

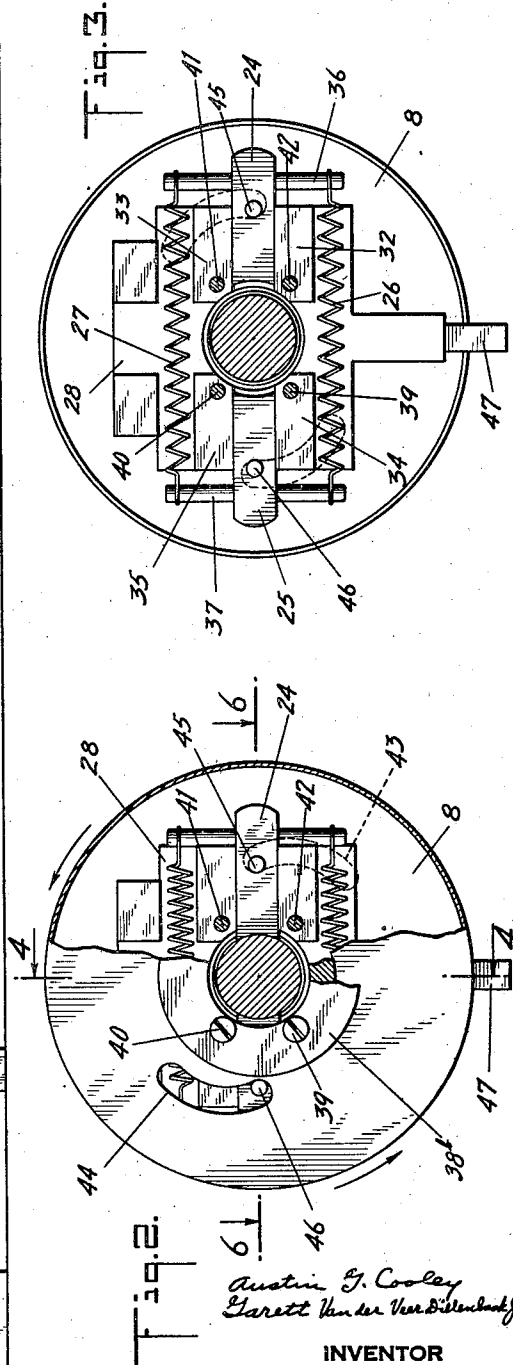
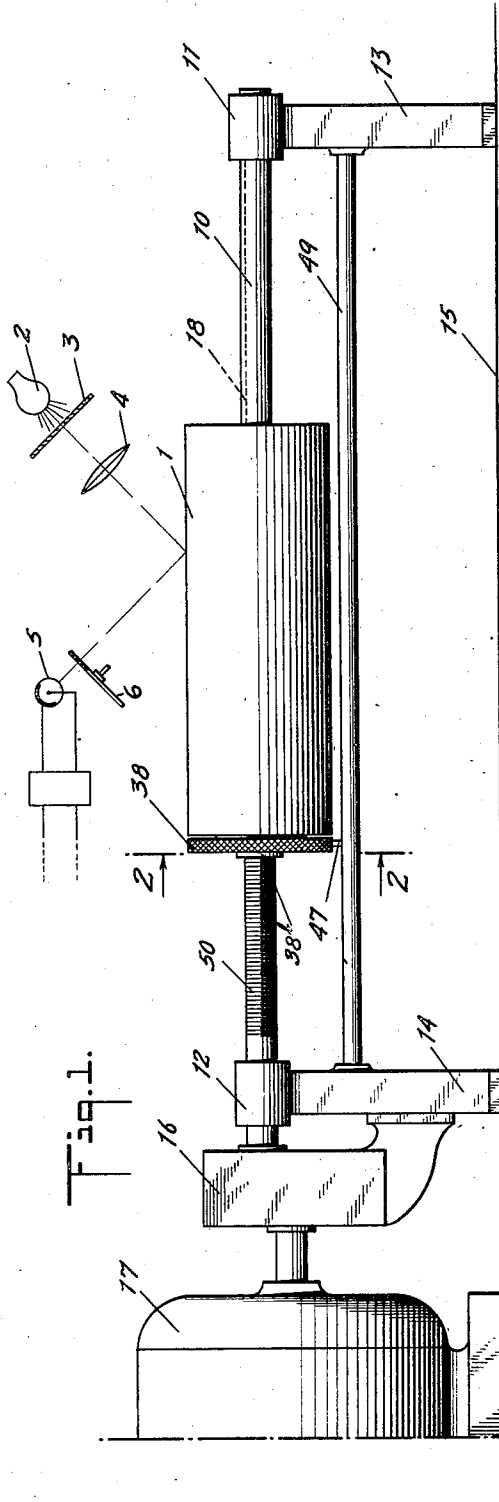
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A. G. COOLEY ET AL
SCREW AND NUT MECHANISM

2,138,784

Filed May 4, 1937

2 Sheets-Sheet 1



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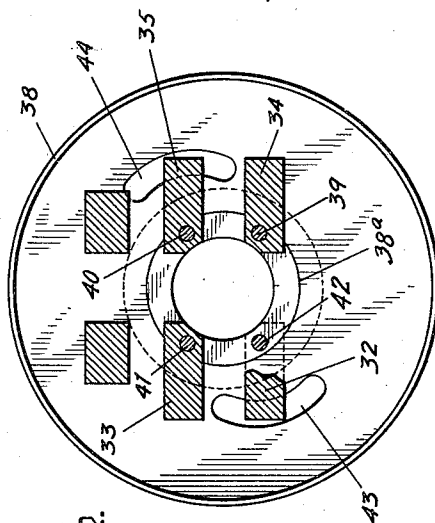
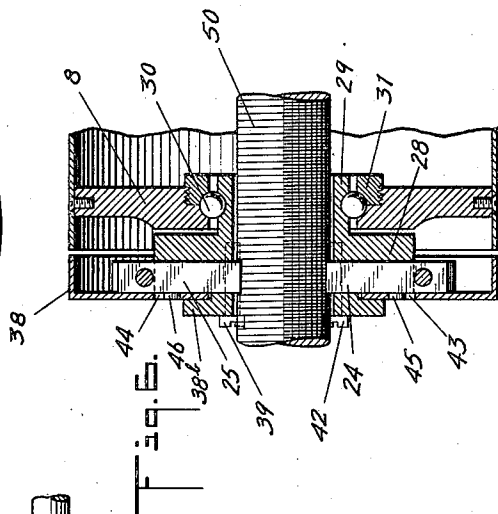
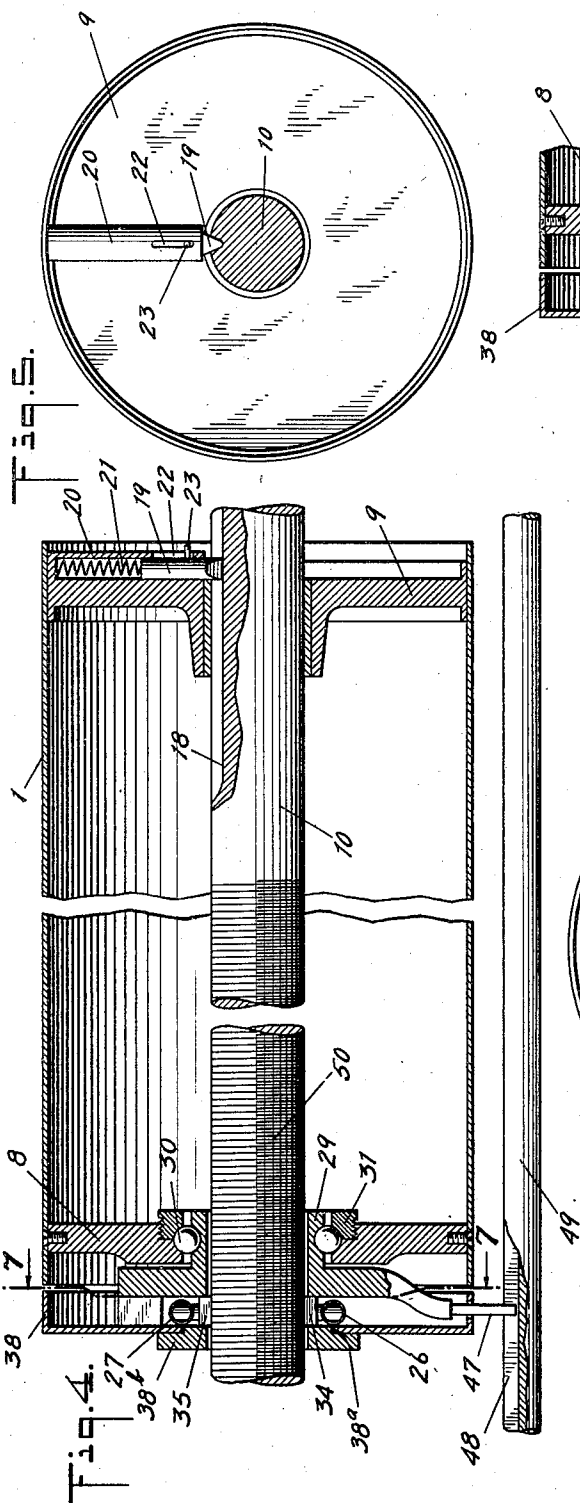
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SCREW AND NUT MECHANISM

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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SCREW AND NUT MECHANISM

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14 Claims. (Cl. 74—424.8)

This invention relates to facsimile apparatus and more particularly to systems for transmitting pictures and other visual representations to a distance by electrical means.

5 A principal object relates to an improved organization of scanning apparatus for a drum type picture transmitter or receiver.

A feature of the invention relates to an improved means for coupling a scanning drum to a
10 lead screw or the like.

Another feature relates to a scanning drum arrangement for a picture transmitter or reproducer, wherein the drum is fed longitudinally directly by means of a lead screw, thus avoiding
15 the use of special gearing and the usual rotating countershaft.

Another feature relates to a novel manner of coupling and uncoupling a picture scanning drum and its concentric lead screw shaft.

20 A further feature relates to a lead screw arrangement for longitudinally feeding and rotating a scanning drum, in conjunction with a novel form of clutch for allowing the drum to be returned along the lead screw without rotating the
25 drum or screw.

Other features and advantages not specifically enumerated will be apparent after a consideration of the following detailed descriptions and the appended claims.

30 In the drawings which show one preferred embodiment of the invention,

Fig. 1 is a front elevational view of a scanning drum arrangement and associated equipment according to the invention.

35 Fig. 2 is a vertical sectional view of Fig. 1 taken along the line 2—2 thereof and with certain parts broken away.

Fig. 3 is another view similar to that of Fig. 1 but with certain parts turned through an angle.

40 Fig. 4 is a vertical longitudinal section of part of Figs. 1 and 2, taken along the line 4—4 of Fig. 2.

Fig. 5 is a right hand end view of Fig. 4.

45 Fig. 6 is a horizontal longitudinal view in section, of part of Figs. 1 and 2, taken along the line 6—6 of Fig. 2.

Fig. 7 is a vertical sectional view of Fig. 4 taken along the line 7—7 thereof.

Inasmuch as the invention is applicable to
50 any well known type of picture transmission system, only sufficient parts of the system are shown to enable a clear understanding of the invention to be attained. Accordingly in the drawings the numeral 1 represents any well
55 known form of scanning drum such as is

customarily employed in picture transmission systems. Preferably, although not necessarily, the drum is of opaque material such as a cylinder of aluminum or other suitable metal. The picture or any other form of visual representation, in the shape of a sheet or film, is wrapped
5 around the drum and held fast thereon in any suitable manner, for example as disclosed in detail in application Serial No. 117,347, filed December 23, 1936. Associated with the drum
10 and mounted in proper spaced relation thereto is any well known form of electro-optical system comprising for example, a source of light 2, an apertured diaphragm 3, and a suitable lens system 4 for projecting an elemental scanning light
15 spot on the picture surface. The light reflected from each elemental area of the picture impinges on a suitable light sensitive device or photo-electric cell 5. If desired the light can be modulated or interrupted at a regular frequency
20 determined by the speed of rotation of the scanning drum, and while a rotating disc light chopper 6 is schematically shown for this purpose other well known means may be employed for
25 producing in the output of cell 5 a current having a regular frequency component for synchronizing purposes, as well as the components corresponding to the shade values of the successive elemental scanned areas of the picture. The picture
30 currents or voltages developed in the cell 5 are preferably amplified and transmitted over any suitable transmission channel to a receiving station in the manner well known in the photo-telegraphic art. For a detailed description of one
35 typical system of this character reference may be had to Patent No. 2,015,742 granted to Austin G. Cooley.

In order to effect the scanning action, the drum
1 must be rotated around its longitudinal axis and also advanced longitudinally along its axis.
40 Heretofore this has been accomplished by mounting the drum for sliding movement on one shaft and providing a counter shaft with suitable gearing to effect the rotational and translational
45 movements of the drum. In another known system the drum carries integrally therewith a lead screw which cooperates with a threaded nut to effect the necessary scanning movement. In accordance with the present invention the drum is
50 mounted for sliding movement on a shaft which has one portion of its length threaded and another portion slidably keyed to the drum. A special form of releasable coupling is provided
55 between the drum and shaft so that the drum can

be moved freely and rapidly in a longitudinal direction at any desired time.

Referring to the drawings, the drum 1 is provided at opposite ends with closure members 8, 9 having aligned axial openings through which passes the shaft 10. Shaft 10 is mounted in suitable bearings 11, 12 in the pedestals 13, 14 which are rigidly fastened to a base 15. At its left-hand end shaft 10 is coupled through suitable gearing 16 driven from a motor 17 of accurately controllable speed. The righthand portion of shaft 10 is provided with a key-way 18 in which rides the spring pressed key 19. For this latter purpose the member 9 is formed with, or has attached thereto, a tubular extension 20 in which key 19 is mounted and a suitable spring 21 may be interposed to press the key into the keyway. Preferably the wall of member 20 is vertically slotted as at 22, to receive a pin 23 fastened to the key, whereby the key may be manually disengaged from the keyway, if and when desired.

The lefthand portion of shaft 10 is threaded and is associated with a correspondingly threaded bi-part member comprising a pair of slidable jaws 24, 25 which are normally held in engagement with the threads on the shaft by springs 26, 27. For this purpose there is provided a block 28 having a cylindrical collar 29 with a peripheral groove to provide a ball bearing race for the ball bearings 30. The block 28 is held in place by a threaded ring 31 which is threaded into the closure member 8. As shown in Figs. 4 and 6, the adjacent faces of members 8 and 31 are grooved to form a race to receive the ball bearings 30. By this arrangement the drum can be rotated freely with relation to block 28. For the purpose of guiding the jaws 24, 25 block 28 is provided with spaced projections 32, 33, 34 and 35 defining diametrically opposite channels in which the said jaws are slidable. Each of the jaws 24, 25 is provided with projecting arms 36, 37 between which the springs 26, 27 extend.

In order to uncouple the drum from the threaded shaft so that it may be slid therealong without the necessity of rotating, there is provided a cup-shaped cover-plate 38 which is mounted for rotation on the portion 38a of the bushing 38b. Bushing 38b is held in place by screws 39 to 42 which are threaded into the projections 32 to 35. Plate 38 is thus capable of being rotated in either direction with respect to shaft 10 and is held against longitudinal displacement by members 38b and said projections 32 to 35. Plate 38 has a pair of oppositely disposed arcuate slots or cams 43, 44 which register with corresponding pins 45, 46 on jaws 24, 25. Block 28 is provided with an arm 47 which extends downwardly through an opening in the rim of cover 38 to engage a keyway 48 in a fixed bar 49 mounted at opposite ends in pedestals 13, 14. The slots 43, 44 are so shaped and positioned that by turning the cover 38 in the direction of the arrows (Fig. 2), the jaws 24, 25 are moved from the position in which they engage the shaft (Fig. 2), to a position where they disengage the shaft (Fig. 3). In both positions of the jaws they are prevented from rotating by reason of the engagement between arm 47 and the keyway in bar 49. In other words when the jaws are in closed position (Fig. 2), rotation of shaft 10 results in a sliding movement of the drum along the said shaft, the rate of movement being controlled by the pitch of the threads 50 and the speed of rotation of the shaft. Of course in this position of the jaws the drum rotates with the shaft 10. When the drum has

been advanced to its extreme left position, that is at the completion of the scanning, it may be returned to its starting position, or to any intermediate position, by turning the cover 38 whereby the jaws 24, 25 are uncoupled from the threaded shaft, and the drum can then be easily and rapidly slid back to the desired position. This arrangement for enabling the drum to be slid to any position along the shaft can be utilized either when the said shaft is rotating or when it is stationary.

While certain specific apparatus and parts have been described it will be understood that the invention is not limited thereto. For example while the drawings illustrate the invention embodied in a transmitting drum it is equally well applicable to a receiving drum. Various other changes and modifications may be made in the disclosed embodiment without departing from the spirit and scope of the invention.

What is claimed is:

1. Facsimile scanning mechanism comprising a rotatable drum to support a member to be scanned, a shaft extending axially through said drum having one portion of its length threaded and another portion slidably keyed to the drum, and a pair of jaws coupled to the drum and releasably engaging said threaded portion of the shaft.

2. Facsimile scanning mechanism comprising a rotatable drum to support a member to be scanned, a shaft extending axially through said drum having a threaded portion and slidably keyed to the drum, means to couple the drum to the threaded portion of the shaft whereby rotation of the shaft causes the drum to rotate and advance on the shaft, and means to release said coupling means to allow the drum to be slid along the shaft without rotation.

3. Facsimile scanning mechanism comprising a rotatable drum to support a member to be scanned, a shaft extending axially through said drum having a portion threaded and another portion slidably keyed to the drum, a pair of threaded jaws, spring means normally maintaining said jaws in engagement with said threaded portion, an arm for controlling the separation of said jaws, and means to couple said jaws to said drum whereby said jaws and drum move longitudinally as a unit with said drum while allowing said drum to rotate relatively to said jaws.

4. Facsimile scanning mechanism comprising a rotatable drum to support a member to be scanned, a shaft slidably keyed to the drum at one end and threaded at the other end, a pair of threaded jaws, means to maintain said jaws normally in engagement with said threaded shaft, means to support said jaws, the last-mentioned means having a collar to provide a bearing for said drum and coupled to said drum to move longitudinally as a unit therewith but allowing relative rotational displacement, and means to open said jaws to allow said drum to slide without rotation on said shaft.

5. Facsimile scanning mechanism comprising a rotatable drum to support a member to be scanned, a shaft extending axially through said drum having a threaded portion and another portion slidably keyed to the drum, a pair of threaded jaws, a block in which said jaws are slidable, means to hold said jaws in engagement with said threaded shaft portion, and cam means for controlling the opening and closing of said jaws.

6. Facsimile scanning mechanism comprising

a rotatable drum to support a member to be scanned, a shaft extending axially through said drum, a member freely surrounding said shaft and carrying a pair of threaded jaws to engage said threaded shaft, means to support said drum at one end for rotation around said member, means to fasten said drum to said member for longitudinal movement as a unit therewith, and means engaging said jaws to control the opening and closing thereof.

7. Facsimile scanning mechanism according to claim 6 in which the last-mentioned means comprises a cover plate having a pair of slots engaging corresponding projections on said jaws.

8. Facsimile scanning mechanism comprising a rotatable drum to support a member to be scanned, a threaded shaft extending axially through said drum, a member mounted for rotation in one end of said drum, a pair of threaded jaws carried by said member and engaging said threaded shaft, an arm extending from said member, guide means to guide the longitudinal movement of said member and arm while restraining them against rotation, and means to advance said member and drum as a unit along said shaft.

9. Facsimile scanning mechanism according to claim 8 in which cam means are provided to open and close said jaws.

10. Facsimile scanning mechanism comprising a rotatable drum to support a member to be scanned, a shaft extending axially through said drum having one end threaded, means to support

said shaft for rotation, means including a sliding key to support said drum at one end on said shaft, a bar extending along said drum in spaced relation thereto said bar having a longitudinal groove, means fastened to the other end of the drum and supported by said bar, the last-mentioned means including a member on which said other end of the drum is mounted for rotation therearound and an arm extending from said member and riding in said groove.

11. Facsimile scanning mechanism according to claim 10 in which a pair of releasable threaded jaws are carried by said member said jaws engaging the threaded end of said shaft.

12. Facsimile scanning mechanism according to claim 10 in which a pair of releasable threaded jaws are carried by said member said jaws engaging said threaded shaft, and a rotatable member having means to engage said jaws to open and close them.

13. Facsimile scanning mechanism according to claim 10 in which a pair of threaded jaws are slidably mounted in said member said jaws each having a projection, and a rotatable member having cam-shaped slots registering with said projections.

14. Facsimile scanning mechanism according to claim 10 in which a pair of threaded jaws are slidably mounted in said member, said jaws being normally held in engagement with the threaded end of the shaft by a pair of springs.

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