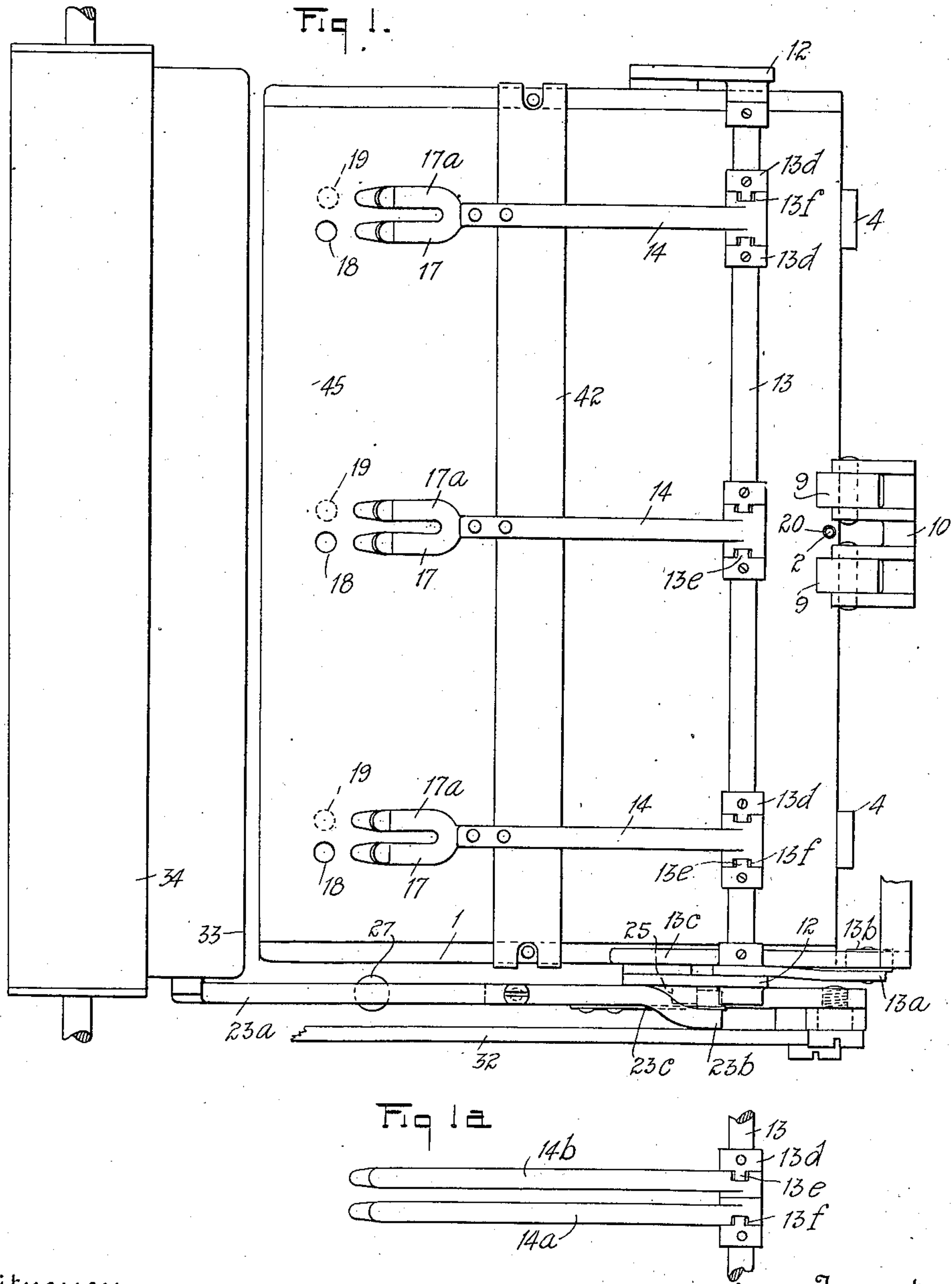


D. MURRAY.
PAPER FEED MECHANISM FOR PRINTING TELEGRAPHS, &c.
APPLICATION FILED AUG. 23, 1915.

1,352,308.

Patented Sept. 7, 1920.
2 SHEETS—SHEET 1.



Witnesses:

J. Massy
Paul H. Frank

Inventor

Donald Murray

By his Attorney

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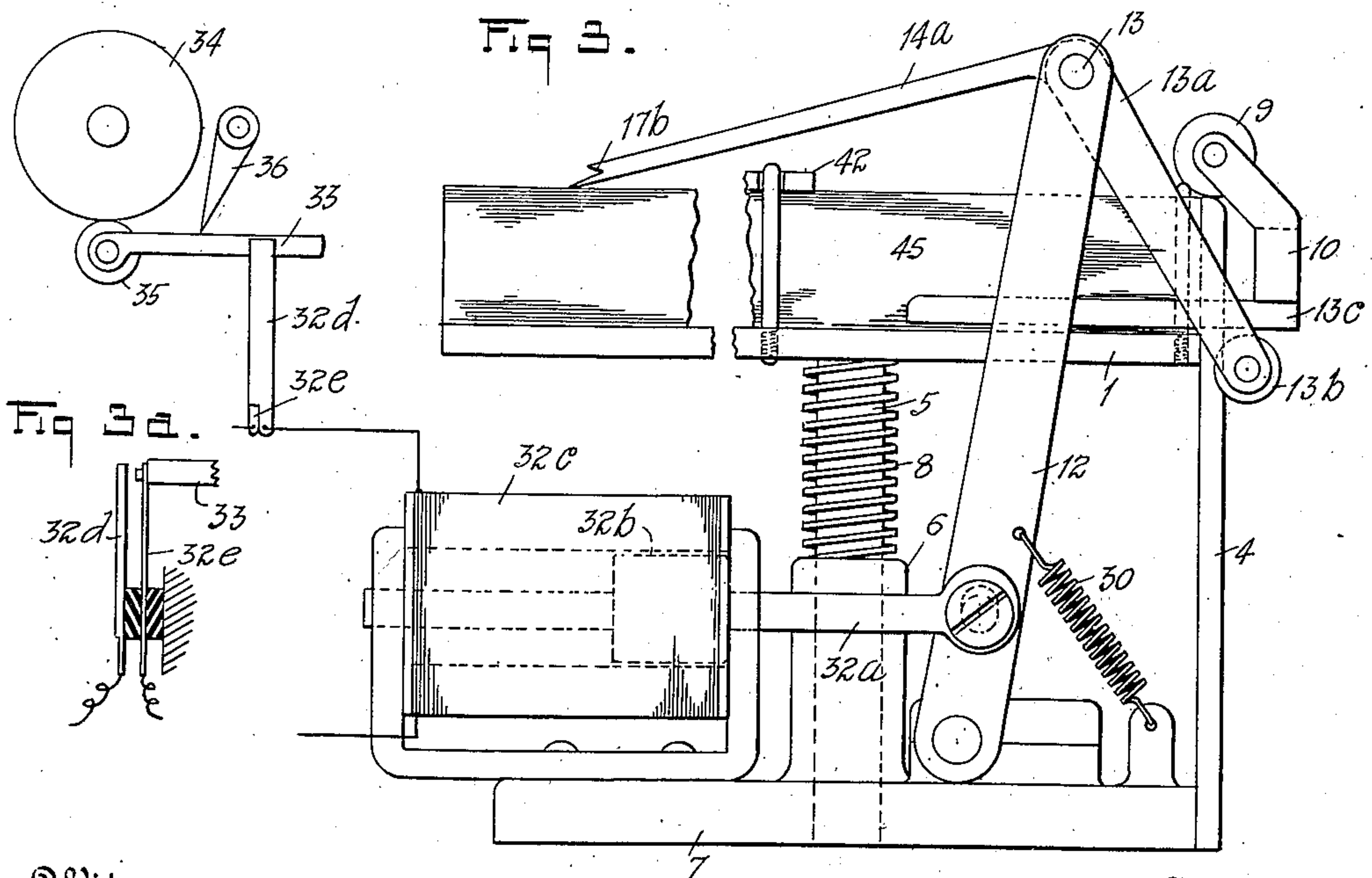
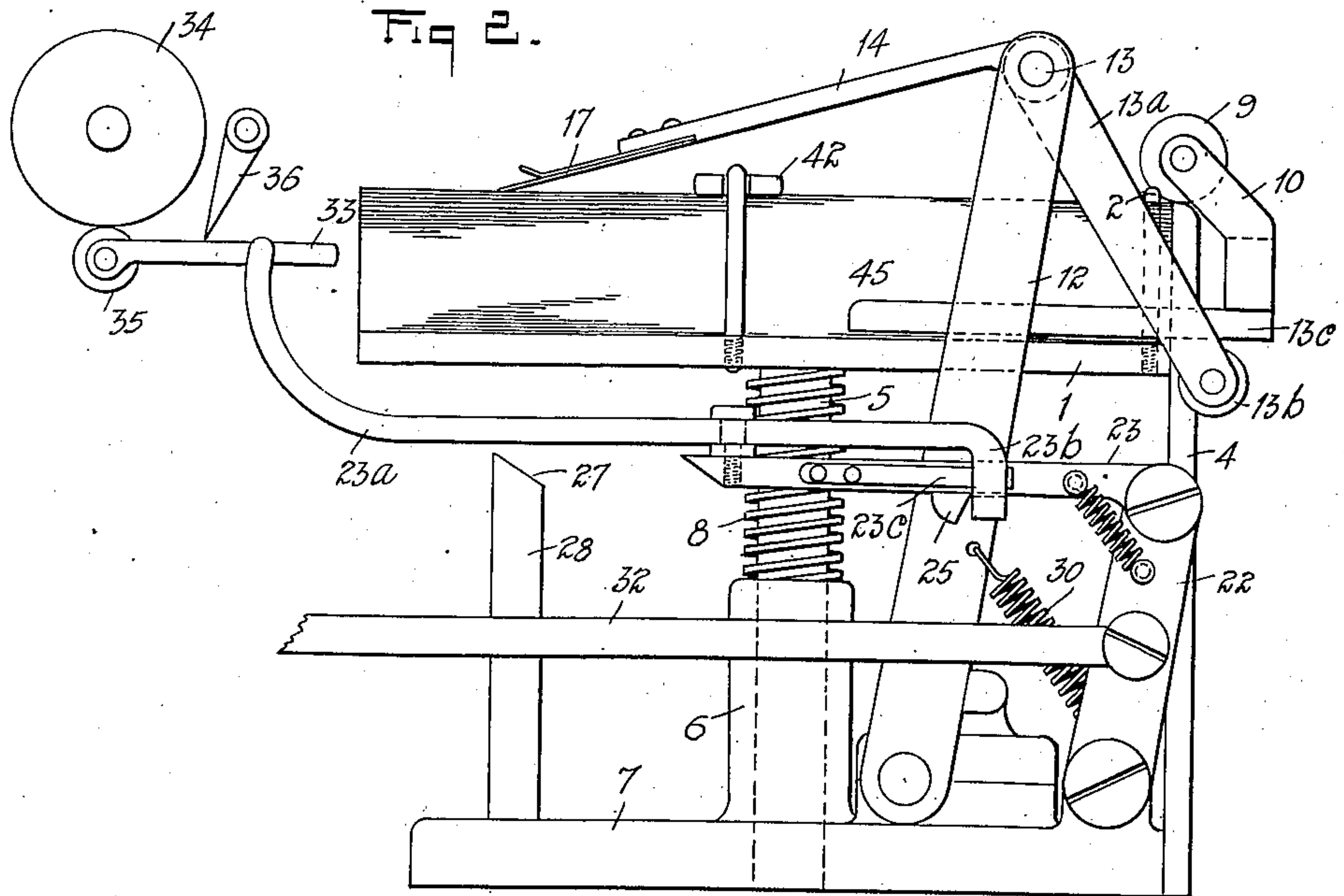
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Witnesses:

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UNITED STATES PATENT OFFICE.

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PAPER-FEED MECHANISM FOR PRINTING-TELEGRAPHS, &c.

1,352,308.

Specification of Letters Patent.

Patented Sept. 7, 1920.

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To all whom it may concern:

Be it known that I, DONALD MURRAY, a British subject, a resident of London, county of London, England, have invented certain new and useful Improvements in Paper-Feed Mechanism for Printing-Telegraphs, &c., of which the following is a specification.

My invention relates to paper feed mechanism for printing telegraphs, typewriters, etc., and is particularly intended for the feeding of telegraph message blanks, sheet by sheet, into automatic page-printing telegraph printers; but the machine herein described is also adapted for feeding paper, sheet by sheet, into typewriters, computing machines, and various other types of apparatus. The machine herein described is particularly intended for use in connection with telegraph printers, typewriters, and other printing machines having laterally movable carriages, and which require the paper to be fed in such carriages at one certain position of the carriage; and my said paper feed mechanism comprises means whereby feeding forward of the paper is prevented except when such carriage is in proper position to receive the paper.

The improved paper-feed-mechanism herein illustrated and described also comprises feeding means adapted for coöperation with a pile of paper sheets or blanks perforated in a particular manner, for engagement by the said feeding means, whereby the feeding of such sheets or blanks, one by one, two by two, or in any other predetermined order, is insured.

The objects of my invention are to provide reliable automatic mechanism for feeding sheets of paper, such for example as ordinary cut telegraph message forms, successively and at the right moments, into some other apparatus, such for example as a telegraph page-printer, or a typewriter, computing machine, etc.; to provide means for preventing such feeding of the paper except at such times as the carriage of the paper-receiving machine is in proper position; to provide for the automatic feeding of sheets of paper one by one, two by two, or in other desired order, and without fail; and to make this mechanism simple, reliable, and readily operated.

I will now proceed to describe my invention with reference to the accompany-

ing drawings, and will then point out the novel features in claims. In said drawings:

Figure 1 shows a top view of my improved paper feed mechanism with a pile of paper sheets or blanks to be fed thereon, and also shows the paper-receiving carriage of a telegraph printer, typewriter, or other machine in connection with which the paper feed device may be used, the pawl 36 (Fig. 2) being omitted.

Fig. 1^a is a fragmentary detail top view illustrating an alternative form of paper feed fingers which may be employed.

Fig. 2 shows a side elevation of the feeding mechanism in connection with the said paper carriage of a machine into which the paper is to be fed; and

Fig. 3 is a view similar to Fig. 2, but illustrating an alternative construction.

Fig. 3^a shows a detail side view of the contact device 32^a—32^c, which may be employed, in connection with the paper-receiving carriage, for controlling the time of closing of the circuit of the magnet of Fig. 3.

The machine herein described comprises a movable paper support adapted to receive and hold a large number of sheets of paper, in the form of a pile, and to move such pile upwardly as sheets are removed from the top of such pile. The machine further comprises means for regulating such movement of the paper holder, in order that the top of the pile may always be kept at a certain definite height, and further comprises feed-fingers for taking the paper off the top of the pile, sheet by sheet, together with operating means for such feed-fingers comprising means whereby the advance of the feed-fingers may be prevented when the said paper receiving carriage is not in proper position to receive the paper. Not only do the feed fingers act positively upon the sheets being fed, (the term "positively" is used in contradistinction to feeding devices which work by friction or by suction), but also the sheets of paper to be fed are held positively until engaged and torn away successively from the positive holding means. The combination of positive feeding means and positive holding means I have found to be very important in a machine of this character.

Referring now to the drawings, and at first to Figs. 1 and 2 thereof, numeral 1

designates a paper-holding tray upon which I have shown a pile of sheets of paper, 45, which sheets are to be fed successively, and one by one, or in any other predetermined number, from the top of such pile. The tray 1 is supported by a pillar 5 mounted to slide upward in a suitable bearing formed in the post 6 of the base 7 of the machine; a spring 8 being provided which tends to lift said tray 1; the rise of the tray being limited, however, by rollers 9—9 engaging one top edge of the pile of paper 45 on tray 1, such rollers 9 being mounted in bearings in a bracket 10 suitably supported from the frame of the machine. Suitable means are provided to prevent the tray 1 from rotating and to hold the pile of paper straight upon such tray; the particular means illustrated for this purpose being vertical guide plates 4 engaging one side of the tray and the pile of papers thereon; though any other suitable means for the purpose may be employed. To further hold the several sheets of paper forming the pile 45, in proper form on the tray, I preferably provide that tray with a spike 2 passing through a perforation 20, near one edge of each of the sheets of paper making up the pile 45, the said spike constituting a positive holding means for the sheets of paper; but any other means for holding, preferably positively, the sheets of paper in proper position upon the tray 1, until those sheets are carried off in proper order by the feed fingers hereinafter described, may be employed.

Numerals 14 designate feed fingers. These fingers are mounted upon a rod 13, extending transversely across the top of the tray 1, such rod being carried by levers 12 pivoted to the base of the machine and arranged at the sides of the tray 1. The fingers 14 are formed at their outer ends to engage perforations formed in the sheets of paper to be fed.

The several sheets of paper to be fed are provided with openings or perforations, 18, or 19, for the receipt of the ends of these fingers 14. Ordinarily, it is desired to feed the paper one sheet at a time into some other machine, and therefore, alternate sheets of paper making up the pile 45 are perforated with holes 18, or with holes 19, as the case may be, the only difference between the holes 18 and holes 19 being a slightly different placing of the holes 18 and 19 respectively. In Fig. 1 I have shown the top sheet of paper provided with holes 18, and have indicated in dotted lines that the sheet below is provided with perforations 19, corresponding to the perforations 18, but spaced away laterally from the perforations 18. It will readily be seen that upon the advance of the feed-fingers 14, those fingers will engage the perforations 18 of the top sheet, but will be prevented by that top sheet from engaging

the perforations 19 of the sheet next below; consequently, only the top sheet, containing the perforations 18, will be fed forward by such movement of the feed-fingers 14. With the sheet provided with the perforations 18 out of the way, upon the next stroke of the feed-fingers the sheet containing the perforations 19 will be fed forward; and so on. By providing alternate sheets of paper with feed perforations, spaced out of registry with respect to corresponding feed perforations of the sheet below, it is insured that only one sheet shall be fed at a time.

The feed fingers 14, it will be noted, constitute positive means for feeding the paper, as distinguished from frictionally acting feeding devices, or feeding devices acting by suction or adhesion.

In some cases, of course, it is desired to feed paper two sheets, three sheets, or a greater number of sheets, at a time. In such case, such number of sheets as are to be fed together will be provided with registering perforations, the next set of such papers will be provided with registering perforations out of registry with the perforations in the first set, and so on.

Heretofore in the printing press art, and allied arts, various automatic devices for feeding sheets of paper one by one, have been devised. In the case of a printing press, which is to print the same subject matter upon a large number of sheets, successively, it does not matter if there be a failure to feed a sheet from time to time, nor does it usually matter greatly if two sheets are fed simultaneously, where the feeding of only one sheet is intended. But in the case of a telegraph printer, typewriter, etc., it is very undesirable to have any failure of the feed occur; and this is particularly true with reference to telegraph printers, for these printers do not print the same subject matter on successive sheets; and if the feed of one sheet be lost, it may happen that the message which should have been printed on that sheet will be lost altogether. For this reason, paper feed devices such as have been developed heretofore for printing presses and the like, have not proved practicable for telegraph printers, and in telegraph printers the message forms have usually either been inserted by hand, or else a continuous web of paper has been employed. Cut message forms are, for many reasons, more satisfactory than forms contained on a continuous roll; for example, the cut forms lie flat and have clean cut edges, and they do not need to be cut or torn off from the main web as the messages printed upon them are finished. Automatic feed of the cut forms also enables the printer attendant to devote the whole of his time to checking the messages.

For the reasons above stated, the feed

mechanism herein illustrated and described is particularly adapted for use with automatic telegraph page printers, since the feeding of the message blanks one by one, or in any other predetermined number at each stroke of the feeding-fingers is assured positively.

In the arrangement of feed-fingers shown in Figs. 1 and 2, each feed finger 14 is provided at its lower or working end with two light spring-claws 17 and 17^a, one of which will engage with perforations 18, the other of which will engage with perforations 19. As an alternative, and as illustrated in Figs. 1^a and 3, there may be two separate feed fingers 14^a and 14^b, arranged in juxtaposition, fingers 14^a arranged to engage perforations 18, and fingers 14^b arranged to engage the perforations 19. In such case, the tips of the feed fingers need not be provided with springs, but are preferably cut into stepped chisel shape, as indicated at 17^b in Fig. 3.

The frame comprising the two levers 12 and spindle 13 carrying the feed fingers, is provided with a spring 30 (Fig. 2) for drawing it back. For pulling this frame forward, I have provided a pull rod 32 connected to a pivoted lever 22 having pivoted to it a spring-actuated pawl 23 carrying another lever 23^a itself provided with a shoulder 23^b adapted to engage a stud 25 upon one of the levers 12, the pawl 23 further having a projecting front portion beveled at its front end, adapted to engage the beveled surface 27 of a post 28 fixed to the base of the machine, by which engagement the pawl 23 and lever 23^a carried thereby will be lifted from engagement with the stud 25, permitting retraction of the frame carrying the feed fingers 14. The pull rod 32 may be pulled forward to cause feeding of the top paper of the pile 45, by any suitable means; for example, by hand, or by some automatic device forming a part of the paper receiving mechanism in connection with which the paper feeding device is used. I do not limit myself to any particular means for actuating this pull rod 32. The pawl 23 constitutes means whereby feeding of paper may be prevented, even though the pull rod 32 be actuated, in case the carriage of the paper receiving machine is not in proper position to receive such paper. I have not attempted to illustrate any paper receiving machine in entirety, but have illustrated, in connection with the paper feeding device, a paper receiving roll 34, which may be supposed to be the carriage roll of a telegraph printer, or typewriter, or other suitable machine; and in connection with such roll 34 I have illustrated the customary grip roll 35 for holding the paper against the roll 34, and have also illustrated a pawl 36 adapted to engage the paper as it is fed forward

between rolls 34 and 35, and thereby to prevent the paper from being dragged backward. The pawl 36 may be supposed to hold the paper against the plate 33 carrying the roller 35, or against any other suitable member associated with the roll 34.

The structure comprising the roll 34, the roll 35, the plate 33, and pawl 36, may be supposed to be movable laterally or in the direction of the axis of such roll, as in the case of the carriage of a typewriter, or page-printing telegraph printer. Obviously, paper should be fed to such roll 34 only in one certain position of that roll. Various means to accomplish this, and arranged to act upon the pawl 23, may be employed. I have indicated the pawl 23 as having pivoted upon it a light lever 23^a one end of this lever 23^a arranged to be engaged by the plate 33 or other suitable member of the laterally movable paper-receiving structure comprising the roll 34, such engagement serving to move the lever 23^a about its pivot so as to bring its shoulder 23^b into position for engagement with the stud 25 upon one of the levers 12. The lever 23^a is moved into position to engage such stud 25, only when the carriage structure comprising the paper holding roll 34 is in proper position to receive the paper. In any other lateral position of such carriage the lever 23^a is held, by a spring 23^c, or other suitable means, out of position for engagement with the stud 25. But obviously various other means may be provided whereby the pawl 23 will engage the stud 25 only when the paper receiving device is in proper position to receive the paper.

Or, alternatively, means may be provided for pulling the levers 12 forward only when such paper receiving device is in proper position to receive the paper. One such arrangement is shown in Fig. 3, wherein the pawl 23 is omitted altogether, and the pawl rod, there designated by numeral 32^a, is connected directly to one of the levers 12 and is provided with an armature 32^b forming the plunger of a solenoid magnet 32^c. Obviously, the circuit of this magnet 32^c may be arranged to be closed only when the paper carriage is in a proper position to receive the paper, (as, for example, by contact springs 32^d and 32^e supported by some fixed portion of the machine and arranged to be brought together by the carriage when the latter is in proper position for receiving the paper) and therefore, with the arrangement shown in Fig. 3, the magnet 32^c will not be energized to feed forward the paper until the carriage or other paper receiving device is in proper position to receive that paper. In Fig. 3 I have not shown the complete circuit for the magnet 32^c, for that circuit will usually be controlled by some other contact device, not shown, whereby the final closing

of the circuit for causing the feed of the paper will be produced. The contact device 32^a—32^e merely prevents the closing of such circuit at a wrong time.

5 In case paper is to be fed over a considerable gap between the tray 1 and the paper receiving device, means may be provided to prevent undue dropping of the paper feed fingers. One arrangement for effecting this
10 result is illustrated in Figs. 2 and 3, wherein the rod 13 is provided with rearward extending levers 13^a carrying anti-friction rollers 13^b adapted to engage the under sides of guides 13^c carried by the frame of the
15 machine. These guides 13^c prevent the feed fingers from dropping much below the lever of the top of the paper pile 45 on the tray 1, and so insure that the levers 12 shall be able to feed papers from the pile 45 across
20 the gap between the tray 1 and the paper receiving device 33—36.

In the construction shown in Fig. 1^a it is quite desirable that the feed fingers 14^a and 14^b shall be capable of some slight motion
25 relative to the rod 13 and relative to each other; and therefore I have shown these feed fingers as mounted loosely upon the rod 13 and have shown, adjacent these feed fingers, fixed collars 13^b, each provided with
30 a projection 13^e playing within a corresponding and slightly larger recess 13^f of the corresponding feed finger. This construction permits the necessary slight relative movement of feed fingers 14^a and 14^b
35 and nevertheless prevents undue dropping of the feed fingers when the latter pass off the edge of the pile of paper sheets and when a considerable gap intervenes between the tray 1 and the paper receiving device. A
40 similar construction is illustrated in connection with the feed fingers 14 of Fig. 1, though this construction is less necessary there.

Of course various means for permitting
45 slight movement of the feed fingers with reference to the rod 13 may be devised, also various constructions may be devised for preventing undue dropping of the feed fingers when the latter pass off the edge of
50 the pile of paper sheets; and the constructions herein indicated for that purpose are to be considered only as particular details for accomplishing the desired article.

Some provision for preventing undue
55 dropping of these feed fingers is, however, quite desirable because, in many cases, the length of the paper sheets used will necessitate a considerable gap between the paper feed device and the paper receiving device,
60 in order that one paper sheet fed into the paper receiving device may not overlies the holes 18 or 19 of the next sheet and so prevent the feed fingers from engaging the holes 18 or 19 of that next sheet. Quite

frequently it is desired that a paper sheet 65 shall be fed into the paper receiving device before the sheet already in that paper receiving device has been removed therefrom; in which case the front edge of the sheet newly fed in should intervene between the
70 roller 34 and the rear portion of the sheet already held by that roller. By providing a proper gap between the paper receiving device and the paper feeding device, and by arranging the paper feed mechanism to feed
75 the sheets properly across such gap, this object is readily accomplished.

Obviously, the operation of the paper feeding device is as follows:

A suitable number of sheets of paper being 80 arranged in the form of a pile 45 on the tray 1, the pull rod 32 is pulled forward by means, either hand operated or automatic, not shown, thereby causing the feed fingers 17 to engage the perforations 18, or 19, as
85 the case may be, of the topmost sheet or sheets and move said sheets forward until their edges are engaged between the rolls 34 and 35. Normally, the rod 32 will be pulled forward only when the paper receiving
90 device is in proper position to receive the paper sheets; in which event the lever 23 will be held by the paper receiving device in position to engage the stud 25 as the pull rod 32 is pulled forward; thereby causing
95 motion of the frame 12—13, and thereby causing motion of the paper feed fingers. If by chance the pull rod 32 should be operated when the paper receiving device is not in
100 proper position to receive the paper sheet or sheets, then the lever 23^a will be held by the spring 23^c out of position to engage the stud 25, and therefore, although the lever 22 and pawl 23 will move forward with the
105 pull rod 32, no feeding of the paper will result. After the feed fingers have moved forward a sufficient distance to engage the sheet or sheets of paper so fed forward,
between the rolls 34 and 35, the pawl 23 will be lifted by post 28, thereby permitting
110 the spring 30 to draw the feed fingers back, whether the pull rod 32 be released at that moment or not.

The feed fingers, in feeding forward the sheet or sheets engaged by them, tear such
115 sheet or sheets away from the spike 2. The feed fingers act in alternation upon sheets containing the perforations 18 and sheets containing the perforations 19, and in this way positive separation of the top sheet or
120 sheets (provided, we will say, with perforations 18) from the sheet or sheets immediately below (provided, we will say, with the perforations 19) is secured.

The operation of the apparatus shown in 125 Figs. 3 and 3^a is similar, the feeding of the paper being caused by the closing of the circuit of the magnet 32^c, the feed fingers

retreating for engagement with a new sheet as soon as the circuit with that magnet is broken.

Conveniently, a light metal bar 42 rests upon the top of the pile of sheets and thus interposes slight friction to the drawing of the top sheet or sheets forward by the paper feed fingers. The tension of the paper sheet or sheets being fed forward, thus secured, obviates any risk of sheets dropping off the tips of the feed fingers.

I do not limit myself to the use of the spike 2, and guide plates 4 for holding the pile of paper sheets in proper position and formed on the tray 1; nor do I limit myself to the use of piles of paper sheets having the alternated perforations 18 and 19, or to the use of feed fingers having either the spring claws 17 or chisel-points 17^b; I may provide the feed fingers with any suitable means for feeding the sheets from the pile one by one, two by two, etc., as desired.

There are likewise various alternatives for the spike and perforated sheets. For instance the pile of sheets of paper may be lightly bound together at one edge with a strip of glued or gummed paper or tape, or they may be sewn together with thread, or the sheets may be riveted together along one edge and perforated near the edge so as to be adapted to tear off easily, or instead of the spike being fixed in the tray as described the spike may take the form of one or more rivets near the edge of the bundle of sheets of paper. In these cases in which the bundle of sheets of paper is bound together apart from the tray, it is necessary to have means for holding the bundle of sheets in place on the tray against the thrust of the feed prongs. This may be conveniently effected by a stiff cardboard back for the bundle of sheets, the tray being provided with a ledge to engage with the cardboard back so as to hold the pile of sheets in place against the thrust of the prongs.

Also, instead of the differentially perforated holes at the top of the message forms, the message forms may each be folded over at the top, the prongs or thrust pawls then tearing off each message form by engaging in the fold. Another alternative instead of holes is to provide the prongs with small sharp teeth or pins to catch in the surface of the top sheet of paper and tear or pull it off from the pile. It is obvious also that slits in the paper may be used instead of holes for the prongs to engage in. The preferred form of the invention that I have described and illustrated, namely that providing for perforated message forms, has the advantage that the perforations can be easily made in the ordinary supply of cut telegraph forms of any telegraph administration.

An important feature of the invention is any suitable arrangement for tearing or pulling off the top sheet of paper from a pile fixed on a tray or stand and bound together at one edge by suitable means permitting the top sheet to be pulled or turn off easily without disturbing the sheet immediately below it, thereby insuring easy and positive separation of each sheet successively from the top of the pile.

What I claim is:

1. Paper feed mechanism such as described comprising paper supply means adapted to hold a pile of sheets at a suitable height, positive holding means for such sheets engaging the same and preventing lateral displacement thereof except by the tearing away of such sheets from such holding means, one or more feed fingers adapted to feed sheets singly or in predetermined number from the top of such pile, said feed fingers adapted to engage such sheets positively and to tear them away successively from the positive holding means, and means for operating said feed fingers.

2. The combination, with movable paper receiving means, of paper feed mechanism such as described comprising paper supply means adapted to hold a pile of sheets at a suitable height, one or more feed fingers adapted to feed sheets singly or in predetermined number from the top of such pile, and means for operating said feed fingers comprising means preventing the feeding of the sheets by said feed fingers except when said paper receiving means is in a predetermined position with reference to said paper feed device.

3. The combination, with movable paper-receiving means, of paper feed mechanism such as described comprising paper holding means and one or more feed fingers adapted to feed the sheets singly or in predetermined number from the top of a pile of sheets on such paper holding means, and means for operating said feed fingers comprising operating means having a detachable connection with such feed fingers controlled by the position of such paper-receiving means.

4. The combination, with movable paper-receiving means, of paper feed mechanism such as described comprising paper holding means and one or more feed fingers adapted to feed the sheets singly or in predetermined number from the top of a pile of sheets on such paper holding means, and means for operating said feed fingers comprising a pawl adapted to be actuated and, when actuated, to engage or disengage a projection provided in connection with such feed fingers, according to the position of said paper receiving means.

5. Paper feed mechanism such as described comprising paper holding means adapted to hold a pile of sheets, in combina-

tion with one or more feed fingers having claws adapted to engage perforations of a plurality of non-registering series provided in different paper sheets, and by engagement with a perforation of one sheet to feed forward that sheet, without the feeding forward of a sheet or sheets having perforations which do not register with the perforations of the topmost sheet or sheets.

6. Paper feed mechanism such as described comprising paper holding means adapted to hold a pile of sheets, in combination with one or more feed fingers having means adapted to engage perforations of a plurality of non-registering series provided in different paper-sheets, and by engagement with a perforation of one sheet to feed forward that sheet, without the feeding forward of a sheet or sheets beneath having perforations which do not register with the perforations of the topmost sheet or sheets.

7. Paper feed mechanism such as described comprising paper holding means adapted to hold a pile of sheets, in combination with one or more feed fingers and means for moving same forward and backward, said feed fingers having spring claws adapted to engage perforations of paper sheets held by said paper holding means, and in combination with a pile of sheets held by said paper holding means, said sheets being provided with perforations adapted to be engaged by said spring claws, the said perforations of certain of such sheets being out of registry with the corresponding perforations of others of such sheets.

8. Paper feed mechanism such as described comprising paper holding means adapted to hold a pile of sheets, in combination with one or more feed fingers and means for moving same forward and backward, said feed fingers having multi-pointed spring claws adapted to engage perforations of a plurality of non-registering series provided in different paper sheets, and by engagement with a perforation of one sheet to feed forward that sheet, without the feeding forward of a sheet or sheets having perforations which do not register with the perforations of the topmost sheet or sheets.

9. Paper feed mechanism such as described comprising paper holding means adapted to hold a pile of sheets, in combination with feed means adapted to move forward and back and comprising means adapted to engage alternately perforations of a plurality of non-registering series provided in the sheets of said pile, and by engagement with a perforation of one sheet to feed

forward that sheet without feeding forward a sheet or sheets beneath having perforations which do not register with the perforations of the topmost sheet or sheets, and means for so moving said feed means.

10. Paper feed mechanism such as described comprising paper holding means adapted to hold a pile of sheets, pivoted levers, a rod connecting said levers, one or more feed fingers pivoted to said rod and adapted to rest upon sheets of paper held on said paper holding means, and means for moving said levers and fingers forward and back, comprising means for raising said feed fingers from the paper after a predetermined forward motion of the feed fingers.

11. Paper feed mechanism such as described comprising paper holding means adapted to hold a pile of sheets, a movable feed-finger frame, one or more feed fingers pivoted to said frame and adapted to rest upon sheets of paper held on said paper holding means, means for moving said frame and fingers forward and back, said feed fingers having a guiding extension, and a guide arranged to engage such guiding extension and thereby to prevent undue depression of said feed fingers when the latter pass off the edge of the pile of sheets on said paper holding means.

12. The combination with paper supply means, and a pile of paper sheets carried thereby, each sheet provided with perforations adapted for engagement by feed fingers, such feed perforations of certain of the sheets out of registry with such feed perforations of other sheets, of means for feeding such sheets of paper successively comprising one or more feed fingers adapted to engage the perforations of said sheets and to feed the sheets forward, and means for operating said feed fingers.

13. The combination with paper supply means, and a pile of paper sheets carried thereby, each sheet provided with perforations adapted for engagement by feed fingers, such feed perforations of certain of the sheets out of registry with such feed perforations of other sheets, of means for feeding such sheets of paper successively comprising one or more feed fingers adapted to engage the perforations of said sheets and to feed the sheets forward, means for operating said feed fingers, and means for holding the sheets together at one edge until torn away by said feed fingers.

In testimony whereof I have signed this specification.

DONALD MURRAY.