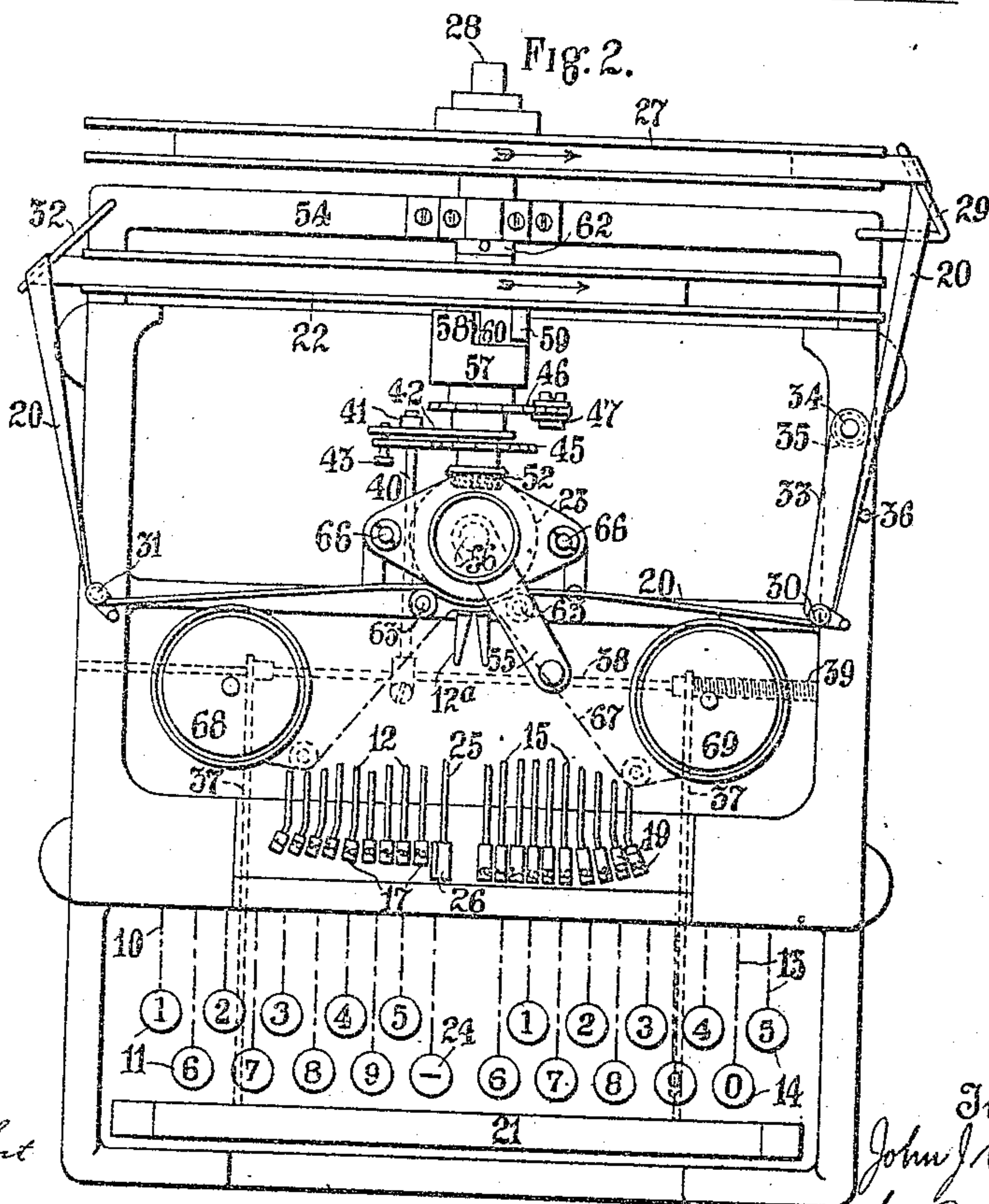
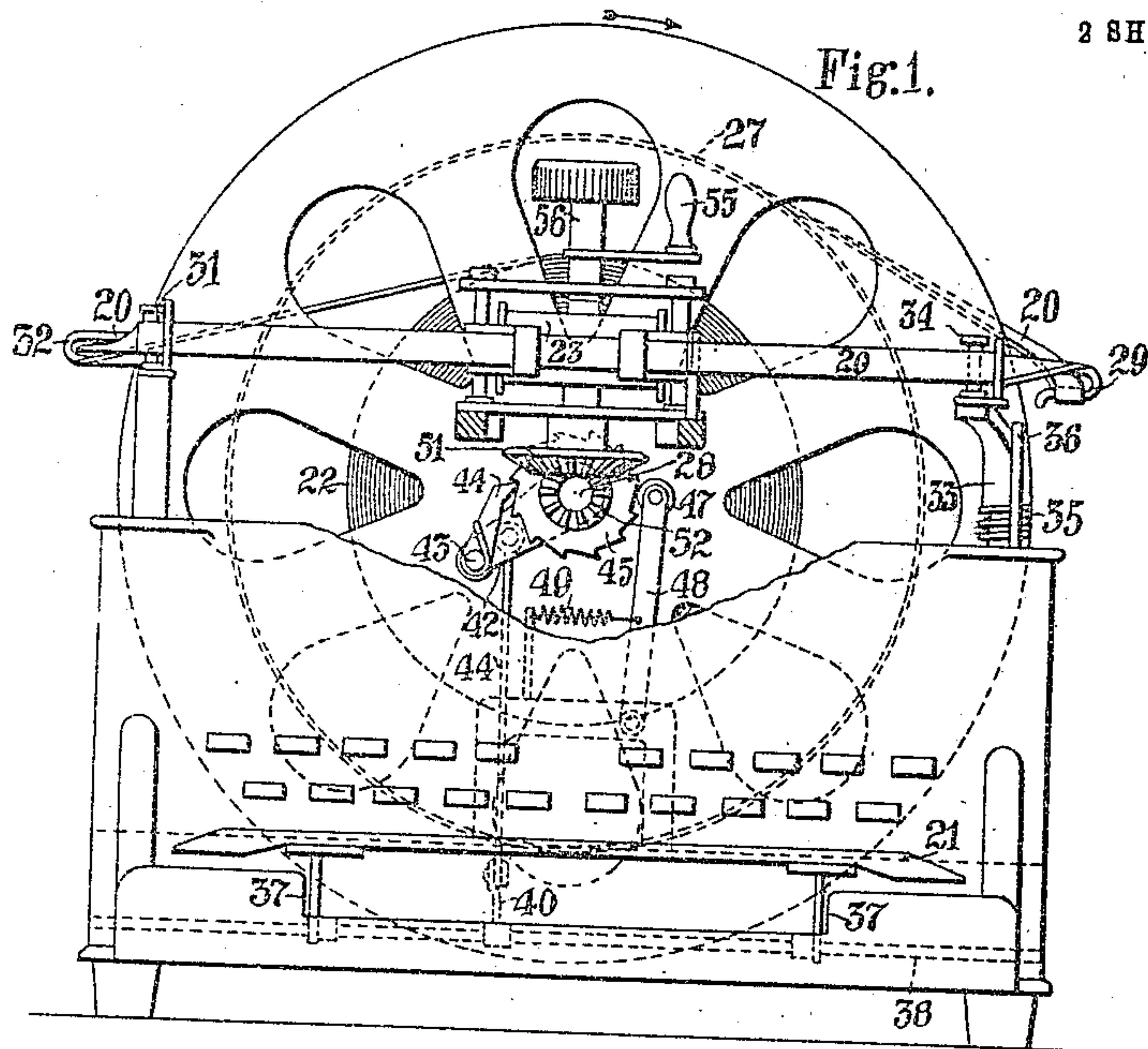


J. J. COOPER.
TYPE WRITING MACHINE.
APPLICATION FILED SEPT. 28, 1910.

991,702.

Patented May 9, 1911.

2 SHEETS—SHEET 1.

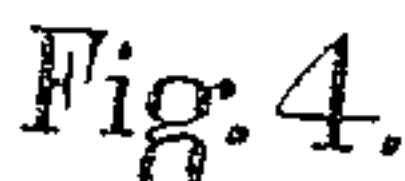
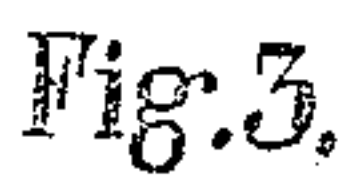


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991,702.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOHN JOSEPH COOPER, OF LONDON, ENGLAND, ASSIGNOR TO UNDERWOOD TYPE-WRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPE-WRITING MACHINE.

991,702.

Specification of Letters Patent.

Patented May 9, 1911.

Original application filed July 23, 1909, Serial No. 509,131. Divided and this application filed September 28, 1910. Serial No. 584,376.

To all whom it may concern:

Be it known that I, JOHN JOSEPH COOPER, a subject of the King of Great Britain, residing in the city of London, England, have
5 invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to typewriters and has for its object to provide an instrument
10 by means of which a series of figures, letters or other signs may be successively impressed upon a narrow ribbon of paper or tape and especially for preparing drafts by textile
15 designers for use in setting up the designs for weaving.

Letters Patent have been granted in Great Britain for this invention No. 19,474 of 1908.

Drafts have heretofore been prepared on
20 what is known as "point paper", comprising a series of ruled small squares, several of these small squares being inclosed in larger squares ruled in ink of a different color. The rows of small squares running
25 horizontally of the paper indicate the pick or filling thread, and the rows of squares running up and down or vertically of the paper indicate the warp threads. The warp
30 threads are carried by heddles or harness which are raised and lowered by means of mechanism operated by a jacquard belt or chain. The chain consists of links and bars,
35 and is at certain times wider than at others, according to the complication in the design of the weave. Each bar carries a series of
40 risers, in the form of small wheels, and sinkers, in the form of filler sleeves between the wheels, said risers and sinkers engaging with an operating jacquard mechanism in
45 the loom to raise or lower certain harness or heddles to permit a shuttle with the filling thread or woof to pass between such warp threads. Each horizontal row of
50 small squares indicates such a bar of the chain with its risers and sinkers; the risers or small wheels being usually indicated by a cross, and the squares left blank representing sinkers or filler sleeves. Assuming that
55 the first three squares are left blank, a cross in the next two, the next blank, a cross in the next three, and the next three left blank, this is read, and the chain constructed, as

follows: three down, two up, one down, three up and three down; meaning that the front three threads of the warp will be depressed, the next two raised, the next one depressed, the next three raised, and the next three depressed, and the filling thread
60 passed between such raised and lowered threads of the warp. It will readily be seen that in view of the large number of blank squares and crosses, mistakes can readily
65 be made by the chain constructor, thus spoiling the entire design of the weave.

It is one of the objects of the present invention to provide an improved means of
70 preparing drafts of a kind which can be easily read, without liability of errors.

In accordance with the present invention, a strip of paper is employed upon which
75 numbers are typewritten to form a column extending lengthwise of the strip. Each number in the column consists of two figures.

The usual letter-spacing mechanism is preferably entirely omitted from the machine; and two distinct sets of numeral keys are employed, one set for writing in the tens column and the other set for writing in the
80 units column; each set of keys having its own set of type bars; and the types being so placed that the numbers will appear in the desired order upon the strip. Line feeding of the strip is effected by a bar or
85 key, which corresponds to the usual space key in ordinary typewriting machines. This line-feeding key is connected to a spool upon which the strip is wound after being written upon.

Other features and advantages will hereinafter appear. 90

In the accompanying drawings, Figure 1 is a front elevation partly in section of an Underwood front strike writing machine modified in accordance with the present improvements. Fig. 2 is a plan view thereof. Fig. 3 is a side elevation of the machine partly in section. Fig. 4 is a sectional perspective view of the connection between the driving wheel and the winding spool. 100

At the left hand side of the keyboard of the machine is mounted upon levers 10 a complete set of numeral keys 11 numbered from 1 to 9 inclusive, these being connected

to a set of type bars shown diagrammatically at 12 and intended to print only in the tens column on the strip. On the right hand side of the keyboard there is mounted upon levers 13 a complete set of numeral keys 14 numbered from 1 to 0 inclusive and connected to a complete set of type bars 15 at the right hand side of the machine intended to write only in the units column on the strip. As usual in the Underwood typewriter, each lever 10 or 13 is connected to a sub-lever 16, the latter engaging the corresponding type bar 12 or 15. The type bars are all pivoted in an arc to strike through a common center guide 12^a, in the usual manner.

It will be seen that the type bars 12 are shorter than the type bars 15, that is, that the types 17 on the bars 12 are less remote from the type bar fulcrum rod 18 than are the types 19 on the bars 15; while the type faces lie crosswise of the bars, or at right angles to their usual positions on ordinary typewriting machines. From this construction it results that any key 11 may be struck to print a number in the tens column on the horizontal paper strip 20, and then that any key 14 may be struck to write a figure in the units column side by side with the figure previously struck in the tens column on said strip, thereby making a complete number.

The types in one set are mounted to strike above those in the other set, the types being set crosswise on the bars, to cause the impressions made by the types in one set to stand or read side by side with the impressions made by the types in the other set.

It will be understood that none of the keys 11 is capable of effecting any feeding movement of the paper, so that the strip lies motionless after the key 11 is struck and until the key 14 is struck, whereby the types operated by the two keys are caused to print side by side or caused to form a number reading transversely of the horizontal strip 20. In other words, the type 17 strikes upon the bottom edge of the strip 20, while the type 19 strikes upon the top edge of said strip, but the types both extend longitudinally of the strip, so that when the latter is removed from the machine and turned to a vertical position the numbers read naturally from left to right forming a double column extending along the strip.

The strip is fed in only one direction, that is longitudinally, and this is accomplished by means of a line feed key 21, which at each stroke effects a slight winding movement of a spool 22 to wind the strip upon the latter after it passes the platen 23. Before operating the line feed key 21, a special key 24 may be struck, this key connected to a type bar 25 having thereon a divisor type 26 consisting of an underscore, which is of

sufficient length to extend entirely across the strip thus dividing the latter up into sections, each section containing a complete number. This divisor mark has a function, which will be understood by those familiar with the weaving art, and the key 24 may be struck or not as occasion may require.

The paper strip 20 is paid off from a spool 27 at the rear of the machine; both spools being mounted on a horizontal forwardly extending shaft 28. The strip passes from the spool 27 around a fixed angle guide 29, whereby it is given a forward direction. It then runs around a pulley 30, and then across the machine in front of the platen 23 and around a vertical pulley 31, thence back to an angle guide 32 over which it folds to wind upon the driving spool 22. The pulley 30 should be yieldingly mounted to avoid liability of rupture of the weak paper strip or ribbon 20; and to this end the pulley may be mounted upon an arm 33 mounted to swing about a vertical axis 34 and yieldingly pressed outward by a spring 35 against a stop 36; the spring being coiled about the axis 34.

The line-feeding key 21 effects rotation of the spool shaft 28 by means of a pair of arms 37 carrying said key and fixed upon a rock shaft 38, which extends horizontally across the machine; a returning spring 39 being coiled around said shaft. Backwardly from the shaft extends an arm 40, from the rear end of which rises a link 41, which is pivoted at its upper end to an arm 42 loosely hung upon the spool shaft 28 and upon said arm is pivoted at 43 a driving pawl 44 to engage a ratchet 45 fixed upon the spool shaft 28. Said shaft is thus caused to turn intermittently and to drive both spools in the direction shown by the arrow at Fig. 1. Upon the shaft is also fixed a star wheel 46 engaged by a detent roll 47 mounted upon an arm 48 caused by a spring 49 to press the roll into the notches in said wheel 46, the teeth of which may be of any suitable shape. The platen 23 is cylindrical and mounted upon a vertical collar or shaft, the lower end of which carries a bevel gear 51 meshing with a pinion 52 on said paper spool shaft 28; whereby the platen 23 is caused to rotate simultaneously with the advance of the paper strip. The forward end of the shaft 28 is supported in a bracket 53; which also supports the platen and its appurtenances; the rear end of the shaft 28 being journaled in a bracket 54 fastened between the spools and carrying the angle guides 29 and 32. At any time the spool 22 may be wound by means of a crank 55 fixed upon the vertical platen axle 56.

A yielding connection is provided between the driving wheel 45 and the winding spool 22, to enable the key 21 to be depressed smartly without encountering un-

due opposition to prevent sudden severe strain upon the paper strip. A collar 57 secured upon the spool shaft 28 is diametrically recessed at 58 to receive lugs 59 formed on a collar 60, which is loose upon the shaft 28; and a spring 61 coiled about the shaft yieldingly connects the collar 57 to the collar 60. The lug 59 is so small as to permit considerable relative play of said collars.

10 When the space key 21 is struck sharply, the collar 57 turns in advance of the collar 60 and the spool 22; this movement being permitted by the spring 61; the latter serving to turn the collar 60 and spool 22 after the

15 shaft 28 and collar 57 come to rest. The collar 60, which is fixed to the wheel 22 and serves as its hub, may be frictionally connected to the shaft 28 to avoid undue accidental tension upon the paper strip. For

20 this purpose, the spring 61 may be mounted to press the collar 60 against a collar 62 fixed upon the shaft. The delivery spool 27 is loose upon the shaft 28. The strip may be confined against the platen by soft rubber rolls 63, one at each side of the printing point; and these rolls may be carried upon yielding plates 64 secured by screws 65 upon standards 66.

The types strike through a ribbon 67 carried upon spools 68, 69, which are operated in the manner usual in the Underwood typewriting machine; the ribbon being vibrated upwardly at each type stroke to cover the printing point in the usual manner. Thus

35 it will be seen that the strip may be produced having thereon the desired numbers, which will be read and understood by the operator, who sets up or prepares the apparatus for weaving.

40 While the figures occupy the relative positions of units and tens, it will be understood that they do not need to represent units and tens, but the figures in the tens column for instance may represent the number of warped threads to be depressed, while

45 the number in the units column may represent the number of warped threads to be raised; and other uses may be found for the numbered strip. The divisor line may represent one pick or one bar in a chain; that is to say, the figures (of which there may be many) between two divisor marks may represent or indicate one pick or one bar in the chain.

55 Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

This is a division of my application No. 509,131, filed July 23, 1909.

60 Having thus described my invention, I claim:

1. The combination of a spool to wind a paper strip, said spool being mounted at the rear of the machine on a horizontal forwardly extending shaft, a key to wind said

spool, a delivery spool also mounted on said shaft, angle guides for the strip adjacent to the spools, pulleys forward of the angle guides, one at each side of the machine, and a platen between said pulleys.

2. The combination of a spool to wind a paper strip, said spool being mounted at the rear of the machine on a horizontal forwardly extending shaft, a key to wind said spool, a delivery spool also mounted on said shaft, angle guides for the strip adjacent to the spools, pulleys forward of the angle guides, one at each side of the machine, and a platen between said pulleys, one of said pulleys being mounted yieldingly.

3. The combination of a spool to wind a paper strip, said spool being mounted at the rear of the machine on a horizontal forwardly extending shaft, a key to wind said spool, a delivery spool also mounted on said shaft, angle guides for the strip adjacent to the spools, pulleys forward of the angle guides, one at each side of the machine, and a platen between said pulleys, one of said pulleys being mounted yieldingly, a ratchet wheel upon said shaft, and a key operated pawl for turning said ratchet wheel.

4. The combination of a spool to wind a paper strip, said spool being mounted at the rear of the machine on a horizontal forwardly extending shaft, a key to wind said spool, a delivery spool also mounted on said shaft, angle guides for the strip adjacent to the spools, pulleys forward of the angle guides, one at each side of the machine, and a platen between said pulleys, one of said pulleys being mounted yieldingly, a ratchet wheel upon said shaft, and a key operated pawl for turning said ratchet wheel, said winding spool yieldingly connected to said shaft.

5. The combination of a spool to wind a paper strip, said spool being mounted at the rear of the machine on a horizontal forwardly extending shaft, a key to wind said spool, a delivery spool also mounted on said shaft, angle guides for the strip adjacent to the spools, pulleys forward of the angle guides, one at each side of the machine, a platen between said pulleys, one of said pulleys being mounted yieldingly, a ratchet wheel upon said shaft, and a key operated pawl for turning said ratchet wheel, said winding spool yieldingly and frictionally connected to said shaft.

6. The combination of a spool to wind a paper strip, said spool being mounted at the rear of the machine on a horizontal forwardly extending shaft, a key to wind said spool, a delivery spool also mounted on said shaft, angle guides for the strip adjacent to the spools, pulleys forward of the angle guides, one at each side of the machine, a platen between said pulleys, one of said pulleys being mounted yieldingly, a ratchet

wheel upon said shaft, a key operated pawl for turning said ratchet wheel, and a detent for said shaft or winding spool.

7. The combination of a spool to wind a paper strip, said spool being mounted at the rear of the machine on a horizontal forwardly extending shaft, a key to wind said spool, a delivery spool also mounted on said shaft, angle guides for the strip adjacent to the spools, pulleys forward of the angle guides, one at each side of the machine, a platen between said pulleys, one of said pulleys being mounted yieldingly, a ratchet wheel upon said shaft, a key operated pawl for turning said ratchet wheel, a detent for said shaft or winding spool, and a gear between said shaft and said vertical platen.

8. The combination of a spool to wind a paper strip, said spool being mounted at the rear of the machine on a horizontal forwardly extending shaft, a key to wind said spool, a delivery spool also mounted on said shaft, angle guides for the strip adjacent to the spools, pulleys forward of the angle guides, one at each side of the machine, a vertical platen between said pulleys, one of said pulleys being mounted yieldingly, a ratchet wheel upon said shaft, a key operated pawl for turning said ratchet wheel, a detent for said shaft or winding spool, a gear between said shaft and said vertical platen, and a crank or finger piece connected to the platen to turn the same and said winding spool.

9. The combination of a spool to wind a paper strip, said spool being mounted at the

rear of the machine on a horizontal forwardly extending shaft, a key to wind said spool, a delivery spool also mounted on said shaft, angle guides for the strip adjacent to the spools, pulleys forward of the angle guides, one at each side of the machine, a platen between said pulleys, one of said pulleys mounted yieldingly, a ratchet wheel upon said shaft, a key operated pawl for turning said ratchet wheel, a collar secured upon the spool shaft and recessed to receive a lug formed on the hub of the winding spool, and a spring between said collar and said winding spool.

10. The combination of a spool to wind a paper strip, said spool being mounted at the rear of the machine on a horizontal forwardly extending shaft, a key to wind said spool, a delivery spool also mounted on said shaft, angle guides for the strip adjacent to the spools, pulleys forward of the angle guides, one at each side of the machine, a platen between said pulleys, one of said pulleys mounted yieldingly, a ratchet wheel upon said shaft, a key operated pawl for turning said ratchet wheel, a collar secured upon the spool shaft and recessed to receive a lug formed on the hub of the winding spool, and a spring between said collar and said winding spool; said winding spool being frictionally mounted on the shaft.

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