

Dec. 12, 1944.

G. H. RIDINGS ET AL

2,364,754

COIN CONTROLLED FACSIMILE SYSTEM

Filed April 18, 1941

4 Sheets-Sheet 1

FIG. 1

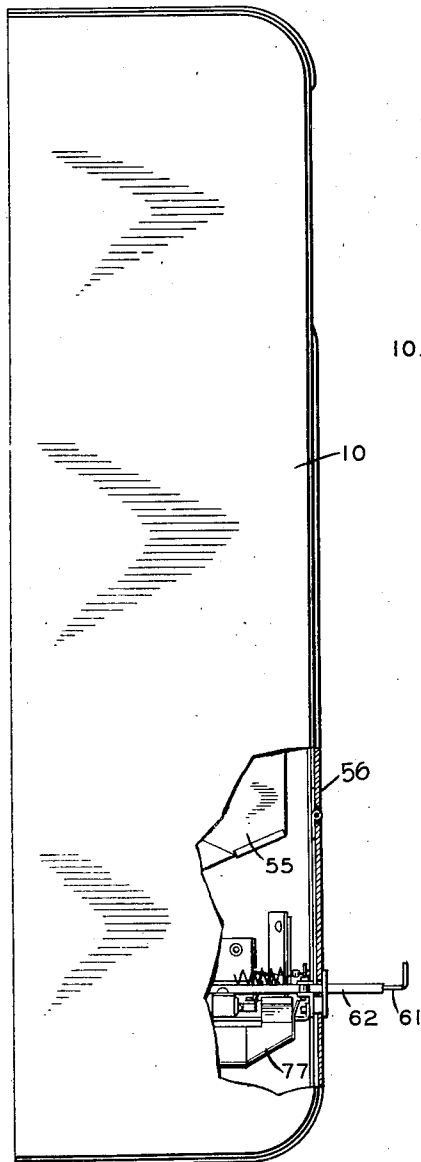
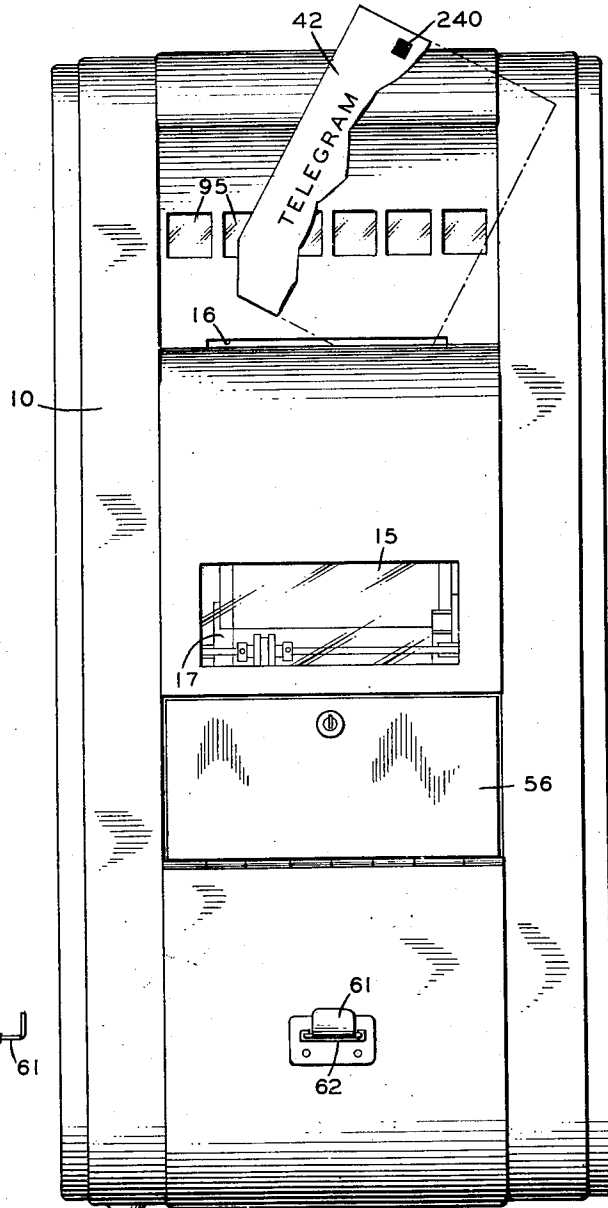


FIG. 2



INVENTORS
G. H. RIDINGS
R. J. WISE

BY

ATTORNEY

Dec. 12, 1944.

G. H. RIDINGS ET AL

2,364,754

COIN CONTROLLED FACSIMILE SYSTEM

Filed April 18, 1941

4 Sheets-Sheet 2

FIG. 6

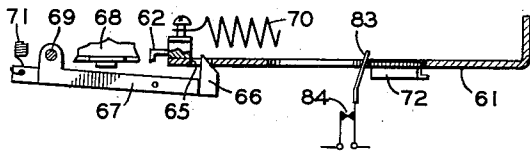


FIG. 7

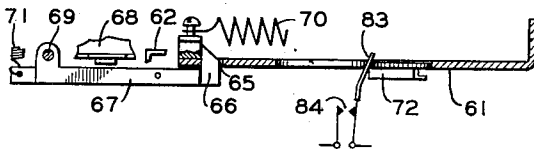


FIG. 3

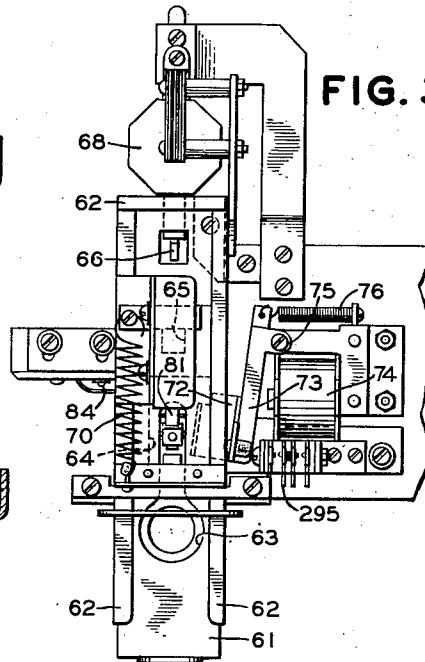


FIG. 4

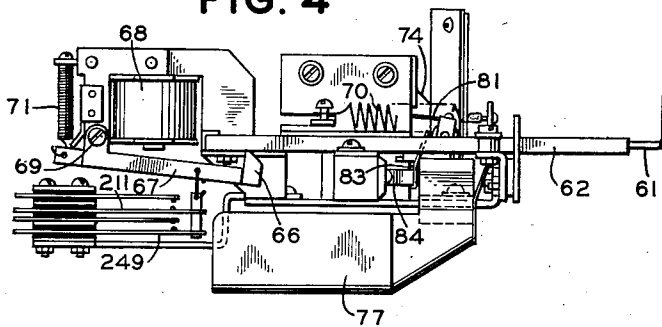
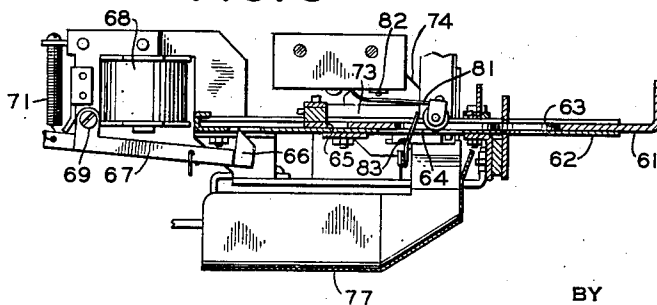


FIG. 5



INVENTORS
G. H. RIDINGS
R. J. WISE

BY

ATTORNEY

Dec. 12, 1944.

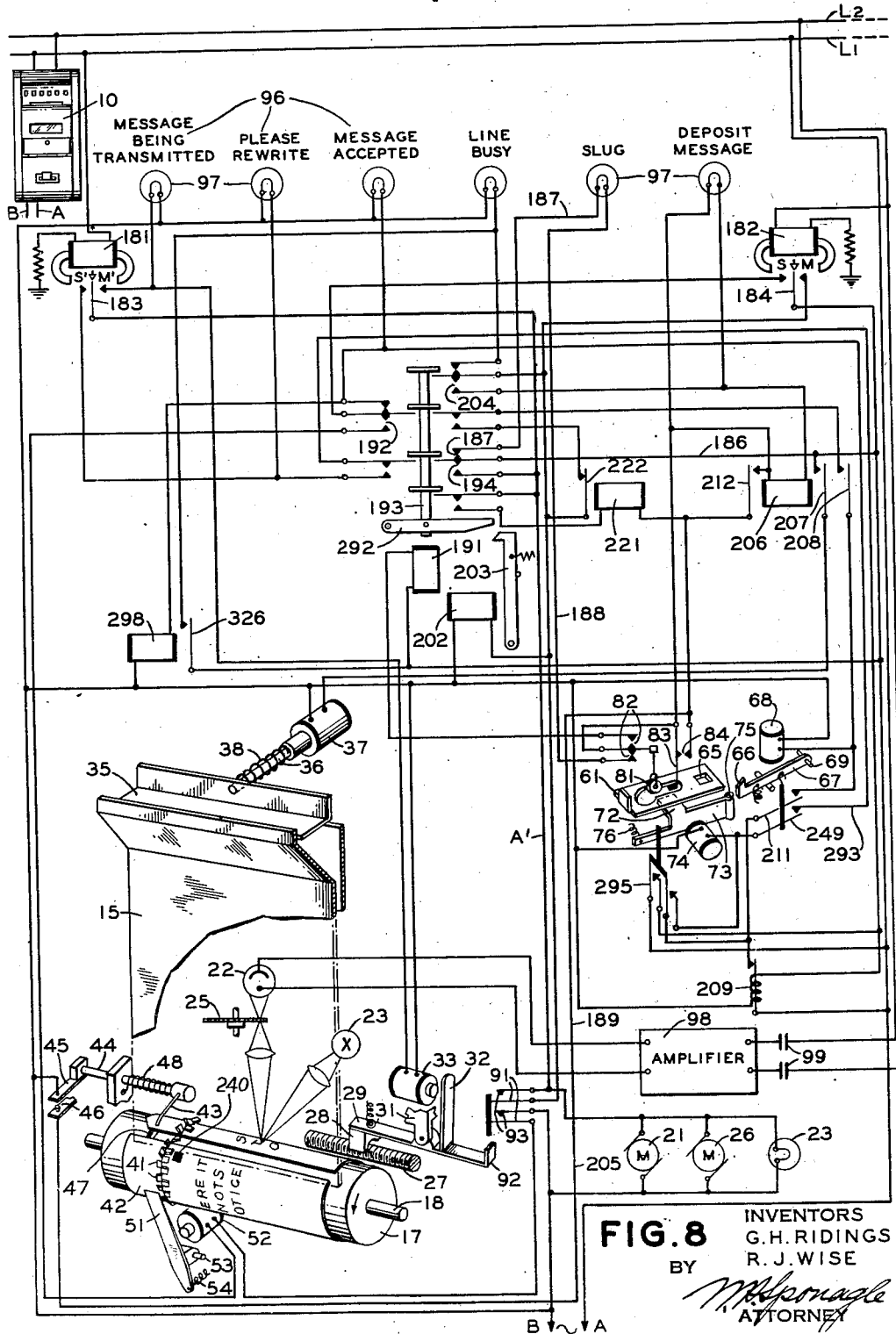
G. H. RIDINGS ET AL

2,364,754

COIN CONTROLLED FACSIMILE SYSTEM

Filed April 18, 1941

4 Sheets-Sheet 3



Dec. 12, 1944.

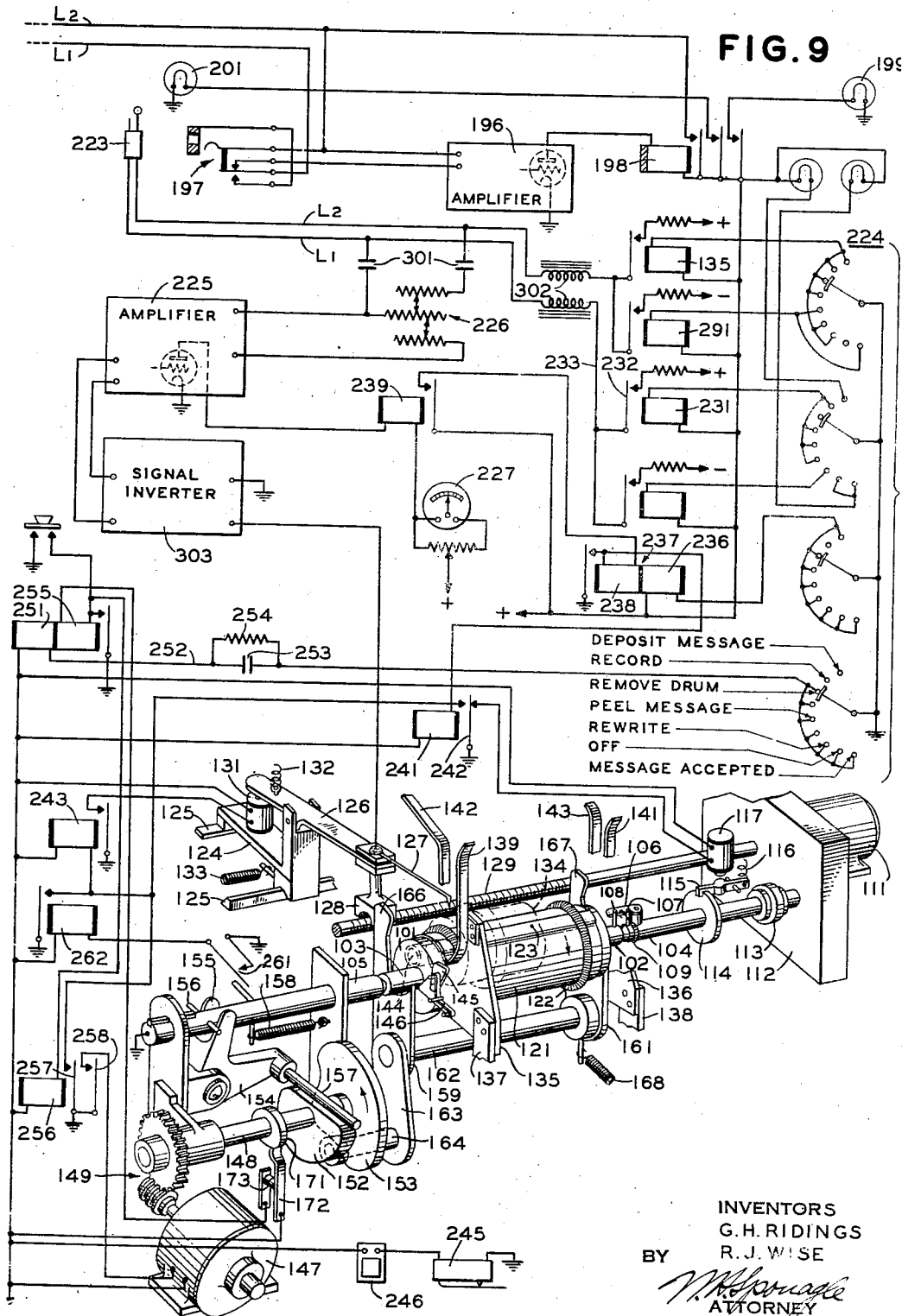
G. H. RIDINGS ET AL.

2,364,754

COIN CONTROLLED FACSIMILE SYSTEM

Filed April 18, 1941

4 Sheets-Sheet 4



UNITED STATES PATENT OFFICE

2,364,754

COIN-CONTROLLED FACSIMILE SYSTEM

Garvice H. Ridings, Summit, and Raleigh J. Wise,
Dunellen, N. J., assignors to The Western
Union Telegraph Company, New York, N. Y., a
corporation of New York

Application April 18, 1941, Serial No. 389,163

6 Claims. (Cl. 194—1)

This invention relates to automatic telegraph systems and particularly to facsimile transmission systems such, for example, as that disclosed in the copending application of Wise et al. for System and apparatus for automatic facsimile telegraphy, filed April 22, 1939, Ser. No. 269,314, now Patent No. 2,262,715, granted November 11, 1941, although it will be apparent that the present invention is not limited to use with any single system or apparatus.

An object of this invention is to provide a check-controlled automatic telegraph transmitter.

A further object is to provide a coin controlled automatic telegraph adapted to be operated by a customer and constructed and arranged to return the coin to the customer if the message to be sent is not acceptable.

A still further object is to provide a mechanism of the type set forth in which acceptance or rejection of the customer's coin is controlled from the receiving apparatus.

These and other objects which will be apparent to those skilled in the art are accomplished by the present invention, one embodiment of which is illustrated in the accompanying drawings in which:

Fig. 1 is a sectional view through an automatic facsimile transmitting apparatus constructed in accordance with one embodiment of this invention;

Fig. 2 is a front elevation of the device shown in Fig. 1;

Fig. 3 is a plan view of a coin device forming a part of this invention;

Figs. 4 and 5 are a side elevation and a section of the device shown in Fig. 3;

Figs. 6 and 7 are fragmentary views of the device shown in Fig. 3 and illustrate some of the features of operation thereof;

Fig. 8 is a diagrammatic showing of a circuit arrangement suitable for use with the present invention; and

Fig. 9 is a diagrammatic showing of a circuit arrangement and parts of an associated receiving apparatus for receiving messages transmitted by the apparatus of Fig. 8.

In the present invention a facsimile transmitting apparatus is located in a box 10 adapted to be mounted on any suitable support such, for example, as a wall, pole or the like. The transmitting apparatus may be similar to that described in Patent No. 2,262,715 and reference is made thereto for a detailed mechanical description thereof. In the present disclosure only such me-

chanical details are shown as are necessary to a complete understanding of this invention.

Transmitting apparatus

The transmitting apparatus (see Figs. 2 and 8) includes a chute 15 of elongated box-like form extending from a slot 16 in the front of the box 10 to a point adjacent a copy or message scanning cylinder 17 mounted on a shaft 18 adapted to be driven through suitable gearing by a synchronous or other speed controlled motor 21. A photo-cell 22, exciter lamp 23, and associated optical mechanism comprising a message scanning mechanism are mounted on a carriage 24 movable longitudinally of the rotary cylinder 17 to scan a message thereon. A light chopper 25 driven by a motor 26 forms a part of the scanning mechanism.

The scanning carriage is moved longitudinally of the cylinder 17 by a rotary feed screw 27 driven by the synchronous motor 21 and adapted to be connected to the carriage by a half-nut 28 on one end of a lever 29 pivoted to a supporting bracket 31 on the carriage and connected to an armature 32 of a half-nut operating magnet 33.

The chute 15 extends from the slot 16 downwardly to a point adjacent the cylinder 17 and is positioned substantially tangent thereto. The mouth of the chute is normally closed by a closure slide 35 connected to the end of the armature 36 of a chute closure magnet 37. A spring 38 holds the slide in chute closing position when the magnet is deenergized. The scanning cylinder 17 is provided with a circumferential series of message holding teeth 41, as described more fully in Patent No. 2,262,715. The teeth engage a message sheet 42 fed downwardly through the chute 15 and cause it to be wrapped in position around the cylinder 17, as diagrammatically indicated in Fig. 8. As described in the said patent, the sheet is formed with a cut corner so as to require being inserted in the chute in the way necessary to insure its being properly positioned on the cylinder for correct transmission of the message subject matter. When on the cylinder, the sheet raises an arm 43 supported on a rock shaft 44 having a switch arm 45 secured thereto for opening and closing switch contacts 46. A circumferential groove 47 in the cylinder receives the end of the arm 43 when no sheet is on the cylinder. The arrangement is such that the contacts are closed when no message sheet is on the cylinder, but, as shown in Fig. 8, a message on the cylinder causes the arm 43 to open the contacts. A torsion spring 48 tends to press the arm into the groove.

When a message on the cylinder has been scanned, it is stripped from the cylinder by a stripper blade 51 formed on or by the armature of a stripper magnet 52. The blade is pivotally mounted on a support 53 and normally held in inoperative position by a spring 54 or the like. The dimensions of the message sheet are such that a gap is left between the edges of the sheet when it is wrapped around the cylinder. The message sheet is stripped from the cylinder by energizing the magnet 52 which moves the stripper blade into position against the cylinder so that the edge slips under the edge of the message sheet and peels it from the cylinder. When peeled from the cylinder, the sheet falls into a bin 55 or the like where it remains until collected by an authorized person having access to the bin through a locked door 56 or the like.

The present invention provides a check-controlled mechanism for operation by a customer in using the transmitting apparatus for sending messages. As illustrated in Figs. 3 to 7, inclusive, a coin slide 61 is slidably mounted in a channel member 62 and is provided with a coin opening 63 of a size to receive and fit a predetermined coin such, for example, as a quarter. The channel member has a similar opening 64 positioned to coincide with the slide opening 63 when the latter is moved to its rearmost position. The slide is normally held in a position extending from the housing of the apparatus so that the opening 63 is accessible to a customer. The slide is held in this position by means of a spring 70 which is attached at one end to the slide and at the other end to any convenient stationary structure such as the channel member substantially as shown. A slide holding opening 65 is located in the coin slide at a point near the rear end thereof. Magnetically controlled mechanism is provided for holding the slide in its rearmost position. As illustrated, this includes a slide holding detent 66 extending upwardly from one end of a lever 67 formed by the armature of a coin return magnet 68. The arm is supported on pivots 69 and normally biased by a spring 71 to inoperative position. When the slide has been pushed inwardly to its rearmost position, the coin return magnet is energized which moves the armature lever 67 to raise detent 66 to engage partially in the opening 65 of the coin slide (Fig. 6) the opening 65 is so positioned and the forward edge of the detent is so beveled that the slide returns a short distance from its rearmost position before the detent 66 engages fully in the opening 65 (Fig. 7), for a purpose to be later described. When in retracted position, the coin is kept from dropping through the slide by the top face of a coin supporting surface 72 formed on one end of an armature 73 of a coin accept magnet 74. The armature is mounted on a pivot 75 for horizontal movement into and out of coin supporting position, a spring 76 normally biasing the armature into such position. The spring is attached at one end to the armature and at the other end to any convenient stationary structure such as the magnet supporting member substantially as shown. When the slide has been pushed in, a coin in the coin opening will be supported therein until the coin accept magnet is energized which withdraws the surface 72 and permits the coin to fall through the opening into a suitable receptacle 77.

When a predetermined coin, for example, a quarter, is placed in the coin slide and the latter

pushed into its rearmost operative position, the face of the coin engages the end of a switch lever 81 to operate the associated switch contacts 82, while the rear edge of the coin engages the end of another switch lever 23 to close the associated contacts 84. It will be apparent that either a coin or a slug thinner or smaller in diameter than a quarter, or a washer, will not operate both sets of contacts and hence, will not operate the machine. The arrangement is such, as will be pointed out hereafter, that an improper coin, or a washer, which operates one switch arm only causes a signal to be given to the customer calling his attention to the fact that a proper coin has not been inserted.

Mounted on the scanning carriage are switch levers 91 adapted to be engaged by a switch operating lug 92 on the adjacent end of the half-nut magnet lever 29 to close the switch contacts 93 when the half-nut magnet is energized.

Across the front of the box 10 is a series of openings or windows 95 provided with signs 96 indicating to the customer the operation of the apparatus or directing him in operating it. The signs are indicated diagrammatically in Fig. 8, and are illuminated at appropriate times by lamps 97 controlled and operated by electrical circuits hereinafter described.

Recording apparatus

The receiving or recording apparatus is usually installed at a central office. It is shown diagrammatically in Fig. 9 and in complete detail in the copending application of Wise et al., Ser. No. 110,760, filed November 13, 1936, now Patent No. 2,255,868 granted September 16, 1941, for System and apparatus for facsimile telegraphy. The blanks upon which messages are to be recorded are mounted on recording cylinders which are inserted in the receiving apparatus one at a time. The recording cylinder is rotated and during rotation a marking stylus which bears on the recording blank and has impressed thereon electrical impulses received over the communication circuit, scans the blank in a direction parallel to the axis of the recording cylinder. Mechanism is provided for removing a recording cylinder and blank after a message recording operation, and replacing them with a fresh blank and cylinder. Mechanism is also provided for storing a plurality of blank bearing recording cylinders in a magazine from which they can be automatically fed in succession to the receiving apparatus.

As illustrated in Fig. 9, a cylinder 101 is shown in position. It has axial arbors 102 and 103 by which it is suspended for rotation between centering spindles 104 and 105, respectively. An arm 106 is pivoted on the spindle 104 and extends in the direction of the cylinder to engage a pin 107 projecting radially from the spindle and also a pin 108 extending radially from the arbor 102. The arm 106 is urged into engagement with the pins by a spring 109, one end of which is attached to the arm and the other end to the spindle 104. This device serves to rotate the recording cylinder 101 when the spindle 104 is rotated. The spindle is rotated by a motor 111 through suitable reduction gearing 112 and a friction clutch 113 which permits stopping rotation of the spindle 104 without stopping the motor. A disc 114 having a notch formed in its periphery is secured to the centering spindle 104. An arm or latch 115, pivotally mounted on a support, not shown, engages the notch when acted upon solely by a retractile

spring 116. An electromagnet 117, termed the framing magnet, is adapted when energized to lift the latch 115 out of the disc notch and permit rotation of the centering spindle 104.

A recording blank 121 is wrapped around the recording cylinder 101, and is secured thereto by suitable means such, for example, as the elastic rings or holding members 122. The blank is mounted on the cylinder so that the peripheral location of the lap 123 of the blank edges invariably bears a definite relation to the peripheral location of the notch in the disc 114. This arrangement is to secure proper phasing between the receiving apparatus and the transmitting apparatus, as will be described more fully hereinafter.

A scanning carriage 124 is slidably mounted on guide rails 125 parallel to the axis of rotation of the cylinder 101. A lever 126 pivotally supported on the carriage carries at one end a recording stylus 127 and a half-nut 128 adapted to engage a threaded feed screw 129 rotated at a suitable speed by the motor 111 through the reduction gearing 112. The other end of the lever 126 is operatively associated with a half-nut magnet 131. When the latter is deenergized, a spring 132 moves the lever to cause the half-nut to engage the feed screw, and the stylus to contact a recording blank on the cylinder 101. As shown in Fig. 9, engagement of the half-nut and feed screw moves the carriage 124 to the right against the tension of a retractile spring 133. At the end of a scanning and recording operation, energizing the half-nut magnet 131 disengages the half-nut from the screw and the carriage is returned to its initial position, as illustrated, by the spring 133.

As illustrated, the recording machine has facilities for automatically discharging a recording cylinder after a recording operation and for feeding a fresh cylinder and blank into the machine. A magazine or supply of fresh cylinders is provided (one of which 134 is indicated in dotted lines). A rack for storing fresh cylinders is formed by two rail members 135 and 136 mounted on a pair of supporting brackets 137 and 138, respectively, and spaced apart slightly more than the length of a cylinder 101. A pair of resilient upright members 139 and 141 are secured to the rail members 135 and 136, respectively, to guide the stored cylinders toward the scanning device. The cylinder 134 next to be positioned in the machine is held in readiness by having its arbors 144 supported by the upper ends of a pair of detents, one of which 145 is shown. Each detent is pivoted at its lower end on the associated rail member and is normally held in cylinder restraining position by a resilient member such as a spring 146.

At the end of a scanning and recording operation a cylinder changing motor 147 is operated to drive a shaft 148 through a worm and gear drive 149. Cams 152 and 153 are secured to the shaft. A pivoted bell crank 154 has a fork 155 on one end engaging a pair of pins 156 on the centering spindle 105, and a cam follower 157 on the other end engaging the cam 152. Obviously, rotation of the cam 152 moves the spindle longitudinally against the tension of a spring 158.

Longitudinal movement of the spindle withdraws it from engagement with the cylinder arbor 103 permitting the cylinder to drop onto a cradle formed by grooves in a pair of members 159 and 161, mounted on a rocker shaft 162 journaled in any convenient bearings. Means for rocking the shaft includes a crank arm 163 secured thereto

and having a cam follower 164 secured to its end and engaging the cam 153. Hence, rotation of the shaft 148 by the motor 147 causes the cam 153 to rock the shaft 162 clockwise as viewed in Fig. 9, thereby imparting a similar movement to the cradle members 159 and 161. This moves the latter outwardly until a position is reached in which the cylinder 101 rolls by gravity from the cradle recesses into any suitable receptacle, conveyor or the like. Further rocking movement moves extensions 166 and 167 of the cradle members 159 and 161, respectively, into engagement with the associated detents 145 which are thus moved out of the downward path of the arbors on recording cylinders stacked in the racks 139 and 141 permitting the next cylinder to drop so that its arbors rest on the upper edges of the extension arms 166 and 167. Continued rotation of the cam 153 returns the cradle members to upright position under influence of a spring 168 connected to one of the cradle members. This withdraws the arms 166 and 167 permitting the cylinder arbors to roll into the cradle recesses and the fresh cylinder is carried thereby into position to be engaged by the centering points on the centering spindles 104 and 105. When in the cradle recesses the axis of the cylinder lies slightly below the center of rotation provided by the centering spindles, but the conical form of the supporting centers lifts the cylinder when the spindle 105 is moved inwardly and the cylinder is thereby held free to rotate.

Operation of the cylinder changing cycle is initiated by applying power to the motor 147 after a recording operation, or at any other time, by means to be more fully described hereinafter. A cam 171 is so oriented on the cam shaft 148 with respect to the cams 152 and 153 that, at the completion of a cylinder changing cycle, it operates an associated switch 172 to momentarily break the contacts 173. Through means to be described this cuts off power to the motor. The arrangement is such that before the motor is brought to a stop by its braking system, the cam 171 moves sufficiently to permit reclosing of the contacts 173.

Communication circuit

The communication circuit connecting the transmitting apparatus (Fig. 8) and the receiving apparatus (Fig. 9) comprises a pair of conductors L1 and L2 which are used simultaneously for the transmission of the alternating current facsimile signals or message impulses and the direct current control signals by which the operation of the transmitting and receiving apparatus is controlled. The facsimile signals originate at the photoelectric cell 22 which is connected to an amplifier 98, the output circuit of which is connected through a pair of blocking condensers 99 to the conductors L1 and L2. The purpose of the blocking condensers is to isolate the alternating current facsimile signals from the direct current control signals. The polarity of the direct current potentials which are applied to the conductor L1 is controlled by apparatus at the receiving station for the purpose of operating a polar relay 181 connected to this conductor at the transmitting station. Similarly, the polarity of the direct current potentials which are applied to the conductor L2 is controlled by the apparatus at the receiving station for the purpose of operating a polar relay 182 connected to this conductor at the transmitting station. Each of these polar relays is of the three-position type whereby the tongue is moved to one extreme contact in re-

sponse to one polarity of potential, to the other extreme contact in response to the opposite polarity of potential, and to a mid-position disengaged from both of the extreme contacts in response to a no-current condition. The tongue 183 of the relay 181 cooperates with contacts *m'* and *s'*. The tongue 184 of the relay 182 cooperates with contacts *m* and *s*.

It should be understood that a number of separate transmitting mechanisms may normally be connected to a single communication circuit in a party line system and that each transmitter is adapted to be locked against operation when any other transmitter on the same line is operating, as will be described hereinafter and as is fully set forth in Patent No. 2,262,715.

Operation

The operation of the system will be described in conjunction with Figs. 8 and 9 taken together. It is assumed that power is applied to the transmitting apparatus by connecting any suitable source of alternating current potential 185 to the bus bars A and B, and that bus bar A' in Fig. 8 is electrically an extension of A.

Assuming a customer has a prepared message to be transmitted, he places the required coin such, for example, as a quarter in the coin opening 63 of the slide 61 and presses the latter inwardly to the limit of its movement, causing the coin to move the switch arms 81 and 83 to close the associated switch contacts 82 and 84, respectively.

If a coin of improper size, or a washer, is employed it will be apparent that one or the other of the switch arms will not operate to close the associated contacts and the apparatus will not operate. If a washer having a central hole, or a coin of proper size but too thin for a quarter is used, the rear switch arm 83 will close the contacts 84 but the center switch arm 81 will drop, keeping the lower of the contacts 82 closed and leaving the upper open, the position shown in Fig. 8. Under these circumstances a signal is operated to attract the customer's attention. As illustrated, the signal comprises a sign marked "Slug," or other suitable marking, illuminated by one of the lamps 97 above referred to, the circuit for which is provided by a conductor 186 connecting bus bar A through the upper contacts of a switch 187 to the lamp, the other side of the lamp being connected by conductor 188, lower switch contacts 82, switch contacts 84, conductor 189 and drum contacts 46, closed at this time, to B bus bar.

However, assuming a proper coin to have been used and the coin slide pushed in, the switch arm 81 will be lifted to open the lower contacts 82 and close the upper, while the switch arm 83 is operated to close the contacts 84. This operation energizes the coil of a relay 191 drawing downwardly the relay armature 192 and a multi-contact switch arm 193 connected to the armature. One set of contacts 194 of the multi-contact switch connects power to the exciter lamp 23 of the photocell system, also to the synchronous motor 21 driving the scanning mechanism, and to the light chopper motor 26. Power, suitably rectified where necessary, is applied to the amplifier 98 in any conventional manner, not shown. The beam from the exciter lamp 23 is reflected from the cylinder through the optical system of the photocell, including the light chopper 25 to the photocell 22 and causes a carrier to be generated

and passed through the amplifier to the wires L1 and L2 of the communication circuit. At the central station, where the receiving apparatus is usually located, see Fig. 9, this carrier signal is picked up by a line amplifier 196 which is floating on the circuit at all times through normalization of the line jack 197. This signal operates a relay 198 in the plate circuit of an output tube, lighting a lamp 199 to attract the attention of a station operator or attendant. One of the contacts of the relay 198 also lights a lamp 201 over the line jack 197, associated with the particular communication circuit, and a third contact of the relay puts positive potential on the line L2 which operates the polar relay 182 moving the tongue 184 thereof into engagement with the marking contact *m*. This energizes a magnet 202 moving the armature 203 thereof to the left in Fig. 8 and positioning the hooked end thereof over the end of the armature 192 and locking it and the associated multi-contact switch arm 193 in operative position.

As hereinafter pointed out, the magnet 202 may also be energized under certain conditions of operation, without first energizing the magnet 191, in which case the armature 203 would be positioned under the armature 192 and prevent movement thereof, thus locking the transmitting apparatus against operation.

Operation of the polar relay 182 as described also causes the "Deposit message" light to light, current passing thereto from the A bus bar through the polar relay, switch contacts 204, lamp, coin slide operated switch contacts 84, conductor 205 and closed drum contacts 46 to B bus bar. At the same time the relay 206 is operated, one tongue 207 of which causes the chute magnet 37 to be energized and withdraw the chute closure 35 to permit a message to be placed therein. Simultaneously, a second tongue 208 on relay 206 energizes the coin return magnet 68, which is self-locking through the tongue 211 and the normally closed contact of a thermal relay 209. Energizing the magnet 68 moves the armature 67 to position the detent 66 in the slide holding opening. A back contact 212 on the relay 206 also connects the relay to the conductor 189 without passing through the switch contacts 84 so that the latter can be opened without releasing the relay. As will be later apparent, this prevents reopening of the chute 15 when the circuit is operated to accept the coin 65 in the coin slide 61, thus holding it in retracted position while permitting the coin slide to return just far enough to open the switch contacts 84. The coin in the slide rests on the face of the lever 72. The message sheet is placed in the chute by the customer. It passes down the chute to the rotating scanning cylinder 17 around which it is wrapped in the manner illustrated in Fig. 8, and described more fully in Patent No. 2,262,715. This causes the arm 43 to be lifted out of the groove 47, opening the drum contacts 46, putting out the "Deposit message" light and releasing relay 206. This deenergizes the chute magnet 37, closing the chute. The coin release magnet 68 remains locked through the closed thermal relay contact. Opening the drum contacts also deenergizes the relay 221, which had been previously energized on downward movement of the multi-contact switch 193, and permits closing a back contact 222 which keeps power on the transmitting apparatus as long as a message is on the scanning

cylinder 17. This prevents the central office operator from turning off the machine by mistake.

The central office operator, seeing the lights 199 and 201, plugs into the jack 197 with a plug 223. This disconnects the line amplifier 198 from the lines L1 and L2 and connects a rotary switch 224 and a recording amplifier 225 to the communication circuit. Adjustment of the power level is made by means of a pad 226 at the input of the recording amplifier 225 until the indicator of a meter 227 associated with the amplifier indicates the desired value. The rotary switch 224 has four sets of contacts and four switch arms which are operated simultaneously. The movable contact on each arm is in the form of a brush so that as the switch arms are moved the contact on each maintains connection so that contact is made with the next point before the brush leaves the last preceding point.

It should be understood that the rotary switch was on No. 1 position marked "Deposit message" at the beginning of the operation, see Fig. 9. After adjustment of the power, the rotary switch is moved to the No. 2 position marked "Record." This puts positive potential on the line L1 by operating a relay 231, the tongue 232 of which applies positive potential to the line L1 through a conductor 233, plug 223 and jack 197. At the same time a relay 235 is held active to put positive potential on line L2.

Positive potential on line L1 operates the polar relay 181 at the transmitting apparatus moving the tongue 183 thereof to engage the marking contact *m'*. This causes the half-nut magnet 33 to be energized, engaging the half-nut 28 with the feed screw 27 and moving the scanning carriage longitudinally of the rotating scanning cylinder 17 to scan the message on the cylinder. At the same time, the signal light "Message being transmitted" is lighted to inform the customer.

Also, the number 2 position of the rotary switch 224, by means of the third brush releases the locking coil 236 of a relay 237, which had been energized by the previous position of the switch. This permits the other coil 238 of the relay to be released by a relay 239 in the plate circuit of one of the recording amplifier tubes. The relay 239 is operated as a result of the exciter lamp beam passing over a black mark 240 suitably located on the message sheet, as described in Patent No. 2,262,715. Briefly, the scanning light at the transmitter causes a carrier signal to be received by the amplifier 235, with the plug in the jack. Incidence of the light on the black mark causes the received carrier to drop in amplitude and this releases the relay 239. This, in turn, releases the relay 237 which deenergizes a phasing relay 241, the tongue 242 of which thereupon closes the circuit of the framing magnet 117 on the recording mechanism. The rotary switch 224 is left in the No. 2 position during transmission of the message.

Assuming that a recording cylinder 101 was in position between the centering spindles 104 and 105 at the beginning of the above described operations and the motor 111 operating, it will be apparent that, when the relay 241 is energized the tongue 242 is in position to open the framing or latch release magnet circuit. Hence, rotation of the centering spindle 104, and of the supported cylinder is prevented by the phasing latch 115 engaging the notch in the disc 114, the friction drive 113 slipping at this time. Also, the relay 241 being energized operates a relay 243, the tongue of which closes the circuit of the half-nut

and stylus magnet 131 on the recorder holding the half-nut and stylus in inoperative position. When the phasing relay 241 is deenergized as a result of the black mark passing under the beam of the exciter lamp 23, the latch magnet is energized to unlatch the driving spindle 104 and begin rotation of the recording cylinder 101 in phase with the scanning cylinder 17. Simultaneously, the relay 243 is released which in turn deenergizes the half-nut and stylus magnet 131 permitting the spring 132 to move the armature 126 to place the stylus in operative engagement with the surface of the message blank on the recording cylinder 101 and the half-nut in engagement with the feed screw 129 to move the stylus longitudinally along the recording cylinder.

When the carriage has traveled far enough to record the message, a carriage controlled contact 245 is made to operate a buzzer 246 to attract the operator's attention.

Upon completion of the transmitting operation, the switch 224 is moved to its No. 3 position. This releases relay 231 and removes potential from line L1, releases polar relay 181 at the transmitting station returning the tongue 183 to neutral position. This deenergizes the half-nut magnet 33 on the scanning carriage permitting the latter to return to its starting position. Also, the "Message being transmitted" light is extinguished.

With the rotary switch in the No. 3 position, the phasing relay 237 is again operated and is locked by the relay 239. Relay 237 operates relay 241 to deenergize the framing magnet 117 to permit the latch 115 to again engage the disc 114 and hold the spindle and recording cylinder stationary. Relay 243 is operated to energize the recording half-nut magnet 131 to disengage the half-nut 128 from the feed screw and permit return of the recording carriage to its original position.

The lowest brush of the rotary switch when in No. 3 position operates a drum removal relay 251 to which the switch is connected by a conductor 252 through a condenser 253 having a by-pass resistance 254. The tongue of the relay 251 operates the locking coil 255, the circuit of which includes the cam controlled contacts 173 of the switch 172. The relay 251 also operates a relay 256, one tongue 257 of which controls the circuit of the motor 147 for changing the recording cylinders 101. The other tongue 258 of the relay 256 also controls the half-nut magnet relay 243. Hence, operation of the relay 251 operates the cylinder change motor 147 at the recorder causing the cylinder with the transcribed message to be ejected from the machine and a new cylinder put in place. This is accomplished in one revolution of the cam shaft 148, at the end of which cam 171 momentarily opens contacts 173 releasing the relay 251 and stopping the motor 147. With the rotary switch on No. 3 position, the conductor 252 is grounded. The momentary surge of current charging the condenser 253 is sufficient to operate the relay. Even if the cylinder changing operation is completed before the rotary switch is moved off No. 3 position, the relay 251 will release upon the circuit of the locking coil 255 being broken by the opening of contact 173.

If for any reason a recording cylinder is not in position in the receiving apparatus, the longitudinally movable spindle 105 will move inwardly, to the right in Fig. 9, sufficiently far to close an overthrow switch 261 operating a relay 262 which

operates relay 243 to energize the half-nut magnet and prevent operation of the recording stylus and carriage.

The central office operator, if he finds the recorded message satisfactory will move the rotary switch through the No. 4 to the No. 5 position. In passing through the No. 4 position a positive potential is again put in L1, operating polar relay 181 at the transmitting station and momentarily energizing the half-nut magnet 33. The lug 92 on the half-nut lever 29 engages the switch levers 91 to close contacts 93 when the magnet is energized. The purpose of this is to keep the multi-contact switch locking magnet 202 energized when positive potential is removed from line L2.

When the rotary switch is in the No. 5 position positive potential is supplied to line L1 by operation of the relay 231, while relay 235 is released, removing positive potential from line L2 and relay 291 is operated to apply negative potential thereto. Negative potential on line L2 moves the tongue 184 of polar relay 182 to engage the spacing contact s. Through multi-switch contacts 292 and contacts 93 this operates the peel magnet 52 to remove the message blank from the scanning cylinder. If the message has been received satisfactorily, after peeling the rotary switch is turned to the No. 9 position in which there is no potential on line L1 and negative potential on line L2. This places the tongue of polar relay 181 in neutral position releasing the half-nut magnet 33 and opening contacts 93. Simultaneously, the tongue 184 of polar relay 182 engages its s contact. The multi-switch locking magnet is released and the switch arm 193 is raised to the position shown in Fig. 6. This lights the "Message accepted" light at the transmitting station. At the same time the coin accept magnet 74 is energized and locked through the thermal relay contact to withdraw the coin supporting lever 72 away from beneath the coin slide permitting the coin to drop into any suitable receptacle, the magnet circuit being through relay contacts 294, conductor 293, upper switch contacts 292 to polar relay contact s. Operation of the coin accept magnet operates the thermal relay 209 through contact 295 to open, after a few seconds, the closed contact thereof and release the magnet 68 returning the coin slide to its original position.

If, on the other hand, the recorded copy of the message is not satisfactory, the operator at the recording station may rerun the message with either increased or decreased power, that is, after the rotary switch has been placed in No. 3 position and the copy has been read, if a darker or a lighter copy is desired the operator can make a suitable adjustment of the pad 226 and then return the switch to its No. 2 position in which the recording operation will be repeated. If, on the other hand, the original message is not legible, it will be impossible to obtain a legible copy. In this event the operator moves the rotary switch from its No. 3 position through the Nos. 4, 5 and 6 positions to the No. 7 position. The No. 6 position functions in the same way as No. 4 described above in that it puts a positive potential on both lines L1 and L2 and provides for a change in potential on one line at a time.

In No. 7 position a negative potential is on line L1 and a positive on line L2. Hence, the polar relay 181 is on the spacing contact s which lights the "Please rewrite" lamp and, if desired, a buzzer, not shown, to attract the customer's atten-

tion. This position of the polar relay also operates the thermal relay 209 to open the normally closed contact thereof deenergizing the coin return magnet 68 permitting the coin slide to return to extended position with the coin still located therein. The rotary switch is then turned off and the plug removed from the jack 197. When the customer has rewritten his message legibly he starts again at the beginning.

The magnet 202 in the transmitting apparatus has a dual purpose. As described above, it locks the machine in operative position. Where a plurality of machines are on a single communication circuit the magnets of the inoperative machines will position their armatures so as to prevent movement of the multi-contact switch armature 192 when potential is on the circuit as a result of the operation of some other transmitting apparatus on the line. At the same time the "Line busy" light will light and this condition is maintained while the machine in use is having a message sheet removed from its cylinder by the peel magnet, due to operation of a relay 298 in each inoperative machine, the contact 299 of which closes the circuit of the "Line busy" light.

Condensers 301 pass the carrier current to the amplifier 225, while choke coils 302 block the carrier frequencies from the control apparatus.

The output of the amplifier 225 is fed through a signal inverter 303 to the recording stylus 127 and passes through the grounded centering spindle 105, the recording paper being of any suitable electrochemical type.

It will be understood that many modifications and changes can be made in the structure and circuit arrangements shown without departing from the essential attributes of the invention, and we contemplate all such changes as come within the scope of the appended claims.

What is claimed is:

1. A facsimile telegraph system including a communication circuit, a sheet bearing subject matter to be transmitted, a transmitting apparatus including an optical scanner connected to said circuit for transmitting message signals representative of said subject matter over said circuit, a receiving apparatus connected to said circuit for recording said signals, a check-controlled mechanism for preparing said transmitting apparatus for receiving said sheet, a check-return mechanism, and means controlled from said receiving apparatus for operating said check-return mechanism and removing said sheet from said transmitting apparatus.

2. A facsimile telegraph system including a communication circuit, a transmitting apparatus including a scanner connected to said circuit for transmitting message signals over said circuit, a receiving apparatus connected to said circuit for recording said signals, a check-controlled mechanism for rendering said transmitting apparatus operative, and means controlled from said receiving apparatus for collecting the check from said check-controlled mechanism and simultaneously rendering said transmitting apparatus inoperative.

3. A facsimile telegraph system including a communication circuit, a transmitting apparatus including a scanner connected to said circuit for transmitting message signals representative of subject matter over said circuit, a receiving apparatus connected to said circuit for recording said signals, a check-controlled mechanism including a check slide having a check opening, means con-

trolled by an operative movement of said slide with a suitable check in said opening to prepare said transmitting apparatus for operation, means controlled from said receiving apparatus for preparing said scanner to receive subject matter for transmission and for locking said slide in operated position for the duration of a scanning operation, and means controlled from said receiving apparatus for accepting or rejecting said check and means controlled from said receiving apparatus for removing said subject matter from said scanner.

4. In a facsimile system, a communication circuit, a transmitting station including scanning apparatus for scanning subject matter, said apparatus being connected to said circuit for the transmission of signals representative of subject matter, said scanning apparatus being adapted to be operatively conditioned by check-controlled mechanism, a receiving station connected to said communication circuit and including apparatus for recording said signals and control signaling apparatus, and means including said receiving station control signaling apparatus for rendering said scanning apparatus inoperative for further scanning of the same subject matter and for controlling said check-controlled mechanism.

5. In a facsimile system, a communication circuit, a transmitting station including scanning apparatus for scanning subject matter, said apparatus being connected to said circuit for the transmission of signals representative of subject matter, said scanning apparatus being adapted to

be operatively conditioned by check-controlled mechanism, a receiving station connected to said communication circuit and including apparatus for recording said signals and apparatus for controlling said transmitting station apparatus, and means including said receiving station control apparatus for rendering said scanning apparatus inoperative for further scanning of the same subject matter, and other means including said receiving station control apparatus for releasing said check-controlled mechanism.

6. In a facsimile system, a communication circuit, a transmitting station connected to said circuit and including scanning apparatus for the transmission of signals representative of subject matter, said scanning apparatus being adapted to be operatively conditioned by check-controlled mechanism, a receiving station connected to said circuit and including apparatus for recording said facsimile signals and apparatus for controlling said transmitting station apparatus by control signals transmitted over said circuit, a sheet bearing subject matter to be reproduced in facsimile, means responsive to a receiving station control signal for locking said check-controlled mechanism and for concurrently preparing said scanning apparatus to receive said sheet, and means responsive to other receiving station control signals for removing said sheet from said scanning apparatus and for releasing said check-controlled mechanism.

GARVICE H. RIDINGS.
RALEIGH J. WISE.