted on said bearer-shaft 10, and the bearer-arms 22 at the other ends of said coil-springs pass under said guide-rest arms 15 and provide for them elastic spring-supports. The said set-collars 21 are arranged to be turned to tighten the springs, and when said springs are sufficiently tightened the collars 21 are secured to their adjusted set by the set-screws 23, that pass through perforations in said collars and screw tight against said shaft or to recesses therein, and thereby said spiral bearer-springs are held to their right stiffness.

24 represents the drive pressure-roller which is mounted on the bearing-shaft 25, the said shaft being straight, journaled at 26 in the bearer-studs 27, which bearer-studs are securely attached to the under side of said guide-band rests 15. The said pressure-roller 24 gets its rotary friction movement from direct contact with the aforesaid printing-roller 4, being held in said pressure-contact by said spiral springs 20, which exert their spring-tension through their pressure bearer-arms 22, via the guide-rest plates 15 and the bearer-studs 27, in which studs the shaft 25 of said pressure-roller has its captive bearings.

55 represents a transverse guide-plate that reaches across and connects with the guide-rests 15, and to the under sides at the rear ends of said guide-rests the said transverse plate is secured by the screws 56. The said plate 55 takes the paper from the hand of the operator and forms an initial guide and delivers the sheets between the printing-roller and the pressure-roller 24 and onto said guide-plates 15.

38 represent separating-bands or minor upper paper-rests, of which there are preferably two at each end, one above the other, and which rests are secured by soldering or other suitable means to the bearer-collars 39, and said collars are mounted on the aforesaid paper-guide rod and spool-bearer 13, and are secured in their adjusted position thereon by the set-screws 57. The upper one of said duplex rests or guides 38 supports and guides the upper one of the supplemental sheets 12 and separates the same, except when and where the type strikes, from the supernumerary ink-ribbon 44, and the lower one of said duplex rests or guides 38 separates said ink-ribbon at the same time from the lower supplemental sheet 12, which is a transparent or tissue sheet, and when said lower sheet 12 is not used (as it frequently is not) then said lower one of said paper rests or guides 38 separates the primary type-impression sheet 58 (that is printed by the primary ink-ribbon 40) from too-free contact with and from being blurred by said supernumerary ink-ribbon 44. The said primary type-impression sheet 58 curves round above the major guide-rests 15.

40 represents the primary ink-ribbon, which is operated by any customary devices usual

to the common forms of type-writers. 72 are the spools that carry said ribbon 40, and 73 are the shafts that carry said spools, which shafts run in journal-bearings 74 in the hangers 75 that hang pendent from the table 41, and 76 are cranks by which said spools are wound and unwound.

41 is the usual adjustable paper-table, and 42 is the usual graduated letter-spacer rule, the perforate ends of which rule are secured by screws 59 to the aforesaid major paper-guide rest 15. 69 are buffer-collars and 70 set-screws that secure said collars to the rod 10.

43 represents the duplex supernumerary ink-ribbon spools, which carry the supplemental ink-ribbon 44, and the tubular center bearing-drums 46 of said spools are mounted and run on near the respective ends of the aforesaid paper-guide rod and spool-bearer 13. The said spools are held to their adjusted positions on their bearer-rods on their respective inner sides by the double-action tension-springs 28, which springs are fast seated in the slots 29 of the collars 30, which collars are fast secured in their adjusted positions on said rod 13 by the set-screws 31, and the respective outer sides of said spools are held in position by the flanged screw-threaded lock-collars 32, which engage on their screw-seats 33 on said rod 13, and are there locked by the jam-nuts 34, and thus hold and lock said spools in their true running position. 37 are rough-scored integral rims of said lock-collars 32, which afford a firm grip to facilitate the turning of the same. The pressure of said double-action tension-springs on said respective spools is increased or diminished by the initial adjustment of the set-collars 30 that carry the double-action tension-springs and the secondary adjustment of the flanged lock-collars 32 and jam-nuts 34.

35 represents the major initial drive gear-wheel which is fast secured to the end of the printing-roller to which the ratchet-wheel 8 is secured, the said gear-wheel being located inside said ratchet-wheel.

36 represents the secondary drive gear-wheel which is fast mounted on the spool-bearer rod 13, and, as said printing-roller rotates, the said drive-gear rotates said spool-bearer rod.

60 represents the laterally-divergent necks that project outwardly from the aforesaid guide-band rests 15 with which they are integral, and 61 are expanded integral head-plates that extend outwardly from said necks. 62 are major horns and 63 minor horns that respectively project from the outer corners of said head-plates. The said horns carry the integral angle rods or tubes 64, around which angle-rods the ink-ribbon from the spools turns at an angle of forty-five degrees, so as to run transversely across between the transcript-sheets in the line of printing from spool to spool. The major horns which pass under the spools have curvilinear bends 65 to avoid interference with said spools. The said super-

numerary ink-ribbon 44 travels from one of said angle-turn rods or tubes 64 to the other, by which angle-turn said ribbon is diverted, respectively, to and from longitudinal coincidence with the printing-roller 4. The said ribbon passes at each end of its operative position to and fro between the respective duplex paper-guide rests 38, which guide-rests both guide and steady said ribbon and the supernumerary sheets 12 it prints, and hold the same from flirting when the type strikes, thereby producing a much clearer impression.

Now it will be seen that when the type is made to strike and print (by the usual operative means) the ink-impression from the lower usual ribbon, 40, is printed on the lower usual sheet, 58, and the impression from the upper supplemental ribbon, 44, is printed on the upper supplemental transcript sheet or sheets 12, as the case may be. Also it will be seen that as the upper or supplemental ribbon would otherwise print a reverse copy on the back of the lower or usual printed sheet 58 it is preferred to have two of said supplemental sheets 12, as shown in Fig. V, and still more clearly shown in the enlarged Figs. VII and IX, the lower one of said two sheets being preferably of thin texture so that the impression, which, unlike that on either of the other sheets, is reversed, can be easily read through from the back side, so as to read straight forward instead of backward. By the printing of said extra sheet the back of the lower printed sheet is preserved clean and an extra sheet is printed besides the original or lower sheet on the one hand and the upper supplemental sheet on the other hand. The said extra intervening sheet besides said preservative effect on the lower type-written sheet is useful as a file copy of the correspondence or writing.

I have described the attachment of my supernumerary ink-ribbon spools 43 on the bearer-rod 13 at a right-angle to the usual position of ink-ribbon spools, and the ink-ribbon from said spools being reeled respectively off and on at a right-angled course to that of its working position in which it lies and travels transversely across the sheets being printed, the said ink-ribbon being led to said right-angled divergent course to that in which it respectively leaves and is returned to the spools by the angle rods or tubes 64. The said ribbon on its way to the guide-band 15 passes smoothly over the expansion head-plate 61 and neck-plate 60, both of which are integral with said guide-bar 15 and is thereon held to its true working course by the tension-pressure spring-plates 66, the perforate ends of which springs are secured to the upper side of said head-plates 61 by the screws or rivets 67 and the working lips 68 of said springs (which lips are at an angle to the body of said spring) press transversely across the moving ink-ribbon and hold it smoothly down to said head-plate in a direct course for the line of printing.

By the above elements of the device that regulate and control the movement of the supernumerary ink-ribbon sufficient tension-holds are provided to keep it taut and smooth in its straight working course, and said supernumerary ink-ribbon is still further held from
 5 flirting when the type strikes and from any injurious bound and rebound therefrom by its location between the separating-bands or
 10 minor paper-rests. (See Fig. VI.) The supernumerary transcript-sheets 12 are also separated from each other and from contact with said ink-ribbon, except when printing, by said separating-bands 38, and thus said
 15 sheets between the letters and between the lines are kept clean from the soil of ink; and, further, it will be seen that when, as stated above, sometimes the usual ink-ribbon 40 and the primary type-impression sheet 58 are
 20 (as in some contingencies it is advisable that they should be) dispensed with, not only does the writing by means of the supernumerary ribbon 44 and the supernumerary duplex sheets proceed as effectively as before, but
 25 also as the lower supernumerary sheet is between the type and the supernumerary ink-ribbon the type remains perfectly clean and makes a clearer and better-defined impression than can any type that is contaminated
 30 and gummed up with ink. Still further, it will be seen that when in still other contingencies it may be desired to make only a single copy both the original ink-ribbon 40, the original sheet 58, and also the lower one of the
 35 supernumerary sheets may all be dispensed with or removed, and then without any other change to the machine or material a single impression on a single sheet will be made with as perfect an impression of the type as can
 40 otherwise be effected.

In conclusion it will thus be seen by the specific description that by this machine triplicate primary ink-impressions are made, each impression of which is indelible and will make
 45 a press copy and not merely a carbon or other transient copy; and also the said combination of elements are respectively adjustably attachable and detachable without either interfering with or detracting from the opera-
 50 tive ability of other members of the combination, so as to effect the diverse work of two or three machines in offices where at different times, respectively, single, double or triplicate ink-impressions are required to save both
 55 the room and expense of additional machines.

I claim as my invention—

1. In a type-writer attachment, the combination of multiple ink-ribbons for effecting multiple copies, the multiple sheets on which
 60 said copies are impressed and the guide-band rests that carry and separate said sheets; substantially as described,

2. In a type-writer attachment, the combination of ink-ribbon 40, the ink-ribbon 44,
 65 the multiple sheets that are impressed by the type-driven contact of said ink-ribbons, the guide-band major paper-rests 15 and the sepa-

rating minor paper-rests 38; substantially as described.

3. In a type-writer attachment, the combination of the spools 72, the lower ink-ribbon 40 carried by said spools, the carriage, the printing-roller 4 mounted on said carriage, the combined paper-guide and spool-bearer rod 13, also mounted on said carriage, the
 70 supernumerary spools 43 mounted on said rod; and the supernumerary ink-ribbon 44, mounted in said supernumerary spools substantially as described.

4. In a type-writer attachment, the combination of the carriage, the printing-roller 4, and its journal-shaft 19 mounted on said carriage, the combined paper-guide and spool-bearer rod 13, the spools 43 mounted on said rod, the major drive gear-wheel 35 fast
 75 mounted on one end of said printing-roller, and the secondary drive gear-wheel 36 fast mounted on said spool-bearer rod 13; substantially as described.

5. In a type-writer attachment, the combination of the carriage, the printing-roller mounted on said carriage, the rest-band-bearer shaft 10, the paper-guide-rest band 15 mounted on said shaft, the perforate set-collars 21, the set-screws 23, the spiral springs
 80 20, the bearer-arms 22; the ribbon-spools 72, the ink-ribbon 40 mounted on said spools, the supernumerary spool-carrier rod 13, the supernumerary spools 43 mounted on said rod, and the supernumerary ink-ribbon 44 mounted
 85 on said spools 43, substantially as described.

6. In a type-writer attachment, the combination of the carriage, the printing-roller mounted on said carriage, the combined paper-guide rod and spool-bearer 13, the duplex
 90 supernumerary spools 43 mounted on said rod, the supernumerary ink-ribbon carried by said spools, the rest-band-bearer shaft 10, the rest-band 15, mounted on said shaft, the laterally-divergent necks 60, integral with
 95 said rest-bands, the expanded integral head-plates 61, that project from said necks, the major horns 62 and minor horns 63, mounted on the out corners of said head-plates, and
 100 the angle-bearer rods or tubes 64, that respectively divert the course of the ink-ribbon after leaving one of said spools and previous to winding on the other spool; substantially as described.

7. In a type-writer attachment, the combination of the carriage, the combined paper-guide and spool-bearer rod 13, the supernumerary spools mounted on said rod, at a right
 105 angle to that of the working course of the ribbon, the ink-ribbon carried by said spools, the rest-band-bearer shaft 10, the springs 20 mounted on said shaft, the guide-band paper-rests 15, the set-screws 16, the divergent neck-plates 60, head-plates 61, major horns
 110 62, minor horns 63 and angle-bearer rods or tubes 64, and the tension pressure-springs 66; substantially as described.

8. In a type-writer attachment, the combi-

nation of the carriage 1, the combined paper-guide rod and spool-bearer 13, the journal-bearer pedestals 14 in which said rods are mounted, the integral screw-box lugs 52, the 5 screws 50 that secure said journal-bearer pedestals to said lugs, the supernumerary spools mounted on said rod 13, the collars 30 provided with the slots 29, the set-screws 31, the double-action tension-springs 28, seated in 10 said slots 29, the lock-collars 32, having the rough-scored integral clutch-rims 37 and the jam-nuts 34; substantially as described.

9. In a type-writer attachment, the combination of the carriage, the printing-roller 4, 15 the drive pressure-roller 24, the rest-band-bearer shaft 10, the guide-band paper-rests 15, the lugs 18, the attachment-screws 16, the transverse guide-plate 55, and the attachment-screws 56; substantially as described.

20 10. In a type-writer attachment, the combination of the carriage, the combined paper-guide rod and supernumerary spool-bearer mounted on said carriage, the supernumerary spools mounted on said rod, the supernumerary ribbon carried by said spools, at a right-angled course to that of its working line, the 25 bearer-collars 39 mounted on said rod 13, the set-screws 57, the separating-bands or minor paper-rests 38 fast to said collars; substantially as described.

30 11. In a type-writer attachment, the combination of the carriage, the printing-roller,

the journal-shaft 19 of said roller, provided with the screw-sockets 5½, the journal-boxes 6, the individual screw journal-bolts 5, the 35 drive pressure-roller 24, the journal-shaft 26, and the bearer-studs 27; the guide-band paper-rests 15, the primary impression-sheet 58, the duplex paper-guide rests 38, the supernumerary spool-bearer rod 13, the supernumerary spools 43 mounted on said rod, the 40 supernumerary ink-ribbon 44 carried by said spools, said ink-ribbon held from flirting between said duplex guide-rests 38, and the supernumerary secondary and tertiary impression-sheets 12 also held from flirting when 45 struck by said duplex guide-rests 38, substantially as described.

12. In a type-writer attachment, the combination of the carriage, the printing-roller 50 mounted on said carriage, the rest-band-bearer shaft 10, the paper-guide rests 15 mounted on said shaft, the perforate set-collars 21, the set-screws 23 that secure said collars to said shaft, the spiral springs 20, having the projecting lugs 20½ that engage in 55 said set-collars 21, the bearer-arms 22, the buffer-stay collars 69 and the set-screws 70, substantially as described.

JOHN T. DAVIS.

In presence of—

BENJN. A. KNIGHT,
SAML. KNIGHT.