

(No Model.)

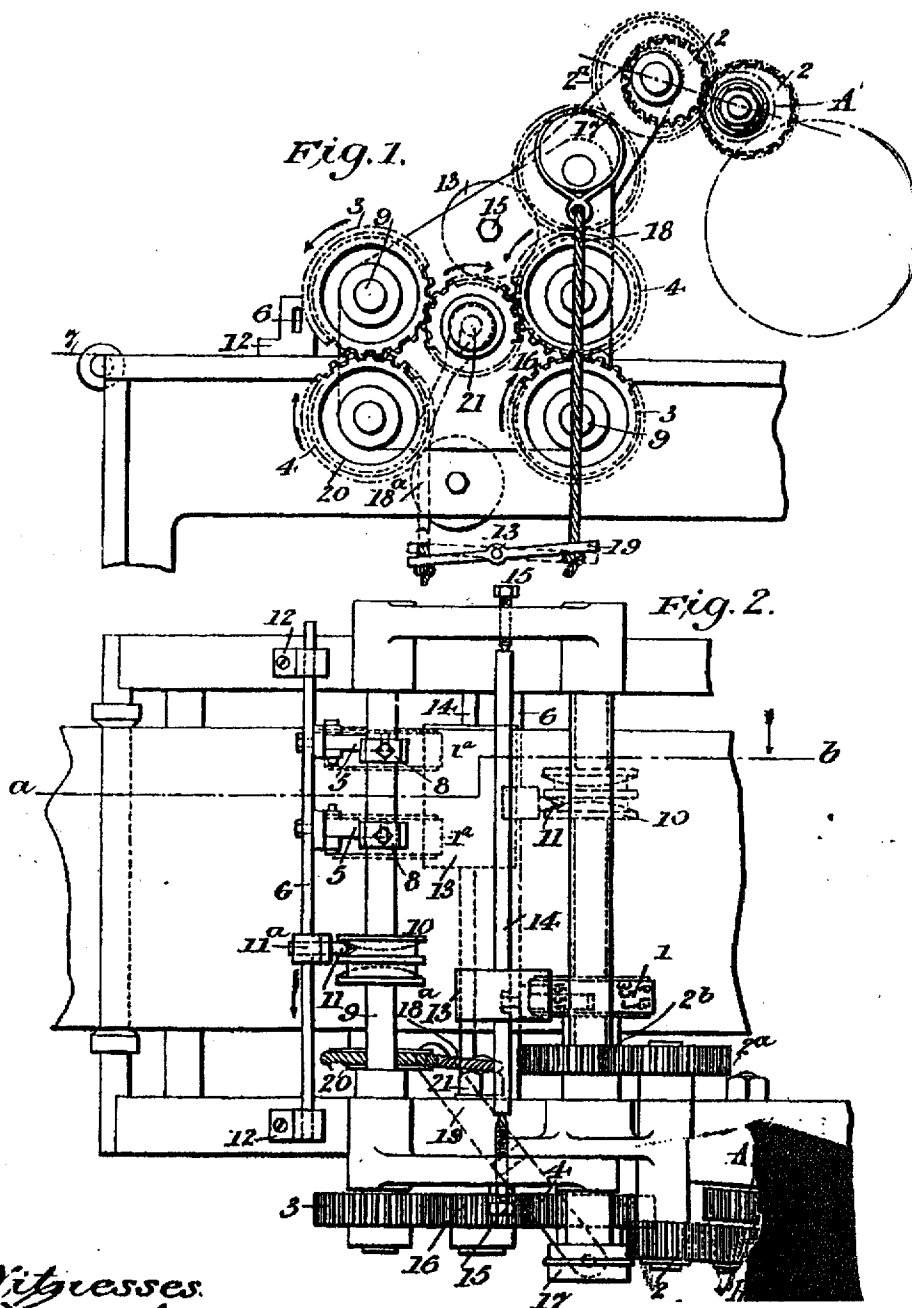
2 Sheets—Sheet 1.

M. H. SPEAR.

NUMBERING APPARATUS FOR PRINTING MACHINES.

No. 583,607.

Patented June 1, 1897.



Witnesses
James H. Spear
Edmund E. Spear

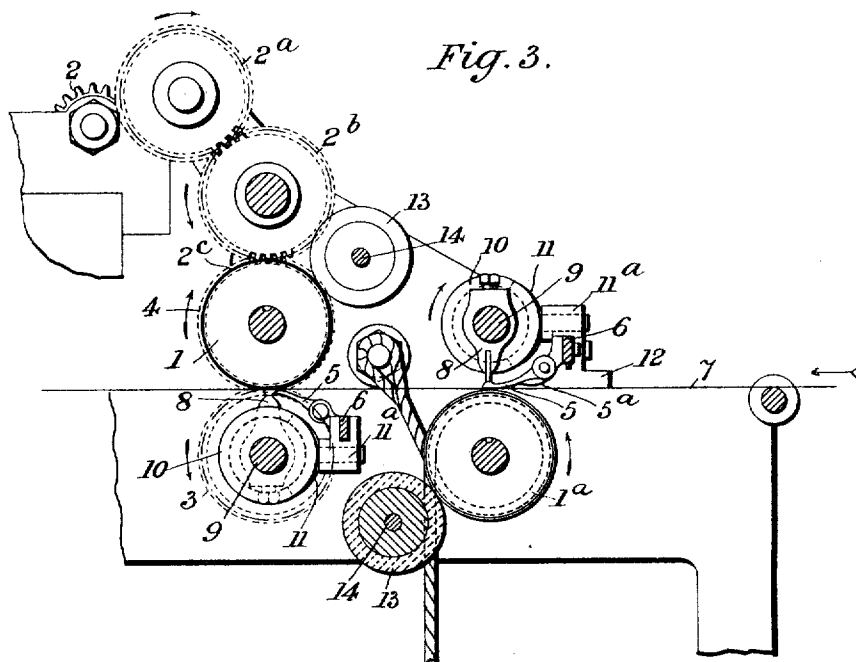
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*Fig. 4.*

58	5	56	20	4	8
3	51	1	52	6	53

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WITNESSES

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UNITED STATES PATENT OFFICE.

MURRAY HINCKLEY SPEAR, OF LONDON, ENGLAND, ASSIGNOR TO THE
LAMSON PARAGON SUPPLY COMPANY, LIMITED, OF SAME PLACE.

NUMBERING APPARATUS FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 583,607, dated June 1, 1897.

Application filed January 17, 1896. Serial No. 575,898. (No model.) Patented in England July 27, 1894, No. 14,459, and in
Victoria June 19, 1895, No. 12,282.

To all whom it may concern:

Be it known that I, MURRAY HINCKLEY SPEAR, a subject of Her Majesty the Queen of Great Britain, residing at London, Eng-
land, have invented a certain new and useful
Improvement in Numbering Apparatus for
Printing-Machines, (for which I have obtained
Letters Patent in Great Britain under date of
July 27, 1894, No. 14,459, and in Victoria un-
der date of June 19, 1895, No. 12,282,) of which
the following is a specification.

My invention relates to an improvement in
numbering apparatus for continuous-print-
ing machines or machines printing upon a
continuous sheet of paper, though the appa-
ratus may be employed apart from a print-
ing-machine for placing numbers on a con-
tinuous sheet of paper.

For certain classes of work it is desirable
to place numbers at intervals on the paper
passing through the machine, such paper
being cut up into consecutively-numbered
sheets on its exit from the machine. It is
customary to employ for such numbering
wheels having numbers around their periph-
ery either contained in the printing or im-
pression cylinders or wheels apart or outside
of same, such wheels when in the printing-
cylinder having apart from a revolution on
their own axis a movement around another
center, which is the axis of such cylinder.
Where the numbers on the wheel are placed
at a distance apart from each other corre-
sponding to the distance they are to be at
when placed on the paper and the wheel
travels at the same rate as the paper, the num-
bering will be satisfactory, but the size of the
wheel will become too great for practical pur-
poses. Where the numbers are placed close
together on a wheel and the wheel makes a
complete revolution or a little more or less
than a complete revolution, so as to bring
the next number in position to print, it is
found impossible to obtain the same surface
speed as the speed of the paper, and this dif-
ference in speed, together with the closeness
of the numbers on the wheel, will result in a
bad impression or a partial printing of the
number on one or both sides of the number

to be printed. The same difficulty arises in
the case where a number of separate units-
wheels are employed, there being the diffi-
culty of obtaining the proper surface speed
of the paper, and where such wheels are op-
erated by ratchets and pawls, as is custom-
ary, the possibility of failure of these to work
by reason of their clogging, thus involving a
considerable loss by spoiled work. To reme-
dy this, I employ the mechanism shown in
the drawings, in which—

Figure 1 is a side elevation of the number-
ing apparatus applied to a part of a printing-
machine. Fig. 2 is a plan of same. Fig. 3
is a sectional elevation on the line *a b*, Fig. 2,
looking in the direction of the arrow; and
Fig. 4 is a plan of a portion of the numbering-
wheel to illustrate the arrangement of the
numbers on same.

Preferably I employ a numbering-wheel 1,
upon the face of which the numbers are ar-
ranged in two parallel rows, the odd numbers
being in one row and equidistantly spaced and
the even numbers in the other row and equi-
distantly spaced, but arranged intermediate
or in staggered relation to the numbers of the
first row, as shown in Fig. 4. Say, for instance,
I desire to print up to "50," I employ a num-
bering-wheel 1, arranged as above, and drive
it through eccentric-gears 2 2, so that instead
of moving on one number at a time it rapidly
makes a complete rotation after each printing,
and these eccentric-gears 2 2, through inter-
mediate gearing, are arranged to drive gears 3
4, having the same pitch, but having unequal
numbers of teeth. For instance, one wheel 3
will have twenty-four teeth and the other
wheel 4 will have twenty-five teeth, so that
instead of the numbering-wheel having the
impression taken from the same number when
it comes round again the impression is taken
at the number before or after the number it
has last printed, depending on the way the
gears are arranged. To take the impression
from the moving wheel onto the paper 7, I
employ fingers 5, pivotally attached to a bar
6 on the other side of the paper 7 to the num-
bering-wheels, such fingers being pressed onto
the paper when the wheel is in its printing

position by means of tappets 8, carried by a shaft 9, such shaft carrying a grooved cam 10, which reciprocates a forked arm 11, pivotally carried in a boss 11^a, affixed to the bar 6, so that said bar, (which is carried in bearings 12,) together with the fingers 5, is shifted to and fro, the fingers thus being brought in turn over an odd number and an even number on either edge of the numbering-wheel 1.

A numbering device such as is described above may be placed at different points of the machine, according to the positions in which it is desired to number the paper.

As shown, there are two numbering-wheels 1^a 1^b beneath the paper 7 and one numbering-wheel 1 above it, the parts operating the wheels 1 and 1^a being identical in construction or substantially so. The finger 5, however, which is situated above the paper, is provided with a spring 5^a to lift it off the paper until pressure is put thereon by the tappet 8. The numbering-wheels are inked from inking pads or rollers 13, carried by loose shafts 14, which may be supported by adjusting-screws 15. The roller 13 beneath the paper is shown in Fig. 2 as wide enough to ink the faces of both numbering-wheels 1^a 1^b. In some cases I may dispense with the fingers and cause the tappets or parts corresponding thereto to act directly upon the paper.

The eccentric-gears 2 2 are driven through gears A A' and operate the parts through the train of wheels 2^a, 2^b, and 2^c, Fig. 3, the latter being on the shaft of the numbering-wheel 1 which is above the paper, so that the gear 4 of said wheel is driven and operates in turn the gear 3 and, by means of the intermediate gear 16, the gears 3 and 4 of the other numbering mechanism.

As illustrated in the drawings, the eccentric-gears 2 2 are circular, and in consequence as they are rotated the extent of engagement between the teeth will be constantly varying. Instead, however, of the circular eccentric-gears elliptical gears may be used to produce the same result, and the engagement between the teeth of these gears is constantly uniform. By employing the said eccentric-gears I obtain a certain margin for adjustment of the surface speed of the printing-wheels, so that at the moment of printing such wheels will have the same speed as the speed of the paper, while when not engaged in printing the wheels are given a rapid revolution to bring the next number into position. In the position of the eccentric-gears shown in Fig. 1 the printing-wheels are given their slowest movement for the purpose of printing, and I am able to obtain the requisite margin for adjustment of the speed of the printing-wheels by a slight movement of the eccentric-wheels on their shafts to the right and left of their direct line of contact with each other, such line being shown in Fig. 1. By this arrangement I am able to employ printing-wheels of a much larger diameter than heretofore possible with a wheel making a complete revolution or

nearly a complete revolution at each printing and to secure such an adjustment as will allow for wear of the parts of the machine or 70 printing-wheels, or for the varying surface speeds of differing thicknesses of paper.

To take up the slack of the gears and to hold the numbering-wheels against rotation by momentum at the moment of printing, I 75 employ a brake, which may consist of an eccentric 17 on one of the shafts, such as the shaft of the wheel 2^c, such eccentric having a cord 18 or the like attached to a strap around same, the cord being carried to one end of a 80 pivoted bar 19, from the other end of which a second cord 18^a passes and is given a turn around the shaft of one of the numbering-wheels 1 or around a pulley 20 on same, and is then secured to some fixed point, such as 21. 85

It will be noted that the train of gears is driven from the right-hand eccentric-wheel 2, Figs. 1 and 2, which is shown in the position it occupies when the printing of a number is taking place. It will also be noted that when 90 the right-hand eccentric is driving the other from its smallest diameter the train of gears is being driven at its slowest speed, during which time the brake is on. When the right-hand eccentric has come around to the point 95 shown, the momentum of the gears, together with the backlash or slack throughout the train, acts to carry them faster than is desirable for printing purposes—in fact, there is a tendency for these parts to drive the driven 100 wheel. To counteract this and cause the numbering-wheel shaft to instantly reduce its speed to accord with the reduction of speed taking place at the driven end of the gears, the brake above described is employed, which 105 tends to put pressure on the back of every tooth throughout the train of gears and thereby check the speed of the numbering-shaft, such brake being operated simultaneously with the change of the right-hand eccentric 110 to its smallest diameter.

What I claim is—

1. In a numbering apparatus, the combination with a numbering-wheel provided with two or more parallel series of numbers, the 115 numbers of one series being arranged in staggered relation to those of the other series, means for rotating the wheel to bring the numbers successively to a predetermined point, devices for pressing a paper strip into 120 contact with the numbering-wheel, and means for intermittently shifting the pressing devices successively from one series of numbers to the other, substantially as described. 125

2. In a numbering apparatus, the combination with a numbering-wheel provided with a series of numbers, means for rotating said wheel at a variable speed and for regulating the extent of such movement whereby the 130 numbers upon the numbering-wheel are brought successively to a predetermined point and devices for preventing the rotation of the wheel by momentum and means for inter-

mittently actuating such devices, substantially as described.

3. In a numbering apparatus for continuous-printing machines, the combination with
5 a numbering-wheel and its shaft provided upon its face with a series of equidistantly-spaced numbers, a gear-wheel upon said shaft, a second gear-wheel intermeshing with the first, said gears being relatively arranged to
10 bring the numbers of the numbering-wheel successively to a predetermined point and means for driving the second gear-wheel at a varying speed, substantially as described.

4. In a numbering-machine, the combination of a numbering-wheel provided with a series of progressively-arranged even numbers, and with a series of progressively-arranged odd numbers parallel to the series of even numbers but arranged in staggered relation
15 thereto, and means for operating the numbering-wheel to bring the numbers thereon

successively to a predetermined point, substantially as described.

5. In a numbering apparatus for continuous-printing machines, the combination of a
25 numbering-wheel provided with two or more parallel series of numbers, the numbers of one series being arranged in staggered relation to those of the other, means for actuating the numbering-wheel to bring the numbers of the series successively to a predetermined point and devices whereby the paper
30 is intermittently impressed with a number of first one series and then the other, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

MURRAY HINCKLEY SPEAR.

Witnesses:

W. M. HARRIS,

GEO. J. B. FRANKLIN.