Sept. 29, 1925.

1,555,683

R. H. MANSON

IMPULSE TRANSMITTER

Filed Oct. 3, 1921

FIG.6

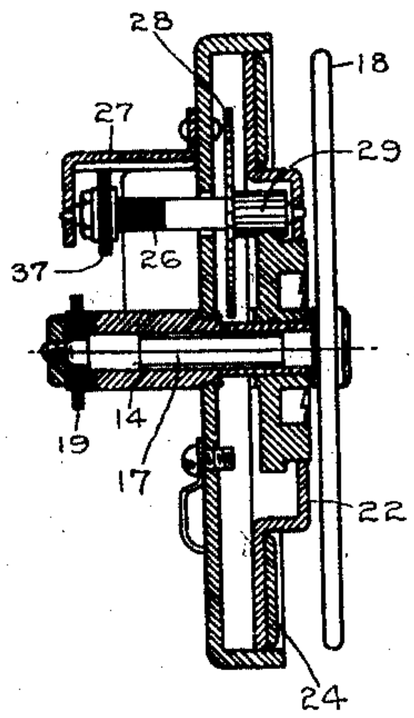


FIG.1

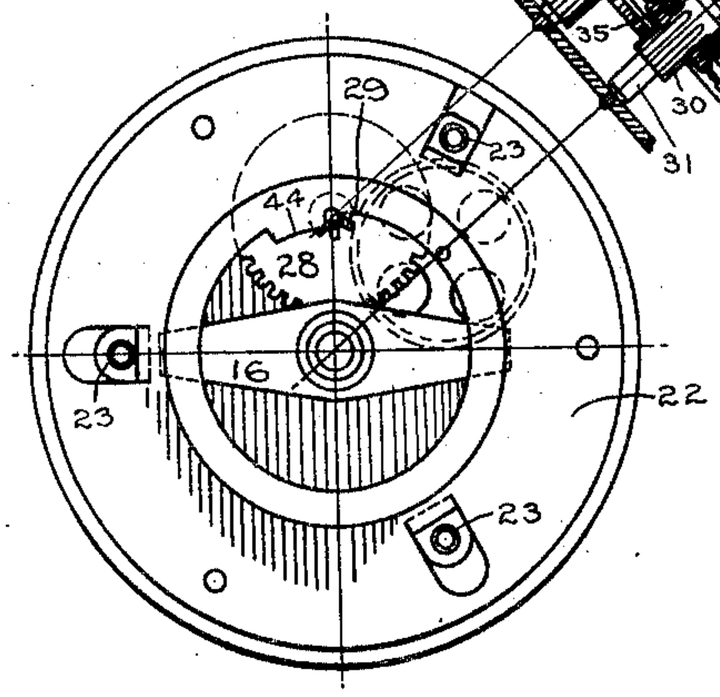


FIG.7

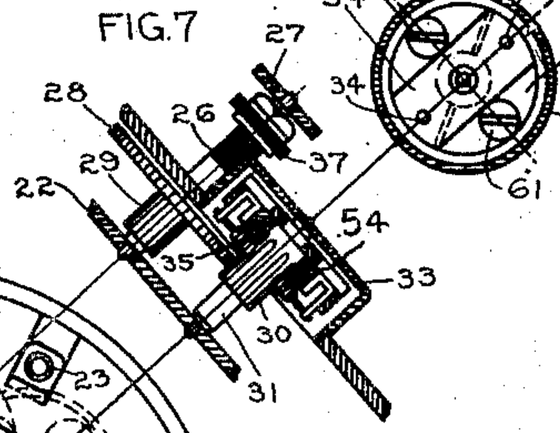


FIG.8

FIG.9

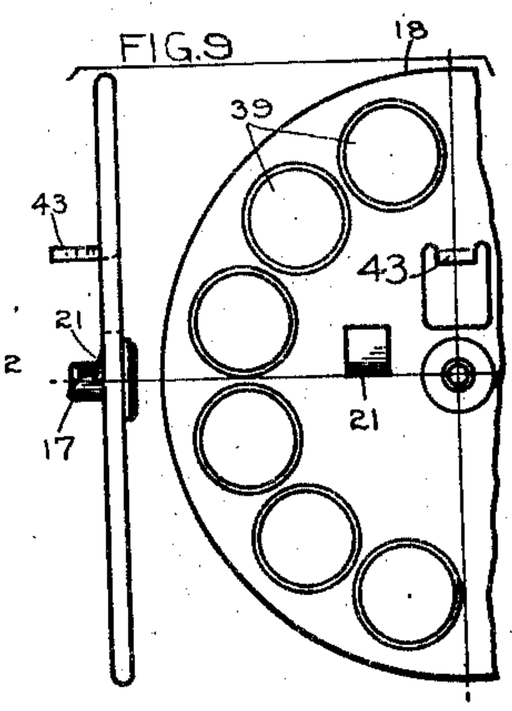


FIG.4

FIG.2

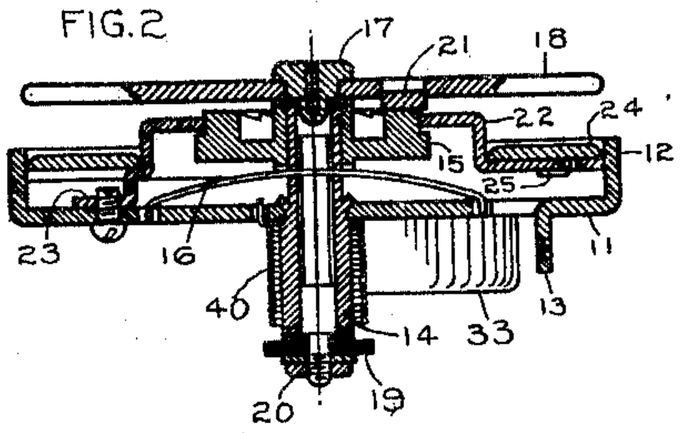


FIG.3

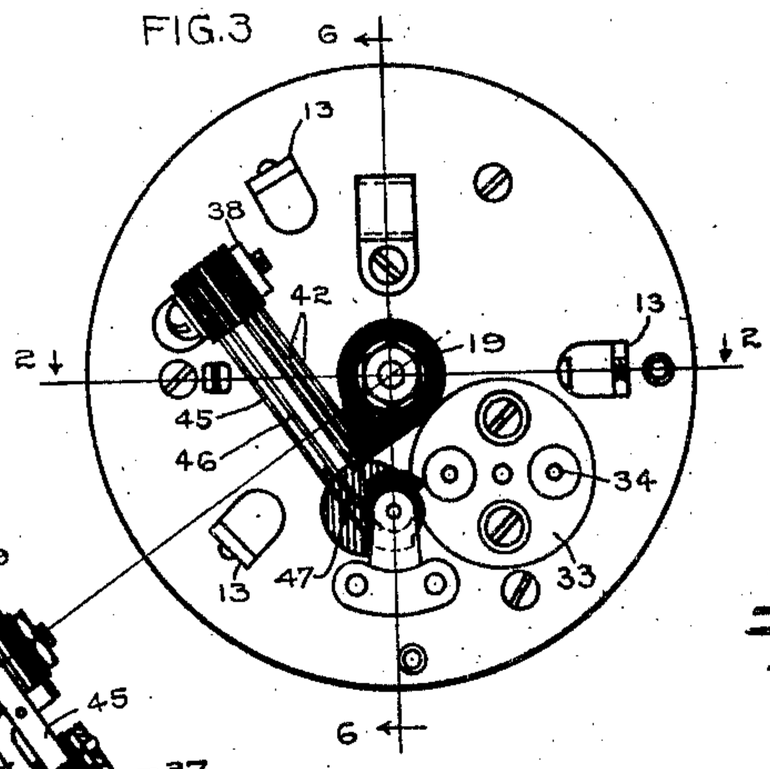


FIG.5

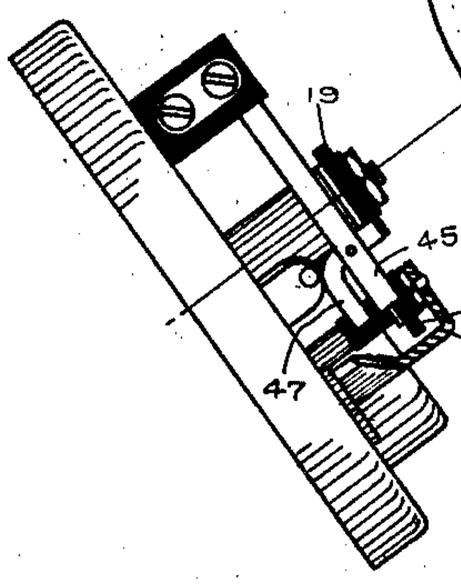
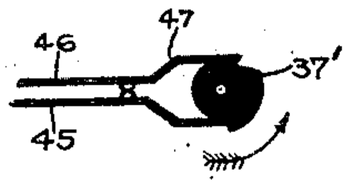


FIG.10

FIG.11



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BY D. Clyde Jones.

ATTORNEY

Patented Sept. 29, 1925. **1,555,683**

UNITED STATES PATENT OFFICE.

RAY H. MANSON, OF ROCHESTER, NEW YORK, ASSIGNOR TO THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

IMPULSE TRANSMITTER.

Application filed October 3, 1921. Serial No. 505,216.

To all whom it may concern:

Be it known that I, RAY H. MANSON, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Impulse Transmitters, of which the following is a full, clear, concise, and exact description.

This invention relates to impulse transmitters and more particularly to impulse transmitters for use in automatic telephone systems.

It is the purpose of this invention to provide an impulse transmitter which is simple in construction, easy to manufacture and economical to install and maintain in operation.

One of the main features in this invention is the novel arrangement of the impulse springs and impulse cam by which the relative adjustment of the impulse springs is maintained independently of the temperature variations or inaccuracy of assembling these springs.

The various features will appear from the detailed description and appended claims.

In the drawing, Fig. 1 represents a top plan view of the impulse transmitter with the finger hold disk, numeral plate and ratchet gear removed; Fig. 2 is a vertical section on the line 2—2 of Fig. 3 looking in the direction of the arrows; Fig. 3 is a bottom view of the impulse transmitter, while Figs. 4 and 5 are side views of the same with certain of the impulse mechanism omitted from Fig. 4 and with the finger hold member and certain other portions omitted from Fig. 5; Fig. 6 is a vertical sectional view taken on the line 6—6 of Fig. 3; Fig. 7 is a vertical sectional view of a portion of the impulse transmitter indicating the arrangement of the impulse cam shaft and governing mechanism; Fig. 8 is a top view of the governor with the top of the governor cup cut away; Fig. 9 represents a side view and a top view of the impulse finger hold disk, a portion of this disk being broken away; and Fig. 10 represents a view of the impulse cam showing the shape of the same. Fig. 11 is a modified showing.

Referring more in detail to the drawings, 11 designates a cup or frame having a flange 12 and struck up lugs 13 by which the impulse transmitter may be secured to a telephone or other support. The cup 12 is provided with a central opening in which a hollow sleeve 14 is staked. On the upper portion of this sleeve a ratchet gear 15 provided with ratchet teeth on its upper surface and with gear teeth about its circumference, is mounted for rotary and longitudinal movement on said sleeve under the control of a flat spring 16. A headed shaft 17 to which the finger hold member 18 is secured, is inserted through the central opening in the sleeve for rotary movement and to the lower end of said shaft an off-normal cam 19 is secured by a nut 20 which also holds the shaft against longitudinal movement in the sleeve. The finger hold member 18, is provided with two ratchets 21 which may be integral with finger hold member 18 or hardened steel pieces secured in openings in the finger hold member in any well known manner. The number of these ratchets is immaterial provided they are symmetrically arranged with respect to each other. However a large number of ratchets provides a large wearing surface while the mentioned arrangement causes a balanced action of the ratchets upon the ratchet gear. A supporting bracket 22 on which various parts of the mechanisms are mounted, is secured to the cup 11 by means of screws threaded into the struck up lugs 23. In the annular space defined by the bracket 22 and flange 12, a porcelain enamel numeral plate 24 is located and is held in place by wires such as 25 integral with the number plate and inserted through openings in the bracket 22 and then bent at right angles. An impulse shaft such as 26 is mounted for rotary movement in a bearing in the bracket 22 and in a bearing formed in supporting arm 27. A pinion 29 is formed on the impulse shaft and a gear 28 is secured thereto in any well known manner. The teeth of the pinion 29 are so constructed and positioned that they mesh with the gear teeth of the ratchet gear 15, while the teeth of the gear 28 mesh with the pinion teeth 30 formed on a governor shaft 31. This governor shaft is mounted at one end in an opening in stop 44 of the bracket 22 and at its other end in an opening in cup 33, which cup is secured to the main cup or frame 11. The governor shaft 31 supports two semi-circular plates 54

which are mounted to rotate on the pivots 34 and a spiral spring such as 35 has its ends secured to the members 61 adjustably mounted in plates 54 to resiliently hold their free ends from engaging the governor cup 33. It will be noted that the members 61 are frictionally held in openings in plates 54 and that their lower ends to which springs 35 is connected, are off-set. When it is desired to increase or lower the speed of the governor, the elements 61 are rotated by means of a screw driver to increase or diminish the tension of spring 35.

At the lower end of the impulse cam shaft 26 there is mounted an impulse cam 37 which consists of insulating material and is shaped in the manner indicated in Fig. 10. On bracket 38 which is struck up from the cup 11 there are insulatedly mounted a plurality of contact springs 42, 45 and 46 to co-operate with off-normal cam 19 and with impulse cam 37.

In the operation of the impulse transmitter the operator inserts his finger in some one of the holes such as 39 of the finger hold disk 18 and rotates this disk as well as the shaft 14 against the tension of the main spring 40 until the operator's finger engages the finger stop 41. During this movement of the finger hold disk the ratchets 21 force the ratchet gear 15 downward against the spring 16 so that the ratchet gear does not partake of this rotary movement of the finger hold disk. The ratchet gear does not partake of this rotary movement owing to certain friction of the apparatus but principally due to the fact that the impulse spring 45 and cam 47 prevent any backward movement of the ratchet gear. However, the off-normal cam 19 is rotated with the shaft 14 and closes the off-normal springs 42 for a purpose well known in this art. As soon as the operator's finger engages the stop 41, he removes it from the finger hold disk 18 whereupon the main spring 40 causes this disk to rotate until its lug 43 engages the stop 44 on the bracket 22 between teeth of pinion 29. During the backward rotation of the disk 18, the ratchets 21 engage the ratchet teeth of the gear 15 whereby this gear is rotated and since it meshes with the pinion 29, the impulse shaft 26 and the impulse cam 37 are rotated to open the impulse springs 45 and 46. It is essential to the operation of the impulse transmitter that these impulse springs 45 be opened and closed at a uniform rate of speed and for this purpose the centrifugal governor mentioned, is provided to control the speed of the backward rotation of the impulse transmitter as will now be described. The gear 28 engages pinion 30 of the governor shaft 31 and if the speed of this shaft accelerates too greatly, the semi-circular plates 54 overcome the tension of the spring 35 and their free ends engage the governor cup 33 and thereby act as a brake to lower the speed of the gear train.

It is important to note the manner in which impulse springs 45 and 46 are controlled. The impulse spring 46 is provided with an extension 47 which rides on the insulated portion of the impulse cam shaft while the impulse spring 45 rides on the periphery of the cam 37. This arrangement insures that there will be a uniform opening and closing of the impulse springs 45 and 46 irrespective of the tension of these springs or other variations due to the temperature changes or inaccuracies of assembly.

It will also be noted that the impulse cam 37 and the impulse cam shaft are prevented from rotation in one direction by reason of the fact that the impulse spring 45 engages the notches 48 in this cam to prevent such reverse rotation of this element.

Fig. 11 shows a modified arrangement of the impulse springs 45 and 46 and a differently shaped impulse cam 37. In this arrangement the free end of impulse spring 46 is positioned on one side of the impulse cam shaft and the free end of impulse spring 45 is positioned on the other side of this shaft. These springs are under tension and spring 46 at its off set portion 47 bears on the cylindrical cam of the impulse shaft, while spring 45 bears on the irregular cam 37'.

What is claimed is:—

1. In an impulse transmitter, in combination with a rotatable element having one surface of regular contour and a cam surface, of means for rotating said element one or more times, an impulse spring continuously bearing on said regular surface, and a second impulse spring intermittently bearing on the cam surface.

2. In an impulse transmitter, the combination with a rotatable element having surfaces, one of which is a cam surface, of means for rotating said element, impulse springs normally in engagement with and bearing on said surfaces, and means including one of said impulse springs for preventing rotation of said rotatable element in one direction.

3. In an impulse transmitter, the combination with a rotatable element having one surface of substantial circular contour and a second surface of irregular contour, of means for rotating said rotatable element, an impulse spring for continuously engaging said surface of circular contour, another impulse spring intermittently engaging the surface of irregular contour and co-operating with said first impulse spring, and means including one of said impulse springs and its associated cam for preventing rotation in one direction of said rotatable element.

4. In an impulse transmitter, the combination with a rotatable shaft having one regular surface and a cam surface, of a pair of impulse contact springs both tensioned

towards said shaft, the free end of one impulse spring co-operating with the regular surface and the free end of the second impulse spring co-operating with the cam surface and means to rotate said impulse cam shaft to actuate said impulse contact springs.

5. In an impulse transmitter, the combination with a rotatable impulse shaft having one regular surface and a cam surface, of a pair of impulse contact springs mounted on the same side of and both tensioned towards said shaft, the free end of one impulse spring co-operating with the regular surface and the free end of the second impulse spring co-operating with the cam surface, and means to rotate said impulse cam shaft to actuate said impulse contact springs.

6. In an impulse transmitter, the combination with a rotatable shaft provided with a regular surface and a cam surface, of a pair of impulse springs mounted adjacent to said shaft and arranged to be normally in engagement with each other, the free end of one of said impulse springs bearing on the regular surface and the free end of the other impulse spring co-operating with said cam surface so as to obtain a uniform opening of said contacts when said shaft is rotated, and means to rotate said shaft .

7. In an impulse transmitter, the combination with a rotatable shaft having an actuating member provided with substantially rigid ratchet teeth, of a spring motor actuated by said shaft to return said shaft to its normal position, a gear train including at one end a ratchet gear for engaging said ratchet teeth, a governor, an impulse shaft controlled by said gear train and governor, said impulse shaft being provided with a surface of substantially circular contour and a second surface of irregular contour, an impulse spring co-operating with each of said surfaces, said impulse springs being normally in engagement and arranged to be separated by the rotation of said surfaces and resilient means for forcing said ratchet gear into engagement with said ratchet tooth.

In witness whereof, I hereunto subscribe my name this 29th day of September A. D. 1921.

RAY H. MANSON.