No. 606,658. Patented July 5, 1898.

G. M. GIBSON.

MACHINE FOR PUNCHING TELEGRAPHIC PAPER.

(Application filed July 26, 1897.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

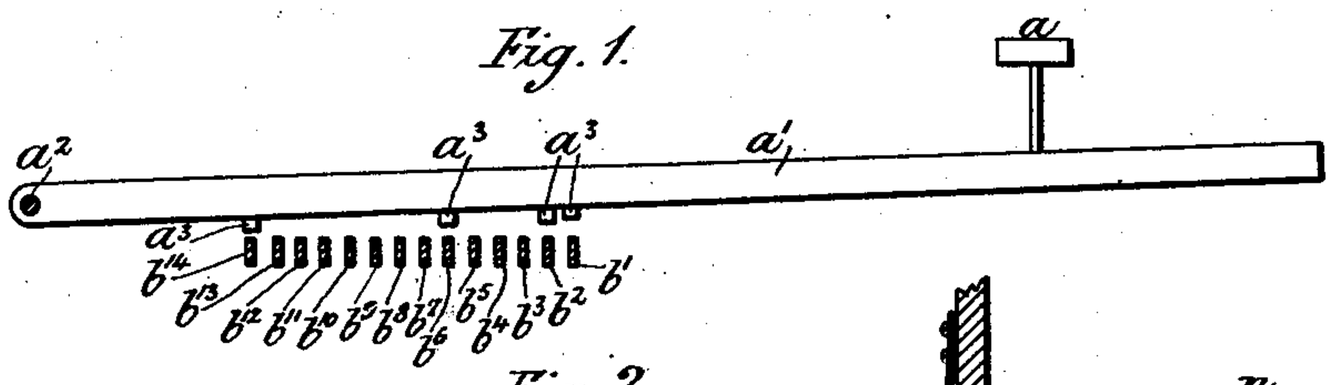


Fig. 2.

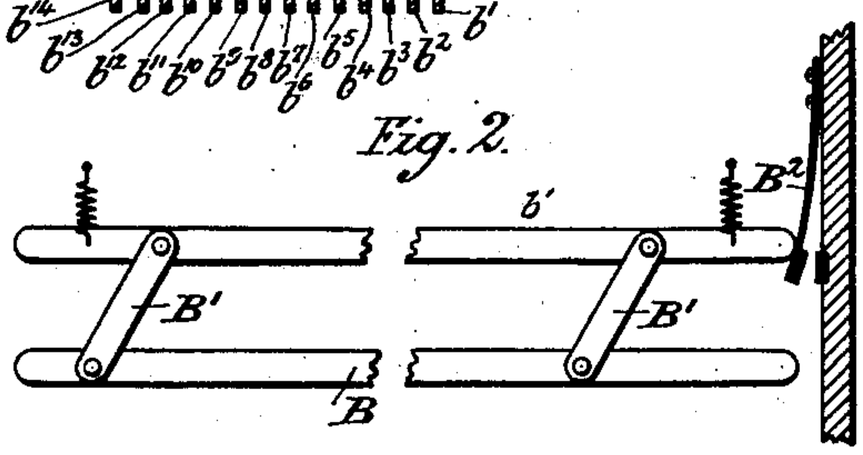


Fig. 7.

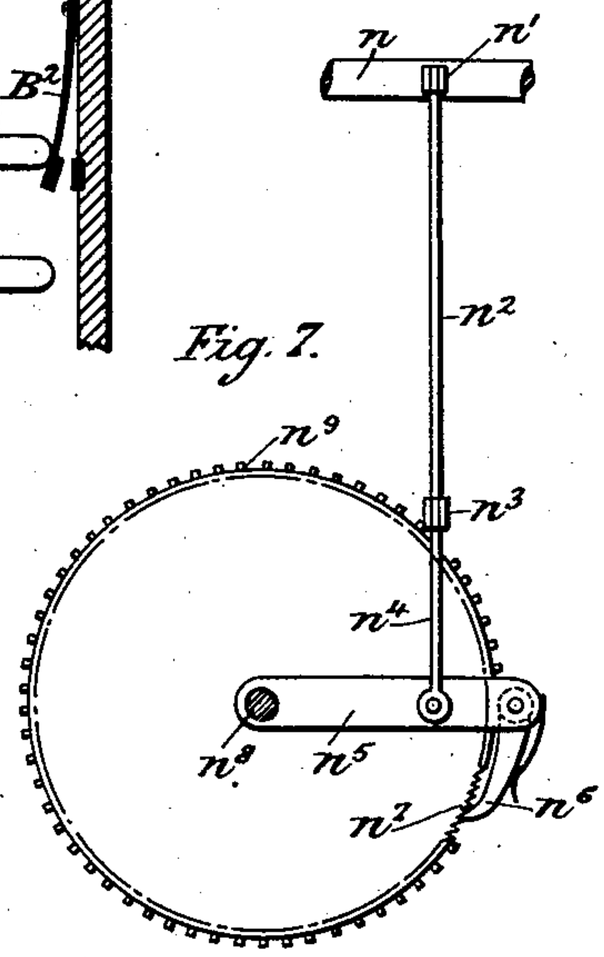


Fig. 6.

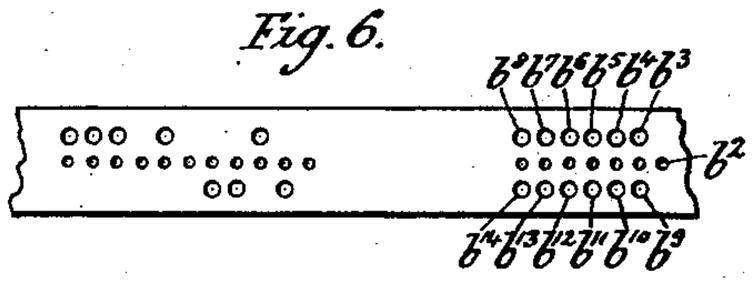


Fig. 8.

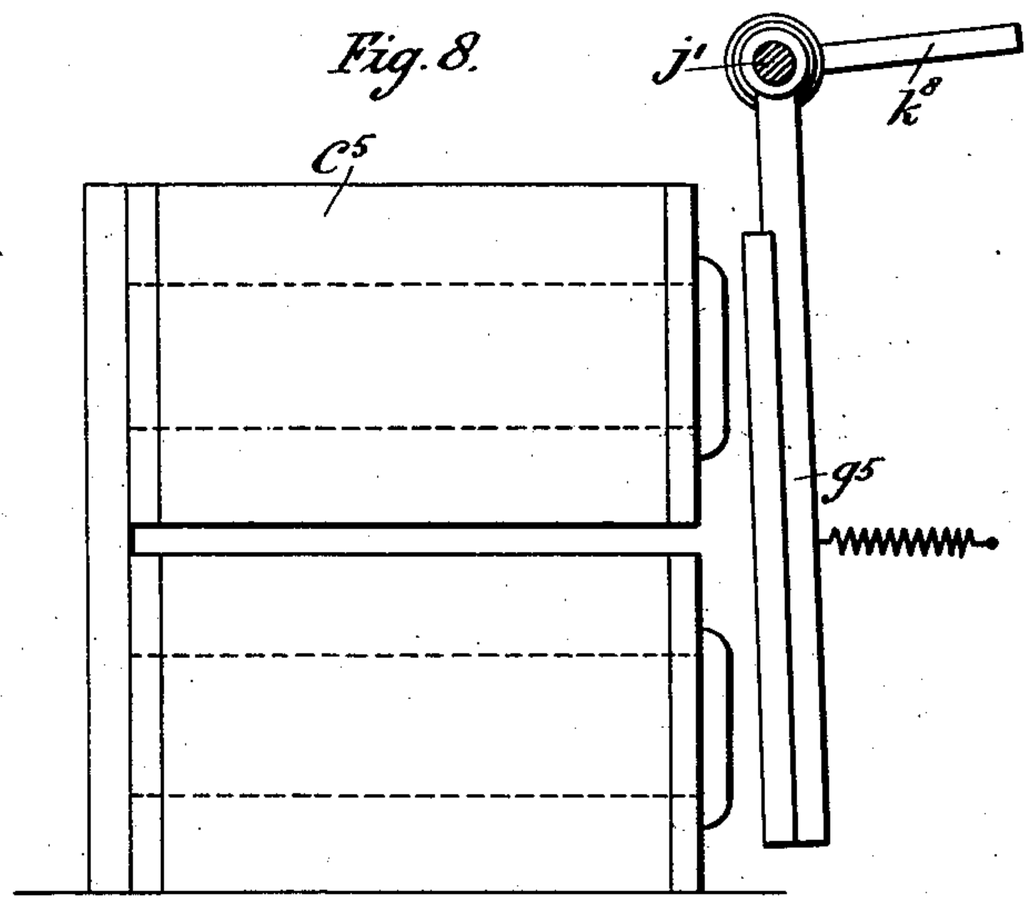
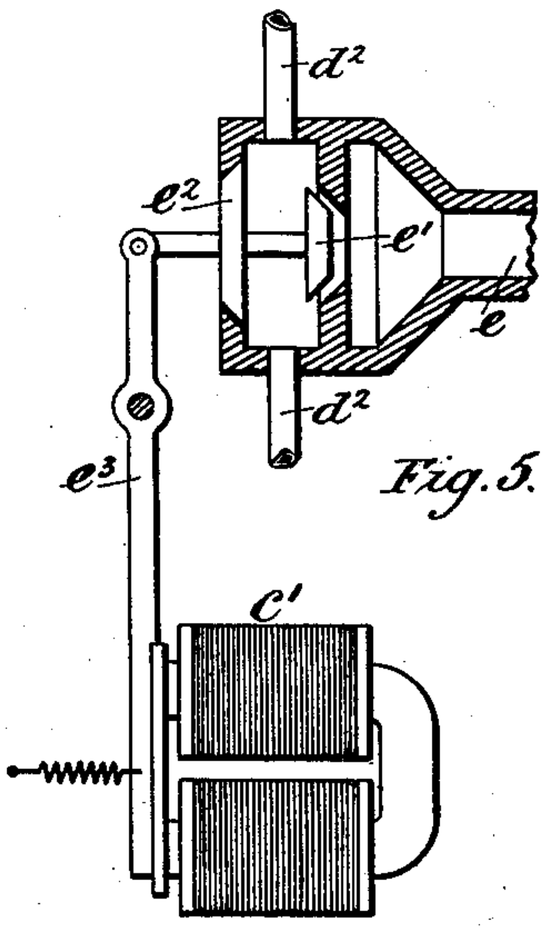


Fig. 5.



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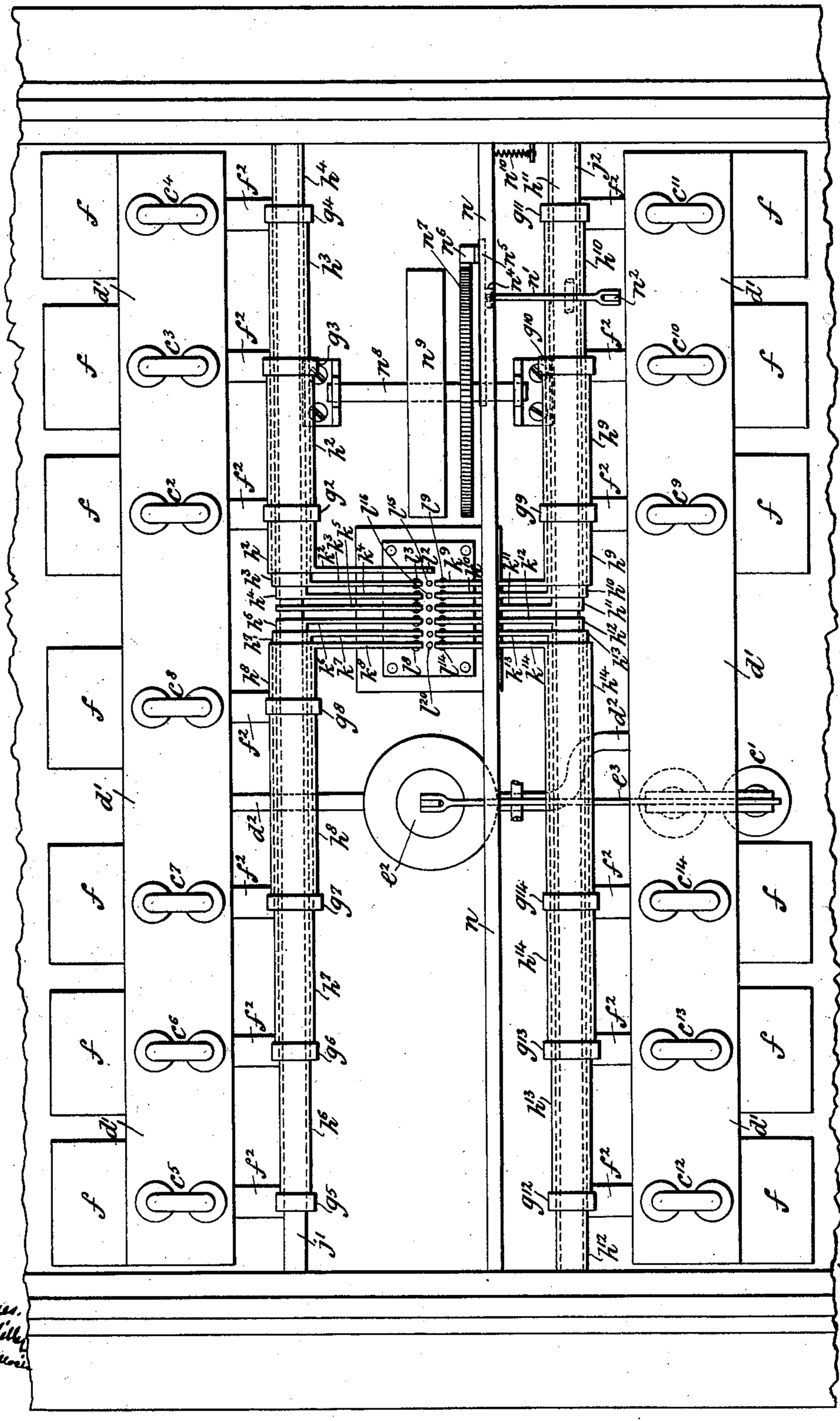
(No Model.) 3 Sheets—Sheet 2.

Fig. 3.



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MACHINE FOR PUNCHING TELEGRAPHIC PAPER.

(Application filed July 26, 1897.)

(No Model.) 3 Sheets—Sheet 3.

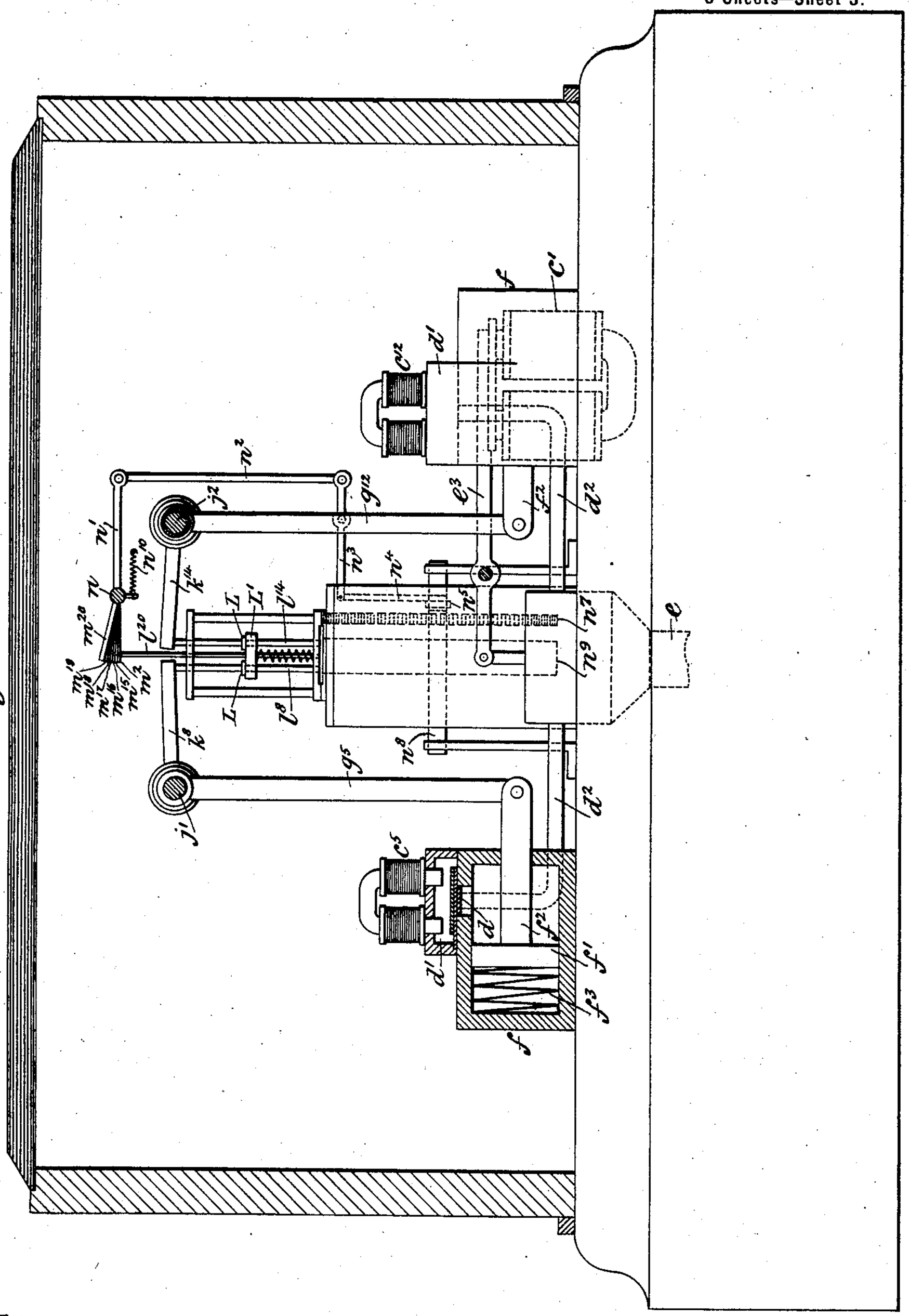

Fig. 4.

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UNITED STATES PATENT OFFICE.

GODFREY MARSDEN GIBSON, OF CHULMLEIGH, ENGLAND.

MACHINE FOR PUNCHING TELEGRAPHIC PAPER.

SPECIFICATION forming part of Letters Patent No. 606,658, dated July 5, 1898.

Application filed July 26, 1897. Serial No. 646,027. (No model.)

To all whom it may concern:

Be it known that I, GODFREY MARSDEN GIBSON, a subject of the Queen of Great Britain, residing at The Rectory, Chulmleigh, North Devon, England, have invented certain new and useful Improvements in Machines for Punching Telegraphic Paper, of which the following is a specification.

According to this invention all the punches used for each letter or character are automatically put into operation by depressing the corresponding key on a keyboard. For this purpose the act of depressing the key makes a number of contacts, closing a number of circuits through electromagnets, whereby the valves of pneumatic cylinders operating the punches are shifted.

Figure 1 is an elevation of one of the finger-keys, and Fig. 2 an elevation of one of the circuit-closers actuated by them. Fig. 3 is a plan, and Fig. 4 a sectional end elevation, of the punching-machine. Fig. 5 is a sectional elevation of the supply and exhaust valve. Fig. 6 shows a piece of the punched paper produced. Fig. 7 is an elevation showing a detail of the feed mechanism. Fig. 8 shows a modification.

a, Fig. 1, is a finger-key carried by a lever a', pivoted at a^2. There is one such key to each letter or character employed.

a^3 are projections on the under side of the lever a', arranged above the transverse bars b' to b^{14}. Each of these bars is mounted as a parallel ruler by links B' from fixed rods B, as shown in Fig. 2, and its end bears against a spring-contact maker B², so that when a bar is depressed a circuit is closed. Six of these circuits actuate, as hereinafter described, punches perforating a strip of paper with holes to correspond to dots in the Morse code and also central holes to feed the paper, six perforate holes to correspond with dashes and also central holes, one perforates a central hole only, and one operates the air supply and exhaust valve. The right-hand end of Fig. 6 shows the result of operating all the punches simultaneously, the holes being marked b^2 to b^{14} to correspond with the bars closing the circuits producing them. It must be understood, however, that the two punches on both sides of the center of the paper are never in practice depressed simultaneously, as this would be equivalent to sending at the same moment a dot-and-dash signal. The actual results produced are such as are shown in the remainder of Fig. 6. The paper shown is that commonly used for submarine telegraphy. It will be obvious, however, that the machine may be modified to punch paper for a Wheatstone transmitter. Every lever a' has projections a^3 above the bars b' and b^2, that above the former being of such a size that this bar is not depressed till after the others. In addition to these two projections each lever has a projection or projections above one or more of the other bars corresponding to the dots and dashes making up the letter or sign marked on the key.

c^2 to c^{14}, Figs. 3 and 4, are magnets through which circuits are closed by the bars b' to b^{14}, respectively. The armatures of the magnets c^2 to c^{14} are carried by flap-valves d, Fig. 4, in air-chests d', connected by pipes d^2 to each other and to the air-supply valve, Fig. 5. In this figure, e is a pipe connected to a reservoir of compressed air, and e' e^2 are valves on a common spindle, connected by a lever e^3 to the armature of the magnet c'. The valve e' leads to the air-pipe e, and e^2 to the outer air.

The chests d' open into cylinders f, having pistons f', piston-rods f^2, and springs f^3, tending to force the pistons outward. The various piston-rods f^2 are pivoted to the lower ends of arms g^2 to g^{14}. The upper ends of the arms g^2 to g^4 and g^6 to g^{14} are fixed to sleeves h^2 to h^4 and h^6 to h^{14}, working one inside the other on two shafts j' j^2, the arm g^5 being fixed to the shaft j'. The sleeves and the shaft j' have fixed to them arms k^2 to k^{14}, resting on the heads of the punches l^2 to l^{14}, the last twelve being side punches and the first a central punch.

Each of the punches l^3 to l^{14} has a collar L, Fig. 4, on it bearing on one or other of six cross-pieces L', each of which carries one of the remaining central punches l^{15} to l^{20}, so that each time one of the punches l^3 to l^{14} is depressed the corresponding central punch is depressed also.

When one of the finger-keys a is put down, three or more of the bars b' to b^{14} are depressed by it, closing circuits through the magnet c^2 and one or more of the magnets c^3 to c^{14} and immediately afterward a circuit

through the magnet c'. The effect is to open the corresponding flap-valves d and then open the air-supply valve e', so that air rushes into those cylinders whose valves have been opened, so depressing the punch l^2 and one or more of the other punches. When the finger-key is released, the circuits are broken, the valve e^2 opens, the cylinders exhaust, and the flap-valves close.

In order to feed the strip of paper forward after the holes corresponding to each character have been punched, the following arrangement is adopted: The central punches are prolonged upward, (see Fig. 4,) and above their heads are arms m^2 and m^{15} to m^{20}, which are omitted in Fig. 3, fixed to a shaft or sleeve n, (see Figs. 3, 4, and 7,) to which is also fixed an arm n', connected by a link n^2, lever n^3, and link n^4 to a lever n^5, carrying a pawl n^6, gearing with the teeth of a ratchet-wheel n^7, fixed to the shaft n^8, which also carries the pin-wheel n^9, by which the paper is fed. The arm m^2 normally rests upon the punch l^2, while the other arms are not normally in contact with their punches; but when the punch l^2 descends the shaft n is turned by the spring n^{10} until it is arrested by the arm m^{15} coming onto the punch l^{15}. Similarly if this punch descends the shaft again turns until m^{16} comes onto l^{16}, and so on. When the punches are released, they are raised again by their springs turning the shaft n back again to its original position and propelling the ratchet-wheel n^7. Thus the angular movement of the shaft n, and consequently the feed of the paper, depends upon the number of holes made in the paper by the central punches—that is, upon the length of the character.

The air-cylinders and the electromagnet c' may be omitted, the electromagnets c^2 to c^{14} being made more powerful and having their armatures fixed to the arms g^2 to g^{14}, as shown in Fig. 8. In all other respects the arrangement is the same as that above described.

I claim—

1. The combination of a number of punches so arranged in relation to each other that the action of one or more of them will without moving the paper produce the holes corresponding to any of the letters or characters employed, electromagnets controlling the punches, contact-makers closing circuits through the magnets, bars mounted as parallel-rulers operating the contact-makers, finger-keys arranged transversely to the bars, and projections between the bars and keys whereby the depression of each key depresses one or more of the bars.

2. The combination of a number of punches so arranged in relation to each other that the action of one or more of them will without moving the paper produce the holes corresponding to any of the letters or characters employed, air-cylinders operating the punches, an air-chest common to the cylinders, valves admitting air to and allowing it to escape from the chest, valves between the chest and cylinders, electromagnets controlling the valves, contact-makers closing circuits through the magnets, and finger-keys operating the contact-makers.

3. The combination of a number of punches so arranged in relation to each other that the action of one or more of them will without moving the paper produce the holes corresponding to any of the letters or characters employed, air-cylinders operating the punches, electromagnets controlling the valves of the cylinders, contact-makers closing circuits through the magnets, bars mounted as parallel-rulers operating the contact-makers, finger-keys arranged transversely to the bars, and projections between the bars and keys whereby the depression of each key depresses one or more of the bars.

4. The combination of a number of punches so arranged in relation to each other that the action of one or more of them will without moving the paper produce the holes corresponding to any of the letters or characters employed, electromagnets operating the punches, contact-makers closing circuits through the magnets, bars mounted as parallel-rulers operating the contact-makers, finger-keys arranged transversely to the bars, and projections between the bars and keys whereby the depression of each key depresses one or more of the bars.

5. The combination of three rows of punches, cross-bars fixed to the punches of the middle row, collars on the other punches bearing on the cross-bars, and means for operating the punches of the two outer rows.

6. The combination of three rows of punches, cross-bars fixed to the punches of the middle row, collars on the other punches bearing on the cross-bars, electromagnets controlling the punches of the two outer rows, contact-makers closing circuits through the magnets, and finger-keys operating the contact-makers.

7. The combination of three rows of punches, cross-bars fixed to the punches of the middle row, collars on the other punches bearing on the cross-bars, electromagnets controlling the punches of the two outer rows, contact-makers closing circuits through the magnets, bars mounted as parallel-rulers operating the contact-makers, finger-keys arranged transversely to the bars, and projections between the bars and keys whereby the depression of each key depresses one or more of the bars.

8. The combination of three rows of punches, cross-bars fixed to the punches of the middle row, collars on the other punches bearing on the cross-bars, air-cylinders operating the punches of the two outer rows, electromagnets controlling the valves of the cylinders, contact-makers closing circuits through the magnets, and finger-keys operating the contact-makers.

9. The combination of three rows of punches, cross-bars fixed to the punches of

the middle row, collars on the other punches bearing on the cross-bars, air-cylinders operating the punches of the two outer rows, electromagnets controlling the valves of the cylinders, contact-makers closing circuits through the magnets, bars mounted as parallel-rulers operating the contact-makers, finger-keys arranged transversely to the bars, and projections between the bars and keys whereby the depression of each key depresses one or more of the bars.

10. The combination of three rows of punches, cross-bars fixed to the punches of the middle row, collars on the other punches bearing on the cross-bars, electromagnets operating the punches of the two outer rows, contact-makers closing circuits through the magnets, and finger-keys operating the contact-makers.

11. The combination of three rows of punches, cross-bars fixed to the punches of the middle row, collars on the other punches bearing on the cross-bars, means for operating the punches of the two outer rows, means for feeding the paper, a shaft operating the same, and arms fixed to the shaft one above each central punch, the distances between the successive arms and the tops of their punches increasing progressively.

12. The combination of three rows of punches, cross-bars fixed to the punches of the middle row, collars on the other punches bearing on the cross-bars, electromagnets controlling the punches of the two outer rows, contact-makers closing circuits through the magnets, finger-keys operating the contact-makers, means for feeding the paper, a shaft operating the same, and arms fixed to the shaft one above each central punch, the distances between the successive arms and the tops of their punches increasing progressively.

13. The combination of three rows of punches, cross-bars fixed to the punches of the middle row, collars on the other punches bearing on the cross-bars, electromagnets controlling the punches of the two outer rows, contact-makers closing circuits through the magnets, bars mounted as parallel-rulers operating the contact-makers, finger-keys arranged transversely to the bars, projections between the bars and keys whereby the depression of each key depresses one or more of the bars, means for feeding the paper, a shaft operating the same, and arms fixed to the shaft one above each central punch, the distances between the successive arms and the tops of their punches increasing progressively.

14. The combination of three rows of punches, cross-bars fixed to the punches of the middle row, collars on the other punches bearing on the cross-bars, air-cylinders operating the punches of the two outer rows, electromagnets controlling the valves of the cylinders, contact-makers closing circuits through the magnets, finger-keys operating the contact-makers, means for feeding the paper, a shaft operating the same, and arms fixed to the shaft one above each central punch, the distances between the successive arms and the tops of their punches increasing progressively.

15. The combination of three rows of punches, cross-bars fixed to the punches of the middle row, collars on the other punches bearing on the cross-bars, air-cylinders operating the punches of the two outer rows, electromagnets controlling the valves of the cylinders, contact-makers closing circuits through the magnets, bars mounted as parallel-rulers operating the contact-makers, finger-keys arranged transversely to the bars, projections between the bars and keys whereby the depression of each key depresses one or more of the bars, means for feeding the paper, a shaft operating the same, and arms fixed to the shaft one above each central punch, the distances between the successive arms and the tops of their punches increasing progressively.

16. The combination of three rows of punches, cross-bars fixed to the punches of the middle row, collars on the other punches bearing on the cross-bars, electromagnets operating the punches of the two outer rows, contact-makers closing circuits through the magnets, finger-keys operating the contact-makers, means for feeding the paper, a shaft operating the same, and arms fixed to the shaft one above each central punch, the distances between the successive arms and the tops of their punches increasing progressively.

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