J. Q. SHERMAN AND A. W. METZNER.

ELECTRICALLY OPERATED MANIFOLDING DEVICE.

APPLICATION FILED APR. 2, 1920.

1,437,949. Patented Dec. 5, 1922.

2 SHEETS—SHEET 1.

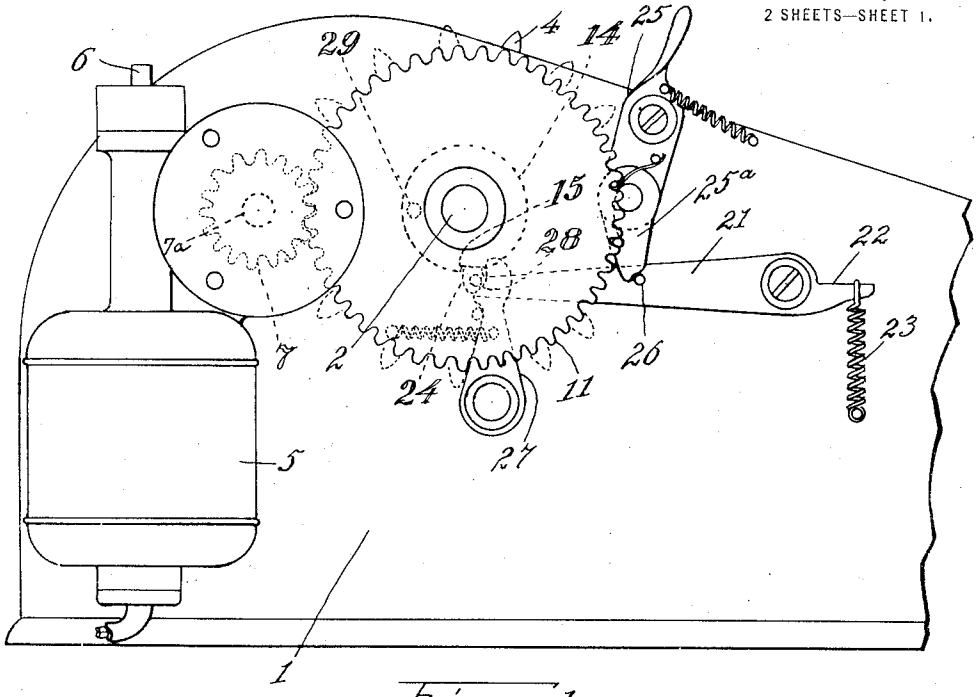


Fig. 1.

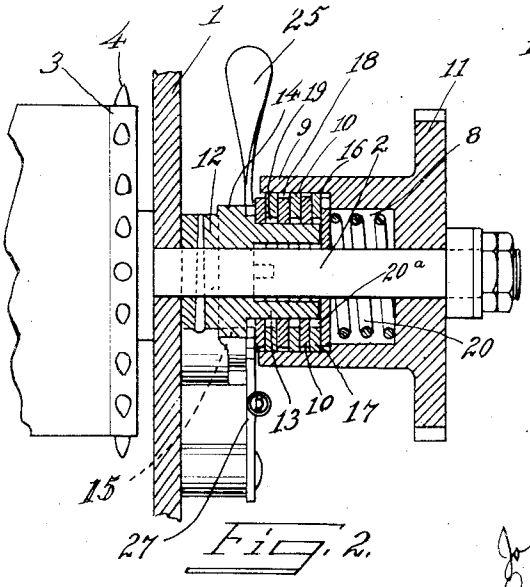


Fig. 2.

Fig. 3.

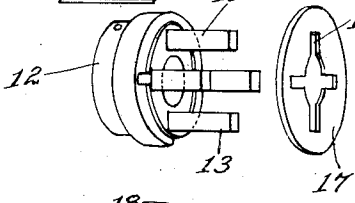


Fig. 4.

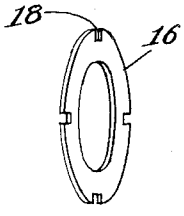


Fig. 5.

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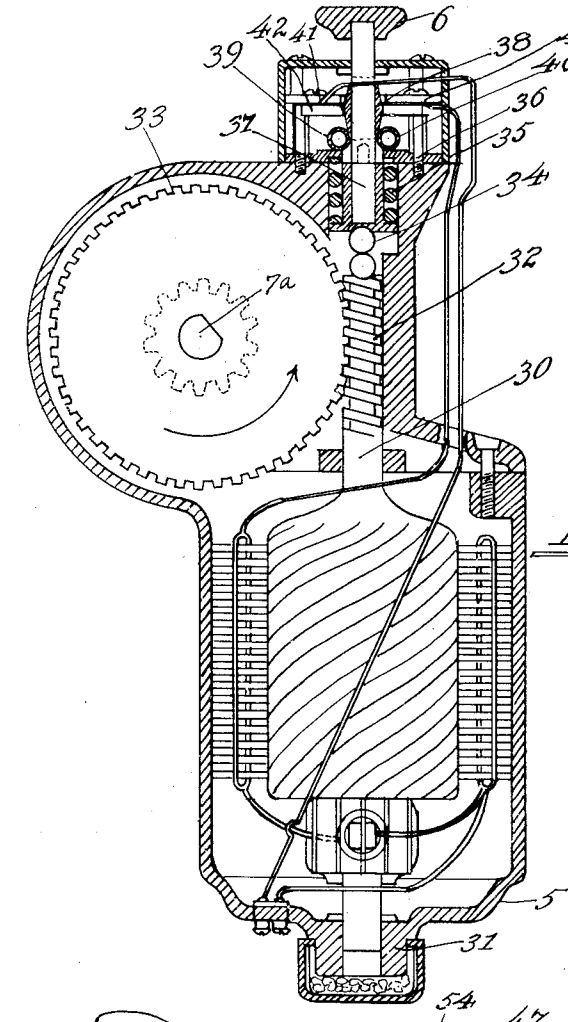


Fig. 6.

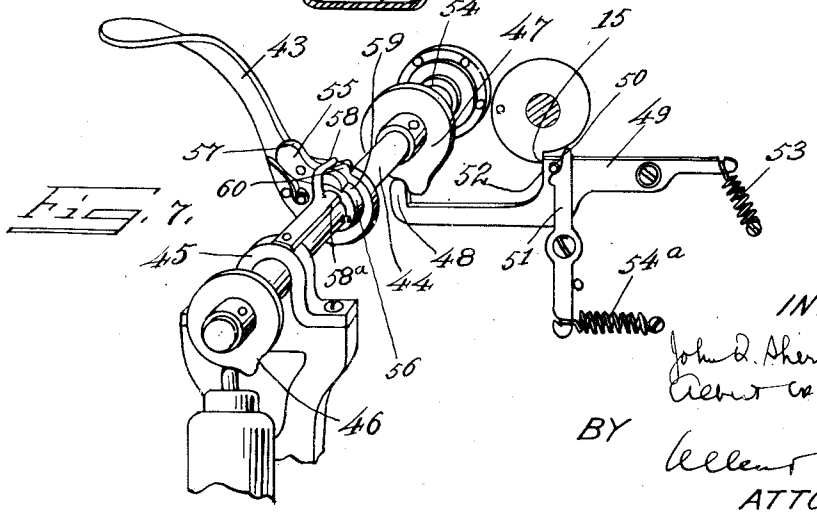


Fig. 7.

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UNITED STATES PATENT OFFICE.

JOHN Q. SHERMAN AND ALBERT W. METZNER, OF DAYTON, OHIO; SAID METZNER ASSIGNOR TO SAID SHERMAN.

ELECTRICALLY-OPERATED MANIFOLDING DEVICE.

Application filed April 2, 1920. Serial No. 370,839.

To all whom it may concern:

Be it known that we, JOHN Q. SHERMAN and ALBERT W. METZNER, citizens of the United States, and residents of the city of Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Electrically-Operated Manifolding Devices, of which the following is a full, clear, and accurate description, reference being had to the drawings forming a part of this specification.

Our invention relates to autographic registers and manifolds in general, such machines being normally employed to issue an original and carbon paper duplicates of printed forms written on with a pencil or typewritten. As shown in the drawings, our invention has been applied by us preferably to a "pin wheel" type of paper feed in autographic registers, but this is not considered as any limitation since our invention may be applied with any usual mechanism for mechanically feeding strips of paper from any manifolding device.

Due to the shortness of the individual forms, as they are ordinarily printed on the rolls of paper for use, in autographic registers and other manifolding devices and the consequent short distance for each feeding operation, it has been found quite difficult to provide an electric operating device which will do the feeding without burning out, while permitting at the same time an accurate stop for the feeding devices, and a simple mode of operation.

The object of our invention is to provide a practical device for electric motor operation of autographic registers and manifolding devices on the general scheme of employing a trip lock directly on the feed shaft of the machine, a motor which automatically stops under undue load, and a friction strength to gradually stop the motor, thereby protecting it, although with the specific motor device shown in the drawings the friction could be omitted without destroying operability of the apparatus.

These objects and other advantages to be noted, we accomplish by that certain construction and arrangement of parts to be hereinafter more specifically pointed out and claimed.

In the drawings,

Figure 1 is a side elevation of the device.

Figure 2 is a central vertical section view of the clutch mechanism.

Figure 3 is a detail perspective of the inner section of the clutch housing.

Figure 4 is a perspective of one of the centrally cut disks.

Figure 5 is a perspective of one of the peripherally cut disks.

Figure 6 is a detail section of the motor driving device.

Figure 7 is a detail perspective of an operating device to jointly release the feed and start the motor.

No particular detail is shown of a complete autographic register or manifolding device, there being indicated merely a casing 1, a feed shaft 2 and a rotary element 3 carrying a series of radial interspaced feeding pins 4, mounted on the said shaft.

The motor has a casing 5, suitably mounted in any desired way on the casing of the machine, said motor having a starting button 6, and a gear 7 driven from the motor, by a worm shaft and gear. The gear 7 is the operating member which actuates the feed shaft through the medium of another gear and a friction clutch, as will be noted, although it should be understood that we may employ the shaft 7^a of the gear 7 as the feed shaft 2 of the paper feed, thereby providing a direct drive.

The motor in our preferred form has a rotor shaft 30, which is slidably and rotatably held in the socket 31, at the base of the casing 5. The rotor shaft is cut at the other end with a worm 32, which meshes with a worm wheel or gear 33, mounted in the casing and carrying the pinion 7, above referred to.

The upper end of the rotor shaft bears against a set of balls 34, held in the casing, between the said upper end of the shaft, and a sliding sleeve or bushing 35, under control of a spiral spring 36, also held in the casing.

Seated in the interior of the said bushing is the end 37 of the switch actuating plunger, which said plunger has at its upper end the protruding starting button 6, and intermediate its ends a semi-diamond shaped section 38, having round apices but correspond-

ing generally to the diamond shape in quick throw electric switches.

Over the semi-diamond shaped section rides a hollow ring 39, within which is seated a spring 40 which grasps the said section, so that when the plunger is moved downwardly or upwardly with the apices of the semi-diamond passing the ring, the spring will contract over the tapering sides of the diamond, thereby moving the ring upwardly or downwardly as the case may be.

Extending across the upper end of the casing, about the plunger member is a plate 41, carrying the electric contacts 42, said contacts being adapted to be connected by the ring 39 in its upper position.

As so constructed to start the motor, with the parts in the position shown in Figure 6, the button is depressed, which effectuates a snapping up of the ring, and a closing of the switch and at the same time thrusts the rotor shaft downwardly through the casing. The exertion of considerable friction against the operation of the worm wheel or gear, will, however, result in the rotor shaft creeping upwardly until it forces the bushing 35, and the switch plunger upwardly and accomplishes an opening of the switch.

As has been said the mechanism comprises in part a connection between a motor of the type now described in detail, and a paper feeding device, which will permit of a frictional slipping, said slipping being tight enough to work a shutting off of the motor.

On the end of the feed shaft is loosely mounted a casting having a hollow spring chamber 8, and a somewhat wider chamber formed by an annular extension 9 within which are a series of interspaced, longitudinal ribs 10. The balance of the casting is in the form of a gear 11, which is set to mesh with the gear 7 of the motor device.

Keyed to the feed shaft between the casing and the outer casting, is a collar 12, from which extend a series of interspaced bars 13. This collar has formed thereon a cam 14, having the nose 15.

Two sets of annular disks are provided, of which the disks 16 are journaled on the outside of the series of bars 13, and the disks 17 are mounted on the feed shaft. The disks 16 have notches 18 in their periphery, which engage over the ribs 10 of the outer casting extension. The disks 17 have notches 19 to engage over the bars 13.

In arranging these disks they are set alternately in the space between the outer casting and the inner collar, and a fairly heavy spring 20 is set in the chamber 8 of the outer casting so as to bear against a washer 20^a set against the outer one of the disks.

This assembly makes up a friction clutch, which operates to revolve the feed shaft, since the disks 16 are keyed by the ribs 10 to the outer casting and the inner disks are keyed to the bars 13 on the inner collar, while the spring causes said disks to frictionally engage each other. Such a clutch has a very wide frictional bearing surface confined to a very small space, and has been designed by us in the above described detail because of this advantage.

Other forms of friction clutch, made to have sufficient slip, but to exert a fairly strong friction, would be well adapted to our invention.

Mounted on the casing of the machine is a lever 21, having a spring arm 22, and spring 23. This lever has a nose 24, which lies on the surface of the cam 14, and will engage the nose of the said cam, and thereby stop the revolution of the feed shaft.

To trip this lever, we provide a finger 25, pivoted to the casing and carrying a spring pawl 25^a, which is secured to the finger by a butt hinge. This pawl is arranged to strike a pin 26 on the lever, when the lever is in position of engagement with the cam nose, so that the operator pushes forward on the finger to trip the lever out of engagement with the cam.

Once the finger and pawl are moved, however, the pawl will ride past the pin on the lever, and to the rear thereof, thereby permitting the lever to rise to its original position of engagement since the pawl will merely be bent upwardly by such a motion once its end is to the rear of the pin.

A tripping of the lever will result primarily in a release of the cam on the feed shaft, and secondarily in the engagement of a spring hook 27, with a pin 28 on the tip of the lever. A momentary movement of the finger will thus not only trip the lever, but move it into a position of being latched out of engagement with the cam.

A pin 29 on the cam, and located about a quarter turn away from the cam nose, will strike off the spring hook, as soon as the movement of the feed shaft has commenced, thereby permitting the lever to ride again on the surface of the cam so that it will stop the same after one complete revolution has been completed.

As was noted in the foregoing matter, the motor is of a type which will throw itself out automatically upon excessive pressure or stoppage, as in the case of our positive feed stop, so that it is not absolutely necessary to provide any frictional take-up, although this will undoubtedly relieve the motor from wear. The friction could, moreover, be embodied with the motor itself without departing from our invention.

The mechanism above described further adapts itself to conjoint operation of the motor and the feed release, and as a convenient means for accomplishing this we

have shown in Figure 7 an adaptation for such purpose.

In this view the lever 43 is provided, mounted on a shaft 44, that is suitably journaled in the frame of the register, and also on some desired form of bracket 45, that may be mounted on the motor casing or some other convenient point.

This shaft carries two cams 46 and 47, the cam 46 being set with its nose in a position to come into operation after the nose on the cam 47. The cam 46 strikes down with its nose the push button 6 of the motor, and the cam 47 presses downwardly on the end 48 of a lever 49, which corresponds to the lever 21 of the form of feed release primarily shown.

As in the case of the lever 21, this lever 49 carries a pin 50, which is engaged by a spring latch 51, mounted on the side of the casing. It has also a contact shoulder 52 for engaging the cam shoulder 15, and is spring-pressed into contact with the cam 14 by means of a spring 53.

The latch 51 corresponds in its operation to the latch 27, although of a slightly modified form, this being nonessential. A spring 54 is mounted around the shaft 44, and serves to maintain it in position of normally releasing the motor button and feed release lever.

Should it be desired to prevent the operator from holding up the operating lever 43 so as to enforce a continuous movement of the motor and feeding devices, it will be necessary to provide that the lever 43 be loosely mounted on the shaft 44 and carrying a pawl 55, which is spring-pressed against the face of a small cam 56 that is tight on the shaft.

This pawl will have a knob 57 at its end beyond the pivot point thereof, which will be stricken down by an arm 58 mounted on the outer journal of the shaft. The cam nose 59 on the shaft will stop the movement thereof by coming into abutment with the branch arm 58^a, when the shaft is in normal position.

With this construction, as soon as the operator has moved the shaft so as to start the motor and release the feed, the pawl 55 will be struck up, releasing the shaft, which will return due to the spring 54^a until the cam shoulder 59 hits the arm 58, thereby stopping the shaft. The lever will fall by gravity until the nose 60 strikes the arm 58.

This last noted form of construction is, of course merely one of the forms which would accomplish a like purpose of making the shaft, lever and cam construction a mere trip, which sets off the motor and the feed release but once upon each operation.

The operator, having written on the uppermost sheet of paper in his register, will then press over the tripping finger, which releases the shaft, and then press down on the starting button of the motor; or else will throw up the lever 43 as per our modification. The motor will then turn over the gear 7 thereof and the gear 11, and the friction clutch device will transmit the rotary motion to the collar 12 and thence to the feed shaft.

When one complete revolution has been accomplished, the feed shaft will be stopped dead and the friction will slip until the motor has automatically shut itself off because of excessive frictional pressure. This will occur, moreover, even if the operator should continue to hold the finger in tripping position. The motor will stop immediately if directly connected, without a frictional device, but the sudden jar will have a tendency to shorten the life of the motor.

This mechanism, therefore, provides a safe method of operation and one which will impart one complete and accurate operation or movement to the feed shaft of an autographic register or manifolding device.

It is not desired that the claims that follow be limited beyond the scope of their wording, to exclude equivalent structures due to the fact that the various possible mechanical equivalents to the parts above described were not specifically mentioned.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. In a manifolding machine, the combination with a paper feeding device therefor, of an electric motor having an automatic shut-off when under heavy load, transmission mechanism intermediate the motor and the feeding device to operate the same, and releasable mechanism for positively stopping the feeding device.

2. In a manifolding machine, the combination with a paper feeding device therefor, of an electric motor having an automatic shut-off when under heavy load, frictionally coupled transmission mechanism intermediate the motor and the feeding device to operate the same, and means for normally retaining the feeding device in a locked position and for releasing it after one feeding operation only.

3. The combination with a revoluble paper feeding device, for a manifolding machine, of motor driven gearing for revolving said feeding device, and means for locking and releasing said feeding device for individual operations only, comprising an element to engage the feeding device at a selected point, means for tripping said element to free the feeding device, a latch to hold said element in tripped position, and means on the feeding device to release the latch after the feeding element has moved away from the selected point, and prior to the completion of a complete operation,

whereby the said element will again move to engaging position.

4. The combination with a paper feeding device for a manifolding machine, of an electric motor, a latch for locking the feeding device, means for tripping said latch and holding it out of latching position, means controlled by the feeding device for releasing the latch during the feeding operation, and a frictional slipping driving connection between the motor and the feeding device.

5. The combination with a paper feeding device for manifolding machine, of an electric motor, a latch for locking the feeding device, means for tripping said latch and holding it out of latching position, means controlled by the feeding device for releasing the latch during the feeding operation, and a frictional slipping driving connection between the motor and the feeding device, said motor having a starting and stopping mechanism actuated independently of said latch.

6. In a manifolding machine, the combination with a paper feeding device therefor, of an electric motor having an automatic shut-off when under heavy load, frictionally coupled transmission mechanism intermediate the motor and the feeding device to operate the same, and means for positively stopping the paper feeding devices, the frictional coupling connection for the transmission mechanism comprising a pair of opposed members in the transmission train, with disks arranged between said members and a spring for pressing them together, with each alternate disk in engagement with one or the other of said opposed members.

7. The combination with a paper feeding mechanism for a manifolding machine, of a stop for releasing the feeding mechanism for one complete operation only, a motor adapted to automatically shut off upon excessive load, a friction connection between the motor and the feeding mechanism, said stop being adapted to be locked into releasing position by the operator, and automatically thrown back into stopping position by the feeding mechanism.

8. In a manifolding machine, the combination with a paper feeding device therefor, of an electric motor having an automatic shut-off when under heavy load, frictionally coupled transmission mechanism intermediate the motor and the feeding device to operate the same, and means for positively stopping the paper feeding device, said means comprising a cam on the feeding device having a nose, a spring lever to engage said nose, a latch for the spring lever to hold it in non-engaging position, and means on the feeding device to trip said latch to release the lever during each feeding operation.

9. In a manifolding machine, the combination with a paper feeding device therefor, of an electric motor having an automatic shut-off when under heavy load, frictionally coupled transmission mechanism intermediate the motor and the feeding device to operate the same, and means for positively stopping the paper feeding device, said automatic shut-off comprising a switch and a slidably mounted rotor shaft against which said switch abuts, a worm on said shaft, and intermediate connections with the paper feeding device whereby when the paper feeding device is stopped the worm will shift endwise to release the switch.

10. The combination with a paper feeding device for a manifolding machine, of an electric motor, a latch for locking the feeding device, means for tripping said latch and holding it out of latching position, means controlled by the feeding device for releasing the latch during the feeding operation, and a frictional slipping driving connection between the motor and the feeding device, said motor having a switch, a rotor shaft controlling said switch, a worm on the shaft for transmission of power therefrom, and means for slidably mounting the rotor shaft, whereby its movement caused by the stoppage of the worm actuated mechanism will operate the switch.

11. In a manifolding device, the combination with a paper feeding device therefor, of an electric motor having an automatic shut-off when under heavy load, transmission mechanism intermediate the motor and the feeding device to operate the same, and releasable mechanism for positively stopping the feeding device, and a single operating device for throwing out the automatic shut-off and releasing the stopping means.

12. In a manifolding machine, the combination with a paper feeding device therefor, of an electric motor having an automatic shut-off when under heavy load, frictionally coupled transmission mechanism intermediate the motor and the feeding device to operate the same, and means for normally retaining the feeding device in a locked position and releasing it for one complete operation only, in connection with a switch for the electric motor adapted to be operated by the means for releasing the feeding device.

13. The combination with a paper feeding device for a manifolding machine, of an electric motor, a latch for locking the feeding device, means for tripping said latch and holding it out of latching position, means controlled by the feeding device for releasing the latch during the feeding operation, and a frictional slipping driving connection between the motor and the feeding device, a switch for the electric motor, said means for tripping the latch being adapted to operate the switch of the motor.

14. In a manifolding machine, the combination with a paper feeding device therefor, of an electric motor having an automatic shut-off when under heavy load, transmission mechanism intermediate the motor and the feeding device to operate the same, and releasable mechanism for positively stopping the feeding device at the end of one feeding operation.

15. In a manifolding machine, the combination with a paper feeding device therefor, of an electric motor having an automatic shut-off when under heavy load, transmission mechanism intermediate the motor and the feeding device to operate the same, and releasable mechanism for positively stopping the feeding device, said transmission mechanism being frictionally coupled so as to relieve jar in stopping.

16. In a manifolding machine, the combination with a paper feeding device therefor, of an electric motor having an automatic shut-off when under heavy load, transmission mechanism intermediate the motor and the feeding device to operate the same, means for releasing the paper feeding device including a manually controlled member, and means for automatically stopping the paper feeding device irrespective of the manually controlled member after a pre-arranged movement.

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