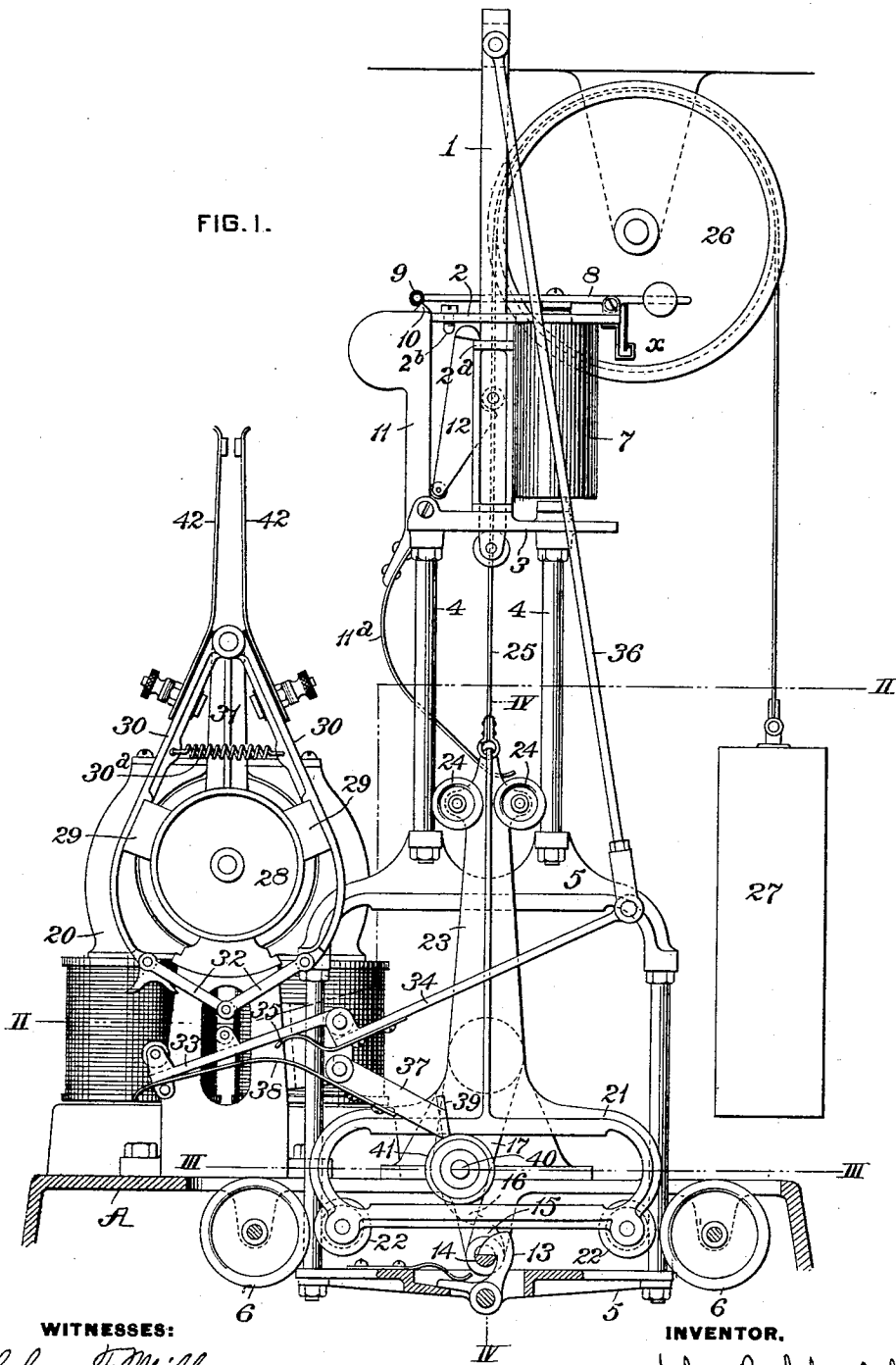


J. P. COLEMAN.
SIGNALING APPARATUS.

No. 590,302.

Patented Sept. 21, 1897.

FIG. 1.



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FIG. 2.

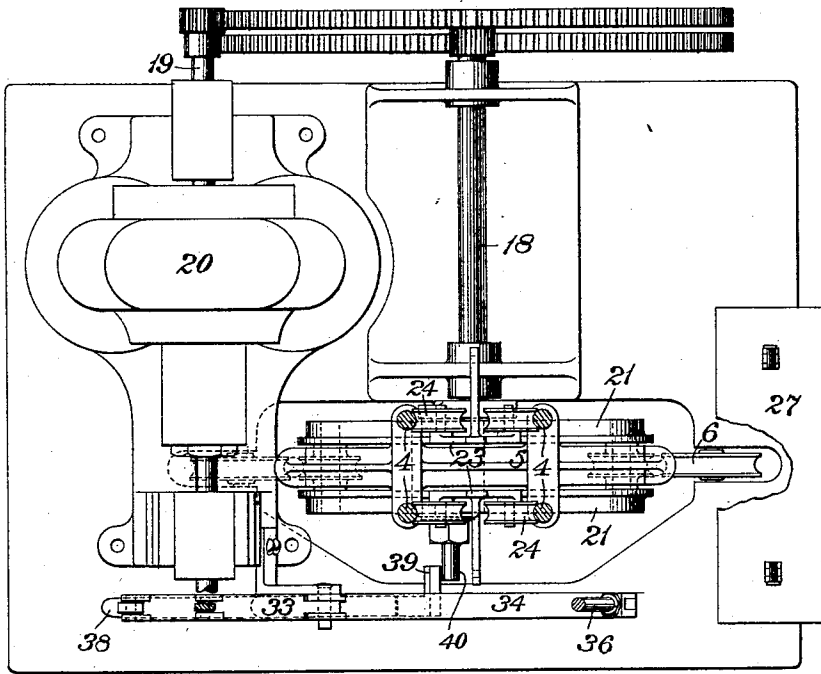


FIG. 3.

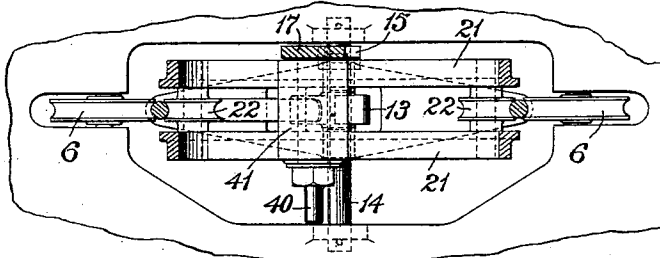
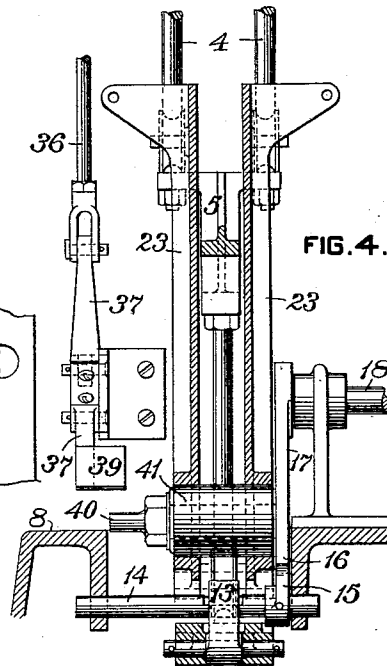


FIG. 4.



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FIG. 5

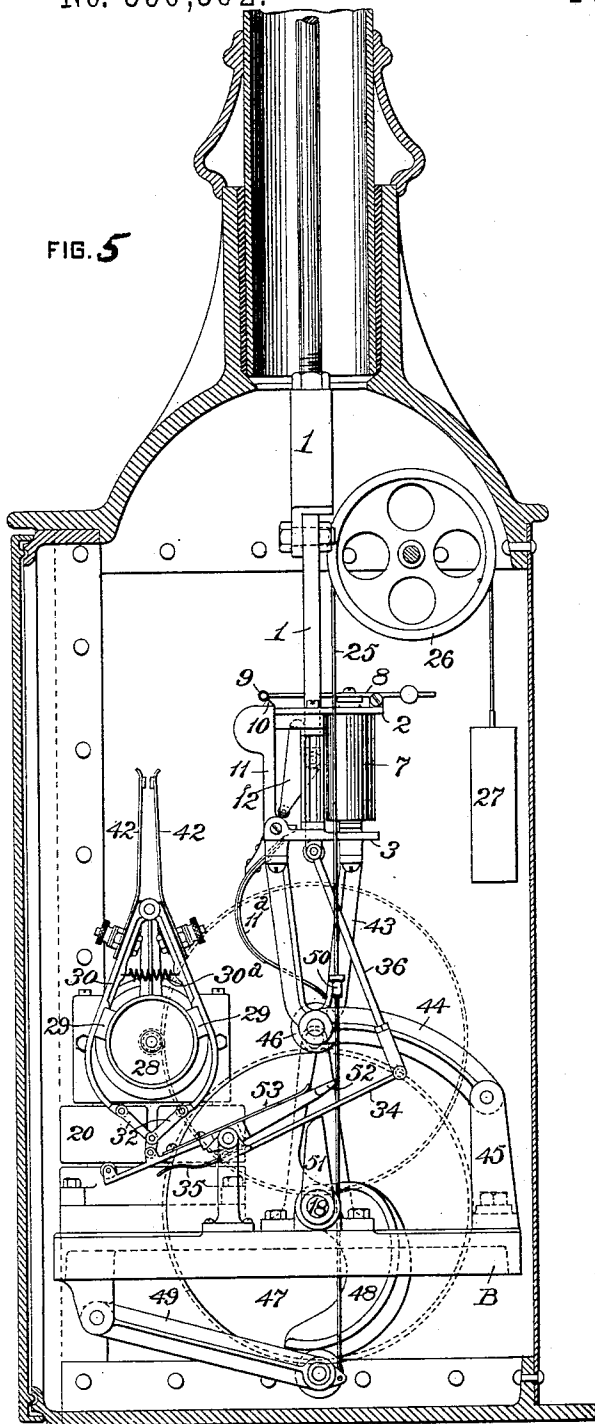
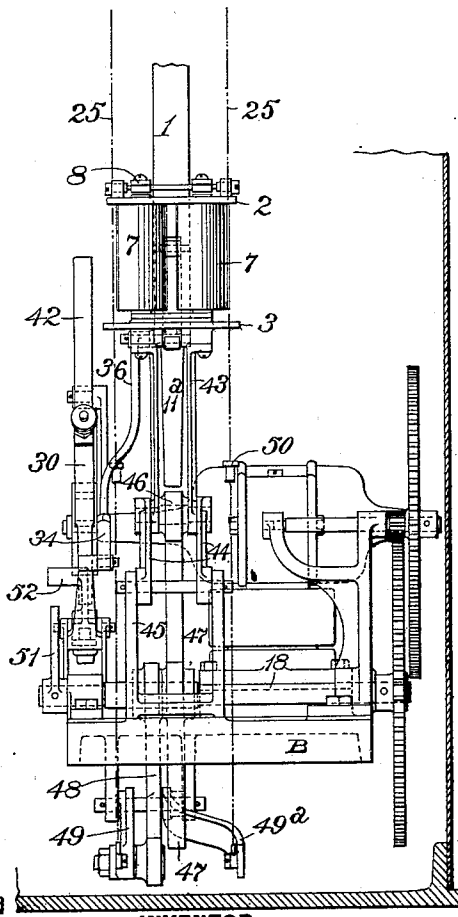


FIG. 6



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UNITED STATES PATENT OFFICE.

JOHN PRESSLEY COLEMAN, OF SWISSVALE, PENNSYLVANIA, ASSIGNOR TO
THE UNION SWITCH AND SIGNAL COMPANY, OF SAME PLACE.

SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 590,302, dated September 21, 1897.

Application filed May 29, 1897. Serial No. 633,701. (No model.)

To all whom it may concern:

Be it known that I, JOHN PRESSLEY COLEMAN, a citizen of the United States, residing at Swissvale, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Signaling Apparatus, of which improvements the following is a specification.

In applications, Serial No. 629,468, filed March 27, 1897, and Serial No. 633,621, filed April 24, 1897, I have described and claimed certain improvements in the construction of automatic railroad-signals. It is characteristic of the constructions shown in said applications that the crank-pin or other mechanism employed for clearing the signal makes a half or nearly a half revolution before the signal is shifted. While this delay in the movement of the signal is not material in the majority of cases, it might cause some delay in train movements where the traffic is very close.

The object of the present invention is to provide for the commencement of the signal to clear immediately after the train has left the section controlled by such signal; and it is a further object of the invention to provide for the shifting of certain parts of the mechanism which assist in the clearing of the signal immediately after the signal has been so cleared, so that such parts would be in readiness to operate promptly when it is desired to again clear the signal.

In general terms the invention consists in the construction and combination substantially as hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a view in elevation of my improved signal-operating mechanism. Fig. 2 is a sectional plan view of the same, the plane of section being indicated by the line II II, Fig. 1. Fig. 3 is a similar view, the plane of section being indicated by the line III III, Fig. 1. Fig. 4 is a sectional elevation, the plane of section being indicated by the line IV IV, Fig. 1. Fig. 5 is a front elevation illustrating a modified form of construction of the apparatus, and Fig. 6 is a side elevation of the same.

In the practice of my invention the signal, which is preferably of the well-known semaphore type and so mounted as to have a bias to danger position, as is generally customary, is connected to the bar 1, which is loosely mounted in suitable guide-openings in the plates 2 and 3, which are secured upon rods 4, having their lower ends secured to the frame 5, which is mounted so as to move vertically between guide-rollers 6. Between the plates 2 and 3 is secured an electromagnet 7, which is included in or controlled by a track-circuit and has its armature secured to a lever 8, so mounted and weighted that when the magnet is deenergized the lever will move away from the magnet. The outer end of the lever 8 is provided with a pin 9, adapted, when the lever is drawn toward the magnet, to engage a projection 10 on the dog 11, which is pivotally mounted on the lower plate 3 and is so weighted that when free to move the dog will move outwardly or to the left in Fig. 1. This dog is designed, when locked, to hold a pawl 12, provided with lateral shoulders at its upper end loosely supported on a bracket 2^a, secured on the under side of the top plate 2, so that a lug thereon will project below a pin or other projection on the signal-rod 1, thereby preventing said rod from dropping until freed, as hereinafter described.

As shown in Fig. 1, the shoulders on the pawl 12 are held from being shifted off from the bracket 2^a when the pawl swings out by a stud 2^b, projecting down from the plate 2, behind the upper end of the pawl, and so located as to permit of the free movement of the pawl without disengagement of its shoulder from the bracket.

The frame 5, carrying the magnet 7 and the devices for locking the signal-bar 1, as above described, is held in its raised position by means of a spring-actuated hook 13, mounted in the lower cross-bar of the frame 5 and engaging the flattened portion of a pin 14, which is mounted in lugs projecting down from the under side of the base-plate A of the signal mechanism. On this pin is secured a projection 15, arranged in the path of movement of a projection 16 from the crank-arm

17 on the shaft 18, which is driven through suitably-interposed mechanism by the armature-shaft 19 of the motor 20.

By reference to Fig. 1 it will be seen that the rotation of the pin 14, caused by the engagement of the projection 16 with the projection 15, will effect a disengagement of the hook 13 from the pin 14, thereby permitting the frame 5 and the parts carried thereby to drop.

Within the frame 5 is arranged a slotted yoke 21, provided with grooved guide-rollers 22, adapted to move along the side bars of the frame 5 and having an upwardly-projecting post or standard 23, also provided with grooved guide-rollers 24, adapted to move along the bars 4. The upper end of this post or standard is connected by a rope or other flexible means 25, which passes over a pulley 26, to a counterweight 27, adapted to assist in clearing the signal, as hereinafter described.

The motor-shaft 19 has secured thereon a brake-drum 28, and brake-shoes 29 are secured on arms 30, pivotally mounted on a bracket 31 and hang down on opposite sides of the brake-drum. The lower ends of these arms 30 are loosely connected to links 32, whose inner ends are connected by a short link to the lever 33. The lever 33 is shifted to bring the links 32 into alinement with each other and thereby force the arms 30 apart against the tension of a spring 30^a by a lever 34, provided at its inner end with a spring 35, bearing against the under side of the lever 33, and has its outer end connected to the signal-bar 1 by a rod 36, so that when said signal-bar drops the levers 34 and 33 will be shifted so as to move the brake-shoes away from the drum 28. The links 32 are moved down sufficiently far to permit of the operation of the spring 30^a by means of the lever 37, having a spring 38 so secured thereto that when the lever 37 is shifted, as hereinafter described, the opposite end of said spring, which bears against a pin on the lever 33, will move the outer end of said lever downward. The free end of the lever 37 is provided with a plate 39, so secured thereto that when the lever 33 is raised to release the brakes said plate will lie in the path of a pin 40 on the crank-arm 17, and the lever 34 will be raised by the movement of the pin along an angle-plate 39. On the crank-arm 17 is mounted a friction-roller 41, projecting into the slot in the yoke 21.

In describing the operation of this mechanism it will be supposed that the signal is at clear position and the several parts of the mechanism in the positions shown in Fig. 1. When a train enters upon the section controlled by the signal, the circuit through the magnet 7 will be broken, thereby permitting of the lever to be shifted to free the dog 11, which will then drop outward and permit the pawl 12 to move out from under the pin or projection on the bar 1, which will then drop, the signal going to "danger." By the down-

ward movement of the signal-bar 1 the levers 34 and 33 will be so shifted as to force the arms 30 and brake-shoes 29 away from the brake-drum and simultaneously shift the springs 42 together, said springs forming one of the make-and-break mechanisms in the motor-circuit. In its downward movement the bar 1 will strike against a spring-arm 11^a on the dog 11, thereby shifting the latter and the pawl 12 to normal position and yieldingly hold said parts in such position until locked, as hereinafter described. As soon as the circuit through the motor is completed by the movement of a train off the track-section controlled by the signal the magnet 7 will become energized to close the make-and-break mechanism x in the motor-circuit, and the motor will operate to shift the crank-arm 17 in the direction of the arrow at *a*, Fig. 1. The first movement of the crank will be to shift the hook 13 out of engagement with the pin 14, thereby permitting the frame 5 to drop. By the dropping of this frame the pawl 12 will be brought into such position that its projection will pass under the pin or projection of the signal-bar 1, and as the magnet 7 is energized simultaneously with the closing of the circuit through the motor the pawl will be held in such position by the dog 11, which is locked in its operative position by the lever 8. By the onward movement of the crank-arm the yoke 21 and the frame 5, which now rests upon the yoke, as described, will be raised, thereby lifting the bar 1 to shift the signal to clear position. This upward movement of the yoke and frame and the parts carried by the latter will be assisted by the weight 27. As the frame 5 reaches its highest position the hook 13 will engage the pin 14 and hold the frame in its lifted position until again shifted, as hereinbefore described. As the crank continues its movement the yoke 21 will be drawn down, thereby lifting the weight 27, and as the crank-arm approaches its lowest position the pin 40 will strike against the angle-plate 39, and thereby so shift the levers 37 and 33 as to pull the links 32 down and permit the spring 30^a to draw the brake-shoes against the drum and check the movement of the motor. The circuit of the motor is simultaneously broken by the separation of the springs 42, which are secured to but insulated from the arms 30 and are included in the motor-circuit.

In the construction shown in Figs. 5 and 6 the bar 1 is connected to the signal, as hereinbefore described, and is held in its raised position by the pawl 12, which in turn is locked by the dog 11, and it by the lever 8, carrying the armature of the magnet 7. These several parts are carried by a frame, which is formed in part by the plates 2 and 3, and are constructed and operated in the same manner as the similar parts of the construction shown in Figs. 1 to 4. The lower plate 3 is secured on the bracket 43, and the lower end of the bracket is pivotally connected to one end of

a lever 44, having its opposite end pivotally connected to a post or standard 45 on the bed-plate B. On the pin connecting the lever 44 with the bracket 43 is mounted a friction-roller 46, so as to form an antifriction-bearing for the cam 47, which is mounted on the shaft 18, driven through suitable gearing from a shaft 19 of the electric motor 20. By the rotation of this cam the bracket 43 and frame can be raised and permitted to drop, as will be hereinafter described. On the shaft 18 is secured a second cam 48, adapted to shift the lever 49. The outer ends of the lever 49 and an auxiliary lever 49^a, secured on the pivotal shaft of lever 49, are connected by ropes 25, passing over pulleys 26, to a counterbalance-weight 27. On these ropes are secured stops 50, adapted to bear against the lower plate 3 of the frame, so that the weight 27 may assist in lifting the bracket 43 and the parts carried thereby. The mechanism for releasing the brakes from the motor is similar to that described in connection with the construction shown in Figs. 1 to 4. The application of the brakes is effected by means of an arm 51, secured to the shaft 18 and adapted to shift a lever 52, upon which rests a spring 53, secured to the lever 33.

The parts of the mechanism being in the positions shown in Fig. 6 and the signal at "clear," the magnet 7 is cut out by the entrance of a train onto the section, thereby releasing the bar 1 in the manner heretofore described and permitting it to drop. By its movement the brakes of the motor are released, and the motor will begin to operate as soon as the train leaves the track-section. By the first movement of the motor the cam 47, which has heretofore supported the bracket 43 and the frame, is so moved as to permit the bracket and the parts carried thereby to drop into such position as to permit of the engagement of the pawl 12 with the signal-bar and the locking of the pawl in such engagement. As the shaft 18 continues to revolve the cam 47 will operate to raise the bracket and frame. This upward movement will be assisted by the weight 27 operating through the rope 25 and stops 50, as the cam 48 has moved beyond the free end of the lever 49 simultaneously with the movement of the cam 47 from under the roller 46.

It will be observed that the cam 48 will not operate upon the lever 49 to lift the weight until after the bracket 43 and the parts carried thereby have been lifted to full height. As the cams 47 and 48 approach the position shown in Fig. 6 the arm 51 will strike and lift the lever 52, so as to pull the links 32 out of line and permit of the application of the brakes of the motor and the simultaneous braking of the motor-circuit by the separation of the springs 42.

It is characteristic of the improvements described herein that as soon as the motors be-

gin to operate they will effect an immediate movement of the signal. It is also characteristic of the improvements that after the signal has been cleared by the operation of the motor the latter will continue its movement, so as to prepare the mechanism, as by the lifting of the weight 27, for the next clearing operation.

Within the scope of the invention as defined in the claims modifications and changes will suggest themselves and may be made by the skilled mechanic, and such modifications and changes, in so far as they may be equivalents of the mechanism specifically described, are considered to be within the scope of my invention.

I claim herein as my invention—

1. In a signal apparatus, the combination of a movable signal-rod adapted to be connected to a signal, a movable frame provided with a catch adapted to engage the signal-rod, a magnet mounted on the frame for controlling said catch, a motor for raising said frame and means for supporting the frame in its raised position, said means being constructed and arranged to be shifted on initial movement of the motor to permit the frame to drop, substantially as set forth.

2. In a signal apparatus, the combination of a movable signal-rod adapted to be connected to a signal, a movable frame provided with a catch adapted to engage the signal-rod, a magnet mounted on the frame for controlling said catch, a motor for raising the frame, a weight for assisting in raising the frame, and connections from the weight to the motor so constructed as to render the latter effective to raise the weight after the clearing of the signal, substantially as set forth.

3. In a signaling apparatus, the combination of a signal having a bias to danger position, a signal-rod, a vertically-movable frame, a catch controlled by train movement for positively connecting or locking the signal-rod to the frame, a rotating cam constructed to raise and permit the dropping of the frame, and means controlled by the train movement for rotating said cam, substantially as set forth.

4. In a signal apparatus, the combination of a signal having a bias to danger position, a signal-rod, a vertically-movable frame, a catch connecting the signal-rod to the frame, a rotating cam constructed to raise and permit the dropping of the frame, a weight connected to the frame, a rotating cam for raising the weight and means controlled by train movements for rotating said cams, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JOHN PRESSLEY COLEMAN.

Witnesses:

DARWIN S. WOLCOTT,
F. E. GAITHER.