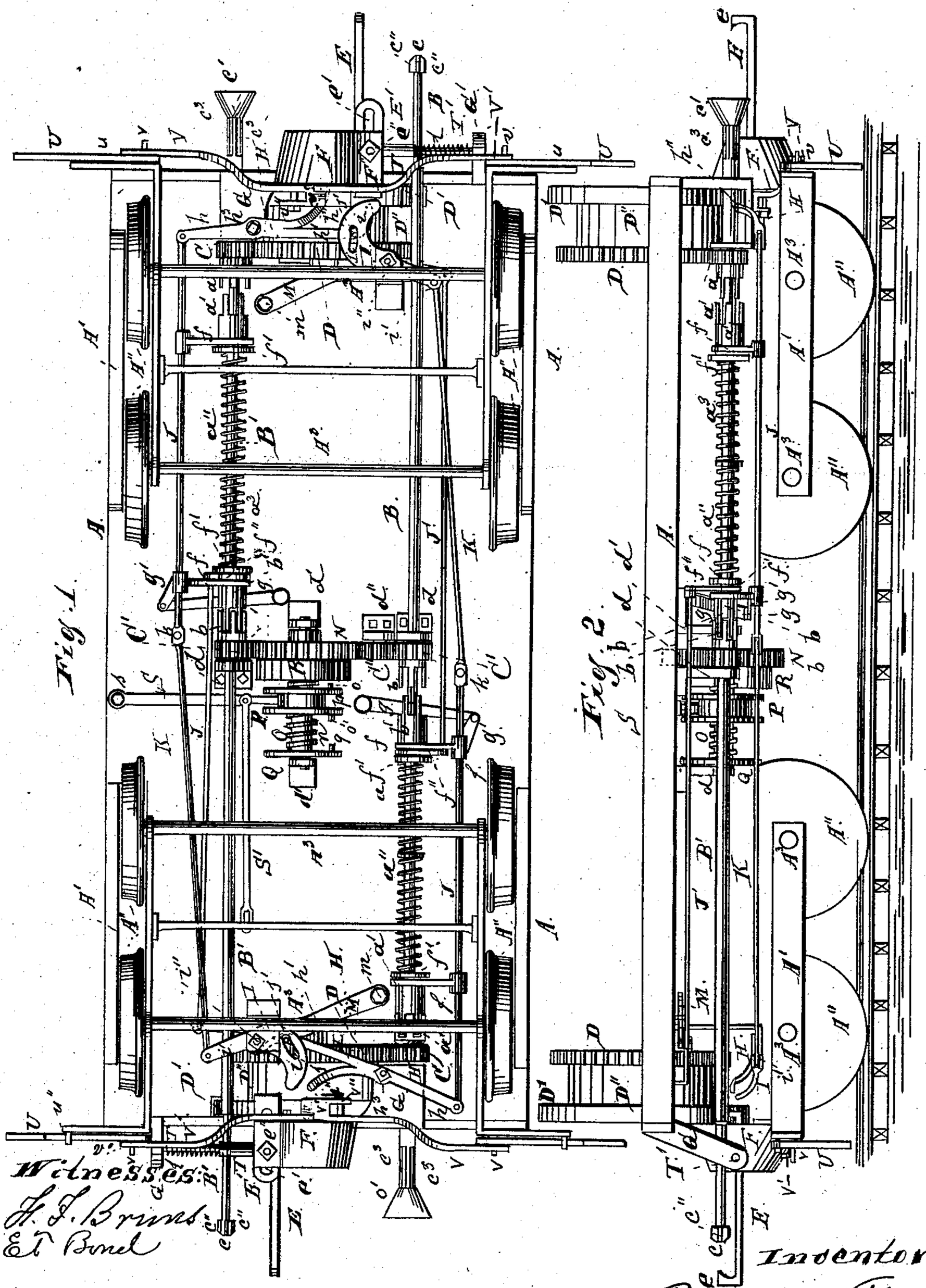
(No Model.)

6 Sheets—Sheet 1.

B. FRESE.

APPARATUS FOR OPERATING RAILWAY TRAINS.

No. 291,180. Patented Jan. 1, 1884.



Witnesses:
H. L. Briggs
E. T. Bond

Inventor:
Bernard Frese

(No Model.)

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B. FRESE.

APPARATUS FOR OPERATING RAILWAY TRAINS.

No. 291,180. Patented Jan. 1, 1884.

Fig. 3.

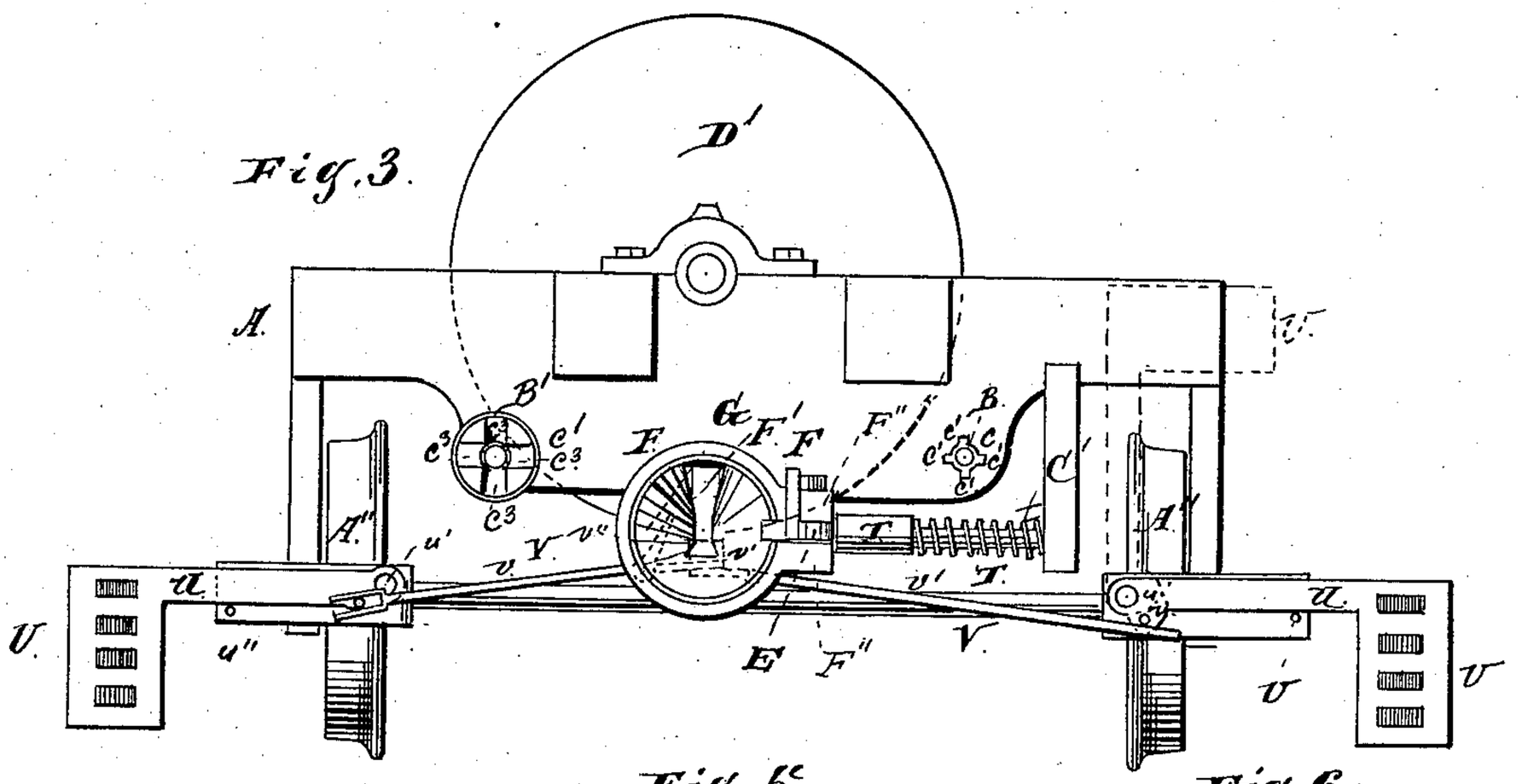


Fig. 4.

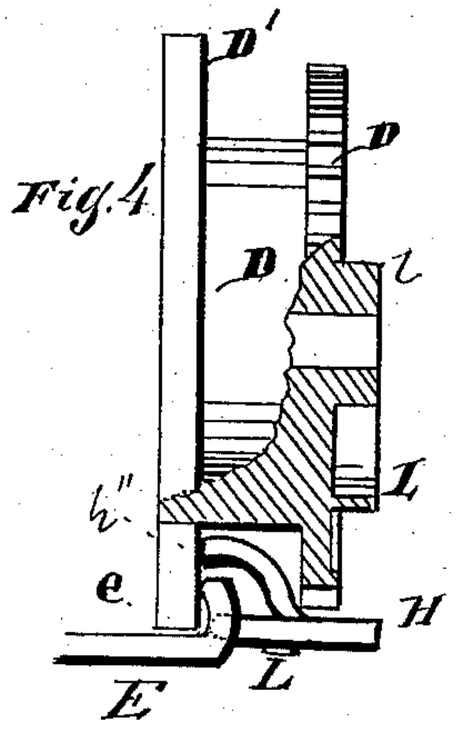


Fig. 5.

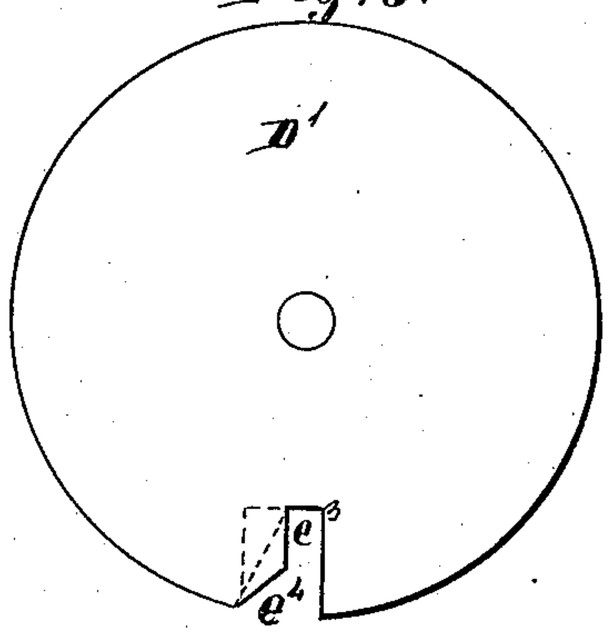


Fig. 6.

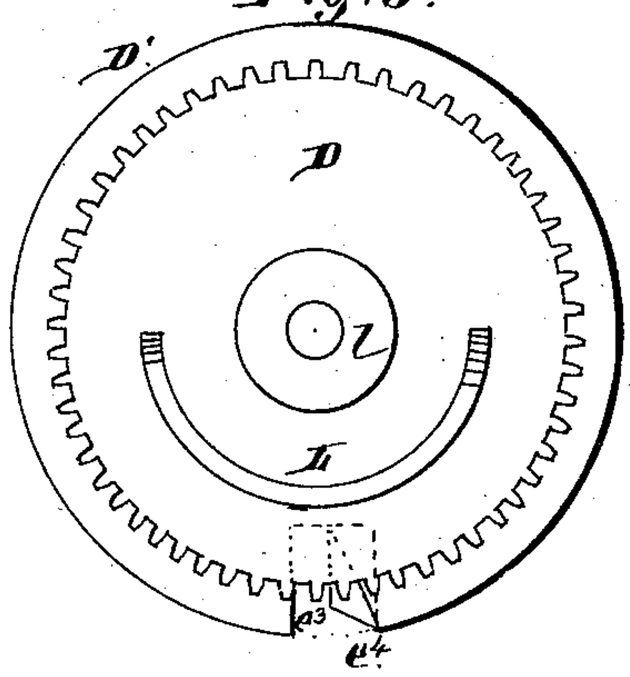


Fig. 7.

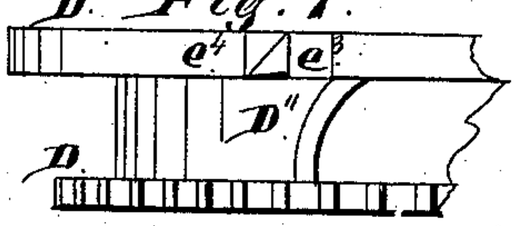


Fig. 8.

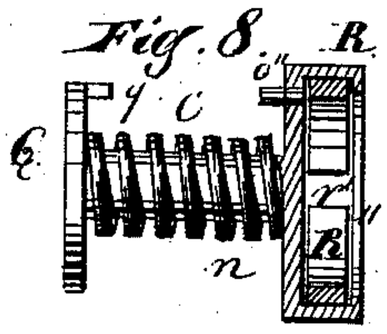


Fig. 9.

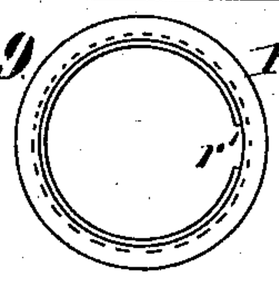


Fig. 11.

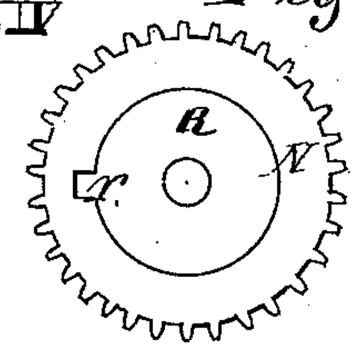


Fig. 13.

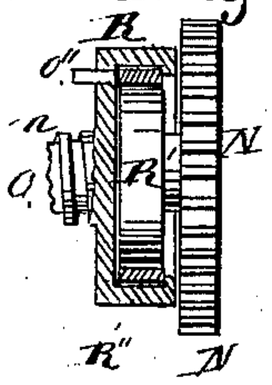


Fig. 10.

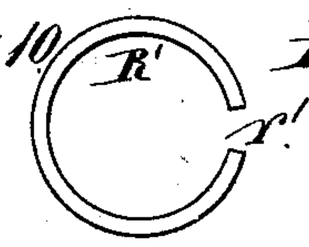
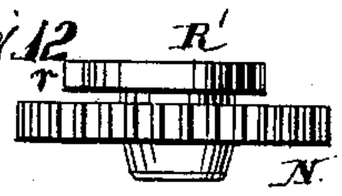


Fig. 12.



Witnesses:
L. F. Brums.
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N. Inventor:
Bernard Frese

(No Model.) 6 Sheets—Sheet 3.

B. FRESE.

APPARATUS FOR OPERATING RAILWAY TRAINS.

No. 291,180. Patented Jan. 1, 1884.

Fig. 14.

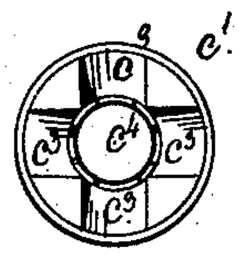

Fig. 15.

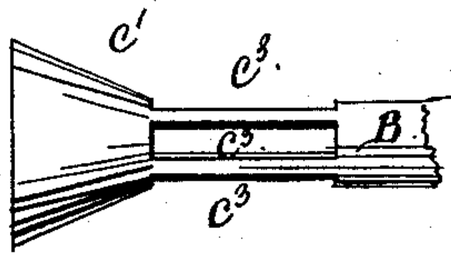

Fig. 16.

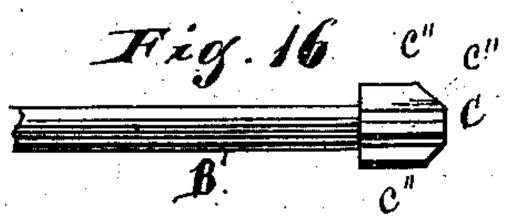

Fig. 17.

Fig. 18.

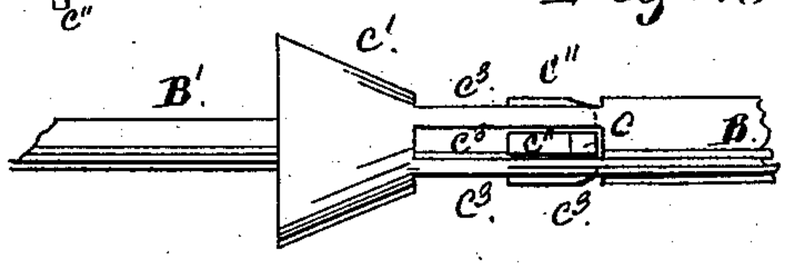

Fig. 19.

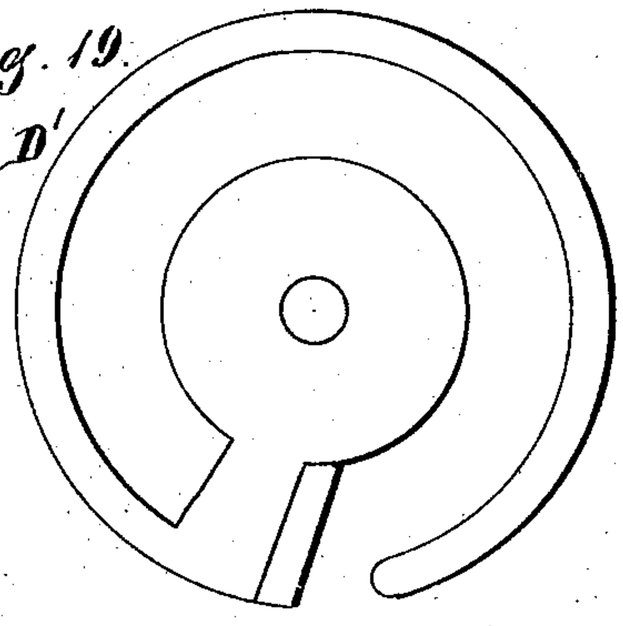

Fig. 20.

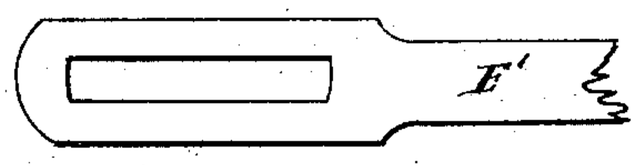

Fig. 22.

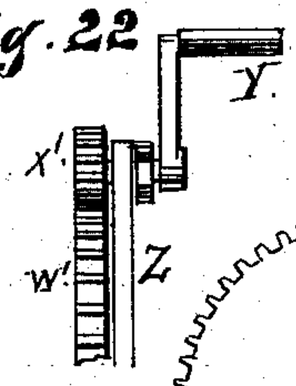

Fig. 21.

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(No Model.) 6 Sheets—Sheet 4.

B. FRESE.

APPARATUS FOR OPERATING RAILWAY TRAINS.

No. 291,180. Patented Jan. 1, 1884.

Fig. 23.

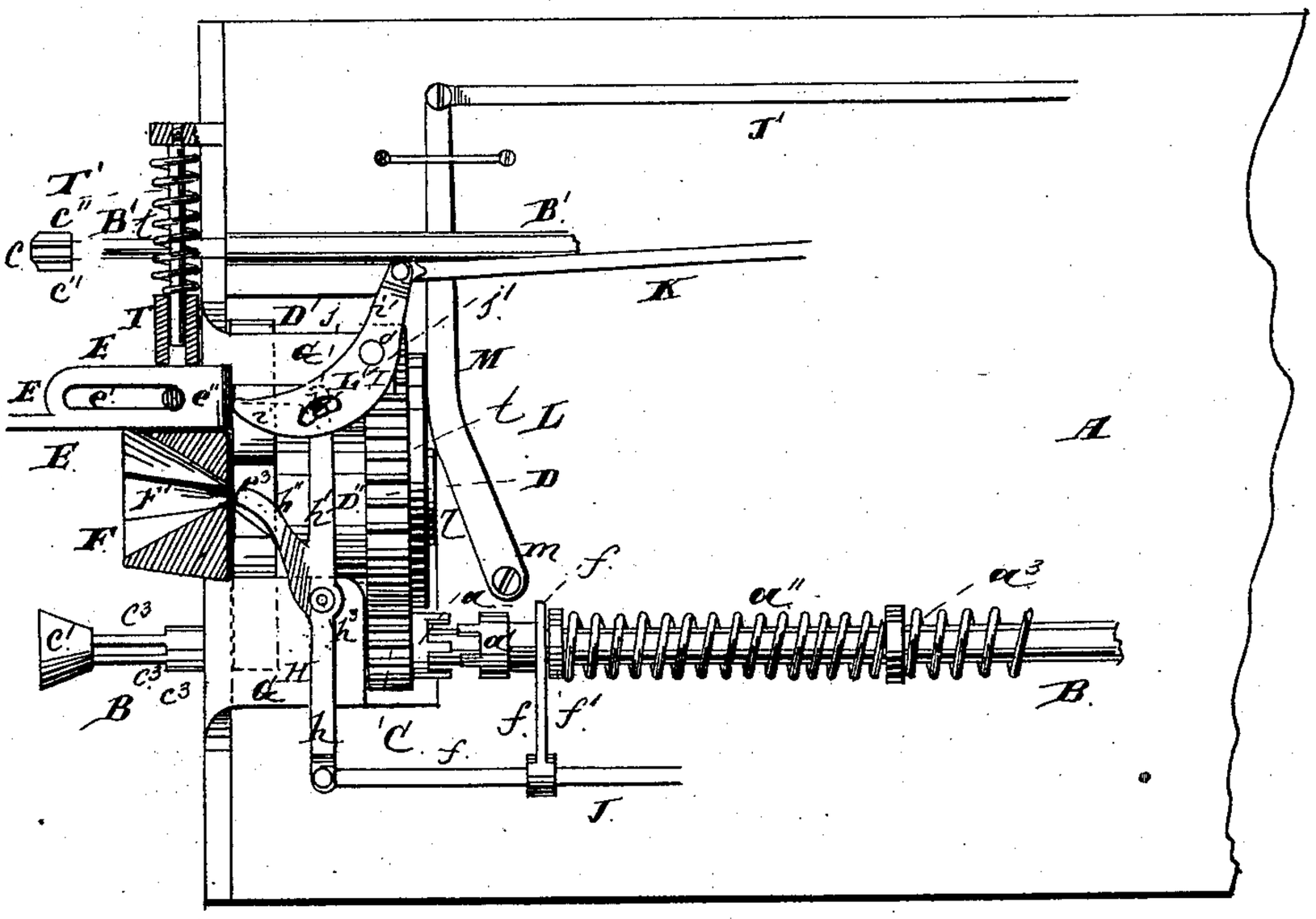


Fig. 24.

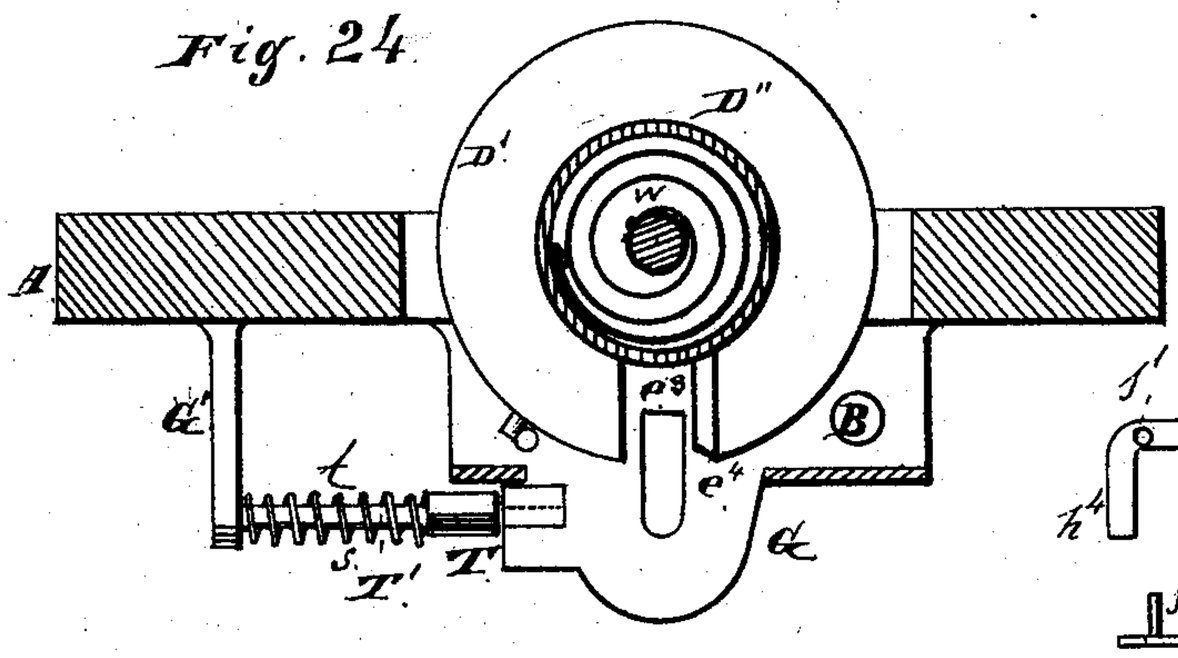


Fig. 25.

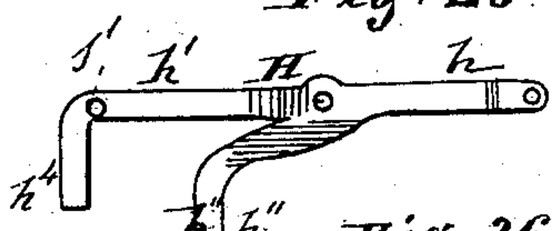
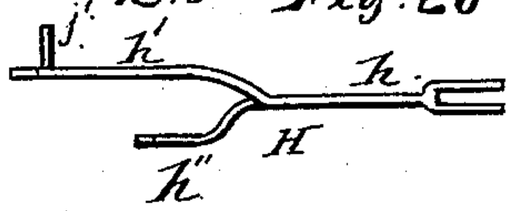


Fig. 26.



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H. F. Bruns.

Inventor:

Bernard Frese

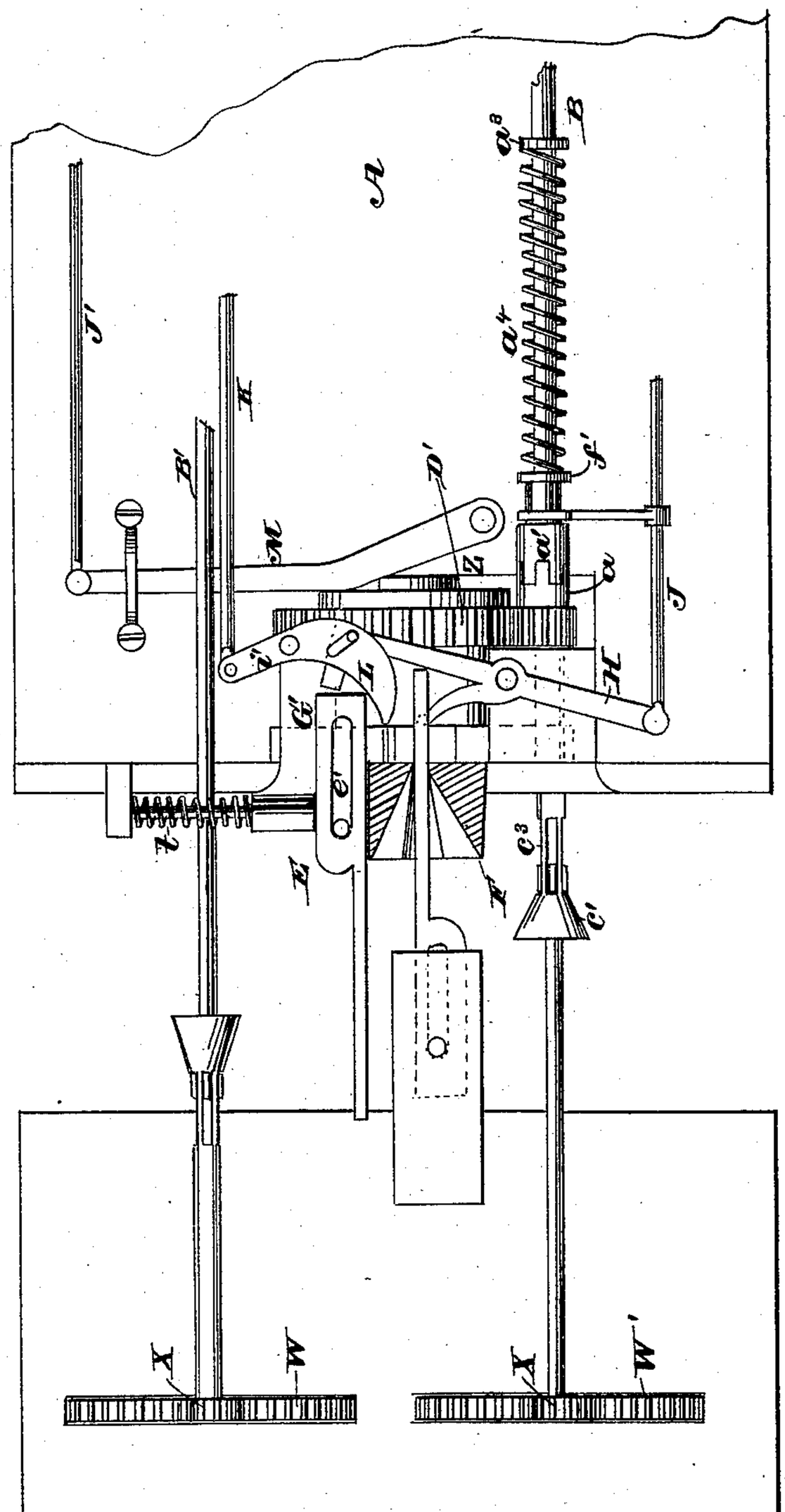
(No Model.) 6 Sheets—Sheet 5.

B. FRESE.

APPARATUS FOR OPERATING RAILWAY TRAINS.

No. 291,180. Patented Jan. 1, 1884.

Fig. 27.



Witnesses:
C. W. Brust
Albert H. Adams

Inventor:
Bernard Frese,

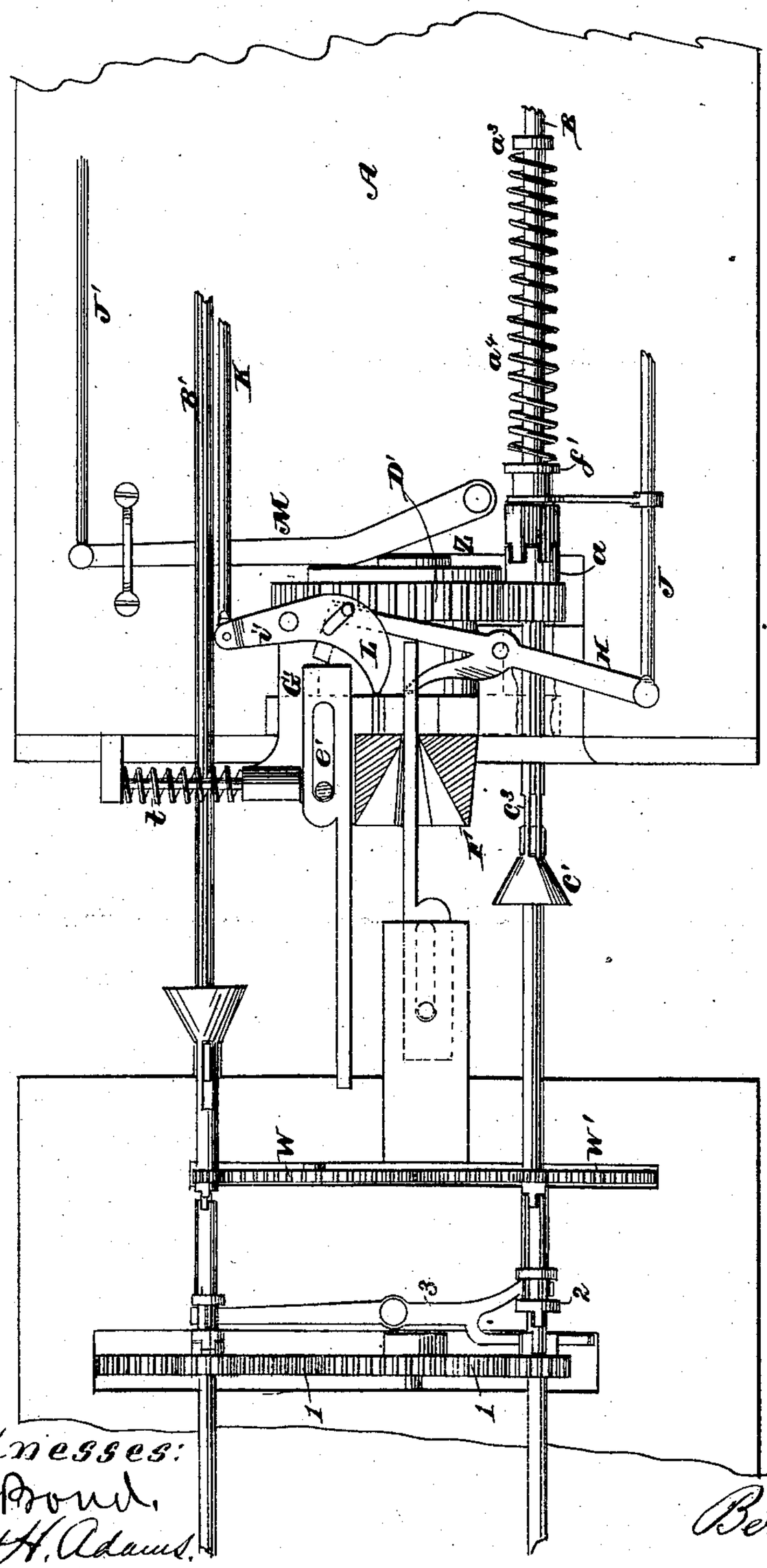
(No Model.) 6 Sheets—Sheet 6.

B. FRESE.

APPARATUS FOR OPERATING RAILWAY TRAINS.

No. 291,180. Patented Jan. 1, 1884.

Fig. 28.



Witnesses:
C. W. Bond.
Albert H. Adams.

Inventor.
Bernard Frese.

UNITED STATES PATENT OFFICE.

BERNARD FRESE, OF CHICAGO, ILLINOIS.

APPARATUS FOR OPERATING RAILWAY-TRAINS.

SPECIFICATION forming part of Letters Patent No. 291,180, dated January 1, 1884.

Application filed March 31, 1882. (No model.)

To all whom it may concern:

Be it known that I, BERNARD FRESE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful System for Operating Railway-Trains, of which the following is a specification.

Figure 1 is a plan view of the under side of a car, showing the devices pertaining to this invention applied thereto; Fig. 2, a side elevation of the frame or body of a car and the devices of this invention; Fig. 3, an end view of a car, showing the devices for signaling purposes and other devices relating to this invention; Figs. 4, 5, 6, and 7, details showing the coupling-disk and the operating-wheel connected therewith; Figs. 8, 9, 10, 11, 12, and 13, details showing a portion of the brake-actuating mechanism by which overwinding is prevented; Figs. 14, 15, 16, 17, and 18, details showing the coupling for connecting the rods or shafts through which a connection is made with the brake and coupling mechanisms of the several cars; Fig. 19, a modification of the coupling-disk; Fig. 20, a modification of the coupling hook or link; Figs. 21 and 22, details showing one way of operating the connecting rods or shafts of the several cars; Fig. 23, an enlarged detail, being an under side view, partly in section, of the coupling mechanism and other devices at one end of the car; Fig. 24, a detail of the coupling-disk; Figs. 25 and 26, details of one of the levers for operating the clutches on the connecting rods or shafts. Fig. 27 is an under view, showing the end of a car and the manner of attaching the coupling devices with the coupling-wheels located on the tender or other portion of the engine, and Fig. 28 is a similar view, showing the connection for coupling and uncoupling from the rear end of the train, or in the reverse manner from that shown in Fig. 27.

This invention relates to a system of operating railway-trains in reference to the coupling and braking of the cars, and has for its objects to construct and apply a mechanism by which the various operations pertaining to the braking and coupling of cars can be performed by a single person located at any designated or desired point on the train, to enable any one or all of the brakes of the train to be applied, either independently or as desired, and to enable the engineer or other person having charge of the coupling and braking to determine with certainty the distance the car to be coupled on is from the moving train, and to couple or uncouple at a station such car or cars to be left at the station, and to keep a record of the location of the different cars in the train, all as hereinafter more specifically set forth and described; and its nature consists in the several devices and combinations of devices hereinafter described, and set forth in the claims, by which the above objects are attained.

In the drawings, A represents the bed or frame of a car; A′, the truck-frame; A″, the wheels; A^3, the axle. These parts may be of any of the usual and well-known forms of construction and arrangement, and their construction and arrangement are not specifically shown in the drawings, nor here described, as they form no particular feature of this invention.

B B′ are rods or shafts located beneath the bottom of the car, above the axles of the wheels, and extending longitudinally of the car, one on each side of the center. These rods are supported at the ends in any suitable bearings, and, as shown, are supported at the center, so as to keep them in position, by a hanger or pendant, *d*, one for each rod or shaft. One end of each shaft is provided with a head, *c*, having wings or flanges *c″*, and the opposite end is provided with a funnel-shaped socket or receiver, *c′*, having a central circular opening, c^4, and slots c^3, leading from the opening outward, the number of slots corresponding with the number of wings on the head *c*. The rods or shafts are arranged so that the head *c* of one will be at the same end of the car as the socket *c′* of the other, as shown in Fig. 1, and the form of the head *c* and the socket *c′* is shown in the detail Figs. 14, 15, 16, and 17. These heads and sockets *c c′* are arranged on the cars, so as to center one with the other and allow the wings *c″* to pass into the slots c^3, so that when two cars are coupled the heads *c* will be connected with the sockets *c′*, connecting the rods or shafts B B′ on the two cars

with each other, by which means the rotation of one rod or shaft will rotate a corresponding rod or shaft on the other car.

C C are pinions, one on the respective shafts B B′, at or near the end of the car, at the opposite ends thereof, and each having one half or section *a* of a coupling, the other half or section of which, *a′*, is located on the respective rods or shafts B or B′, and slides thereon, so that it can be disconnected from or connected with the half or section *a*, to cause rotation of the shaft or rod to impart rotation to the pinion C, with which the clutch *a a′* is engaged. Each shaft B B′, at or near the center thereof, has mounted thereon a pinion, C′, which carries one half or section *b* of a clutch, the other half or section of which, *b′*, is mounted so as to slide on its shaft, to be connected with or disconnected from the half or section *b* and impart rotation to the pinion C′ from the shaft, or allow the shaft to revolve without rotating its pinion C′. The sliding sections *a′ b′* of the respective clutches are held in position on the shaft, so as to slide longitudinally thereon, by means of a spline, feather, or other suitable means, which will connect the clutch-sections with the shaft, so as to revolve therewith, while the pinions C C′ are loose upon the shaft, except when connected by their respective clutches.

D D are wheels, one located at each end of the car in line with the pinions C, each wheel having cogs or leaves to mesh with the cogs or leaves of the pinion. These wheels D are mounted in suitable supports or hangers secured to the bottom of the car, and they project above the bottom of the car, as shown in Fig. 2. Each wheel has connected therewith a center or drum, D″, to which is connected a circular disk or flange, D′. These parts D′ D″ may be formed of a single piece, or of separate pieces suitably connected together, and they may be formed independently of the wheel D, or be formed therewith.

E E are the coupling hooks or links, one at each end of the car, and each having on its acting portion an upward projection or catch, *e*, and having its inner end formed with a return portion, E′, in which is a longitudinal slot, *e′*, through which a connecting bolt or pin, *e″*, passes, by means of which the link or hook has a free longitudinal movement to the extent of the limit of the slot *e′*.

F F are heads or sockets, one at each end of the car, each having a bell mouth or opening and a vertical slot or opening, F′, for the passage of the acting portion E of the link or hook, the bell-mouth serving the purpose of directing the end of the link, so that it will pass into and through the opening F′. As shown, each head F has a side ledge or flange, F″, in which is a slot or opening to receive the return portion E′ of the hook or link and form a support or rest for the same, the bolt *e″*, which holds the link in place, passing vertically through this flange or ledge F″.

G G are frames or supports, one at each end of the car, made of iron or other suitable material, and secured to the end of the car and the under side by suitable bolts. The head F may be formed with this frame or support, or be an independent piece suitably secured thereto or to the end of the car, and, as shown, the end portion of each frame or support has an opening on each side, through which the rods or shafts B B′ pass, and by which the ends of the shafts are supported and have their bearing.

H H are levers, one at each end of the car, each pivoted by a suitable bolt or pivot, *h³*, to the face of the plate or support G. These levers are each of a corresponding shape. Each has an arm or portion, *h* and *h′*, on each side of the pivot, and a secondary arm, *h″*, of a curved or bent form, so as to stand in a direction of the end of the car when the lever is in position, and the arm or end *h′* of each lever has its extreme end, *h¹*, bent or curved to point in the direction of the car end. The location of these levers is shown in Fig. 1, and their form is shown in the detail Figs. 25 and 26.

I are levers, one at each end of the car, and each formed of a head, *i*, and an arm, *i′*, and each pivoted by a suitable bolt or pivot, *i³*, to the face of the plate G, or a bracket or hanger depending from such plate or from the bottom of the car. These levers I are similar in form and construction, and the head *i* is curved or bent so as to stand, when the lever is in place, in the direction of the end of the car, so as to be in line with the rear end of the link E, or a projection, *e²*, extending down from such rear end. This head *i* is provided with a curved slot, *j*, to receive a pin, *j′*, on the end or arm *h′* of the lever H, so that as either lever is moved this pin will move the other lever when the limit of the slot is reached.

J J are link-rods, one located at each end and on opposite sides of the car, as shown in Fig. 1. The outer end of one rod is pivotally connected to the arm or end *h* of the lever H, at one end of the car, and the outer end of the other rod is similarly connected to the lever H at the other end of the car. Each rod J is provided with two forked arms, *f*, one of which straddles the section *a′* of one clutch on the rods or shafts B B′, and the other straddles the section *b′* of the other clutch on these shafts, for the purpose of operating these sections of the clutches, the fork engaging a collar or flange, *f′*, on the respective clutch-sections. Each rod J, at its inner end, is held in position and guided by the bar or arm *g*, pivoted at its inner end in any suitable manner to the floor or bottom of the car, and having at its outer end a pivoted link, *g′*, the outer end of which is secured to the head of the inner fork, *f*, of the rod or link J, supporting the inner end of the rods, at the same time permitting the necessary movement for operating the clutch-sections through the forks.

K K are links or rods, one on each side of

the car, the rod on each side being connected to the inner end of the rod J on that side by a suitable joint, *k*, and to the arm *i'* of the lever I, as shown in Fig. 1. These rods J and K form a connection between the lever H at one end of the car and the lever I at the other end, on each side, so that the movement of the levers at one end of the car will be communicated to the levers at the opposite end, but in a reverse direction.

L is a curved flange on the outer face of the wheel D, extending partly around the wheel. This wheel D, as shown, has a hub or center, *l*, to give it a firmer bearing on its shaft, so as to withstand side pressure and strain in use.

M M are arms or levers, one at each end of the car, each secured at one end, so as to be free to swing, by a suitable bolt or pin, *m*. These levers are similar in construction, and are located so as to lie inside of the wheels D at the respective ends of the car, and, as shown, they are bent or turned at or near the center. so as to permit of their location inside of the wheels. Each arm or lever M has pivotally connected to its outer or free end a link or rod, J', the other end of which is connected to an arm or fork, *f''*, which straddles the clutch-sections *b'* of the center clutches, the arm or fork *f''*, as shown, being located between the arm or fork *f* of the rod J and the collar or flange *f'* of the clutch-section. These rods J', with the arms or levers M and cam or flange L, form an independent means for operating the center clutches on the shafts B B'.

N is a cog-wheel located at or near the center of the car, and in line with the pinions C' on the shafts B B'. This wheel N meshes directly with one of the pinions C', and receives motion from the other pinion through an intermediate pinion, C'', which pinion is supported in a suitable hanger or bracket, *d''*, depending from the floor or bottom of the car.

O is a shaft, having thereon a screw-thread, *n*. This screw-threaded shaft is mounted in suitable bearings in hangers or brackets *d'*, attached to the floor or bottom of the car, and on it is mounted the wheel N, by means of which the shaft or screw is rotated.

P is a spool or nut, having on its periphery a groove, *p*, and having a central screw-threaded opening corresponding to the screw *n* of the shaft O, to allow the nut or spool to travel back and forth on the shaft O by the rotation of such shaft. This spool or nut has on one of its faces a projection or pin, *o*, and on the opposite face a pin or projection, *o'*.

Q is a disk secured to the shaft or screw O at the opposite end from the wheel N, and having on its face adjacent to the spool the nut P and pin or projection *q*, with which the pin or projection *o'* will engage when the spool or nut is at the end of its travel in that direction.

R represents a circular receptacle or box located on the screw-shaft O, in front of the wheel N. This receptacle has located therein a circular disk, R', having a projection, *r*, which disk is connected by a hub or center, or in some other suitable manner, with the wheel N, so as to rotate therewith. This disk R' is of less diameter than the interior diameter of the box R, and between its periphery and the inner face of the box is located a ring, R'', having an opening, *r'*, which receives the projection *r* of the disk and connects the ring and disk together. The face of the receptacle or box adjacent to the spool or nut R is provided with a pin or projection, *o''*, which engages with the pin *o'* on the nut or spool when the nut or spool has reached the end of its travel on the screw O in the direction of the wheel N. The form and arrangement of the receptacle or box R, disk R', ring R'', wheel N, and screw-shaft O, and disk Q are shown in the detail Figs. 8, 9, 10, 11, 12, and 13, and the object of the box R, disk R', and ring R'' is to prevent overwinding; or travel is prevented at the opposite end of the shaft O by the stationary disk Q.

S is an arm or lever, pivoted at one end, by a suitable bolt or pivots, to the floor or framework of the car, near the outer edge, and having its free end engaged with the groove *p* of the spool or nut P, so as to be moved by the travel of the nut forward and back on the screw-shaft O. This arm or lever S has pivoted thereto, at a point between its pivot and the nut or spool, link or connecting-rod S', the free end of which is to be connected with an ordinary brake mechanism in any suitable manner that will cause it to act on such mechanism and apply the brakes. The brake mechanism is not shown, but may be of any of the usual and well-known forms of construction of such devices.

T is a sliding collar or head located on a rod, T, extending out from a post or support, G', attached to the end of the car or to the frame or support G. The head T is arranged to come in contact with the side face of the return portion E' of the link and hold the link against side movement and in line for the acting portion to enter the head F, and the pressure for this purpose, in the form of construction shown, is by means of a spring, *t*, located around the rod T', between the end of the sliding head T and the face of the post G'.

U U represent the signals, one on each side of the car, and supported from arms *u*, pivoted at *u'*, in any suitable manner, to the framework of the trucks, or to a support depending from the end of the car, or otherwise, and, as shown, the signals are held from descending too low by a suitable pin or stop, *u''*, against which the under edge of the bars *u* come in contact.

V V' are levers for operating the signals. One of these levers, at its outer end, is forked, and straddles a pin, *v*, located on the arm U of the signal at a point to one side and below the pivotal center on which the signal turns. The other lever, V', as shown, is not forked, but is arranged to come below a pin, *v*, corre-

sponding to the pin *e* on the other signal-arm, as shown in Fig. 3. The inner end of the lever V′ comes below the inner end of the lever V, so that both levers will be operated by the action of the lever V. The lever V is provided on its inner end with an incline, V′, which, when the signals are down, lies back of and in line with the hook-opening F′, so that as the hook enters the opening and passes to the position where it is to be fastened its under face will come in contact with the incline *v′* and partially depress the inner ends of the levers V V′, raising their outer ends, and the arms *w* elevating the signals, and the elevation of the signals into a perpendicular position is completed by the rotation of the coupling-disk D′, which disk has therein a notch, e^3, to enable the hook *e* of the link E to pass, one side of which opening is provided with an inclined face, e^4, which, as the disk D′ is turned, comes in contact with an arm or incline, *v″*, on the inner end of the lever V, and carries such arm down, depressing still further the inner ends of the levers V V′, raising their outer ends, and carrying the signals to a perpendicular position. The coupling-disk D′ is held in position for the passage of the hooks E by a coiled spring, *w*, located in the drum D″, one end being attached to the shaft of the wheel D and the other to the inner periphery of the drum, and this spring *w* has the proper tension and arrangement to hold the disk D′ with its opening e^3 in line with the opening F when the car is uncoupled, so that the coupling-disk on an uncoupled car will always be in position for the passage of the coupling-link into the opening F′ through the opening e^3, into position for the hook *e* to be caught and held when the disk D′ is turned; and by this arrangement it will be seen that the necessity of bringing the disk to have its opening e^3 into position for coupling is dispensed with, as the spring will act to return the disk after the car is uncoupled to the position required for coupling.

W, Fig. 21, is a cog-wheel gearing with a cog-wheel on the shaft B′, for rotating such shaft, and W′ is a similar wheel gearing with the pinion on the shaft B, for rotating such shaft.

X X′ are pinions for rotating the respective wheels W W′.

Y is a crank by means of which the pinions X X′ are rotated.

Z Z represent standards or posts, in the upper ends of which is mounted the shaft for the pinions X X′ and their respective cranks Y. The wheels W W′ are mounted in suitable bearings on the floor or bottom of the car, or the end frame, or such other part of the train where it may be desired to apply the power for operating the shafts B B′, as shown in Fig. 27, it being understood that the shafts can be operated from the first car in the train, or from the engine, or at some other point. The wheel W′ is the one on the side of the car from which the coupling is to be done, and this wheel on its face is marked with numerals running from a cipher to such numbers as may be desired, the numbers being arranged opposite the cog on the wheel which corresponds with the number of cogs required to make a quarter-revolution of the shaft B′—that is to say, if the pinion on the shaft B′ has twelve cogs, a quarter-revolution on that shaft will take the place of three cogs, and the wheel W′ is to be marked with a cipher as a starting-point, one on the third cog therefrom, two on the sixth cog, three on the ninth, four on the twelfth, five on the fifteenth, and so on until the wheel W′ has been completely numbered on this basis. The first car coupled requires a quarter-revolution of the shaft B′ for the disk D′ to pass back of the hook *e* a sufficient distance to make the coupling, and this quarter-revolution of the shaft B′ will be registered on the wheel W′ by the figure 1 passing to the place where the cipher was at the start. The second car coupled requires also a quarter revolution of the shaft B′ to make the coupling, which makes a half-revolution of the pinion on the first car, and brings the figure 2 to the position occupied by figure 1. The third car also requires a quarter-revolution of the shaft B′ to make the coupling, which makes a three-quarter revolution of the pinion on the first car and brings the figure 3 on the wheel W′ to the place occupied by figure 2, and each car thereafter requires a quarter-revolution of the shaft B′ to make the coupling, which brings a corresponding number into the position occupied by the previous number, so that the person in charge of the car can tell exactly how many cars he has in the train and just where they are coupled on.

The arrangement of the wheels W W′ (shown in Fig. 27) is one for use when the coupling and uncoupling is to be done from the front of the train. When the coupling is to be done from the rear of the train, an arrangement such as shown in Fig. 28 may be used, differing from the arrangement shown in Fig. 27 in having a second series of wheels, 1 1, and a clutch, 2, and operating-lever 3, by means of which the connection can be made with the proper shaft to do the coupling and uncoupling, while the brake-shaft can be disconnected so as to be inoperative during the coupling and uncoupling, and when coupled the lever can be moved to disconnect the coupling side of the shaft and connect the brake side to apply the brakes. The respective clutches *a a′* *b b′* are controlled by springs located around the respective shafts B B′, between the ends of the sliding sections of the couplings and its collar or flange on the shaft, as shown in Fig. 23, *a″* being the spring for actuating the coupling *a a′*, and a^3 the spring for actuating the coupling *b b′*, and in practice the spring which controls the coupling *b b′* should be the strongest, that being the coupling through which the power is imparted for actuating the brake,

and requiring, therefore, a stronger resistance than the other coupling, which simply rotates with the rod or shaft to rotate the wheel D. The arm h'' is arranged to have its end in line with the opening F′ of the coupling-head, and is for the purpose of preventing the coupling of but one car at a time by each quarter-revolution of the coupling rod or shaft, and for this purpose the link E is of the proper length to make the coupling of the clutches $a\ a'$ only when the bumpers of the cars come together.

The operation of coupling is as follows: The link E on the end of the coupled car, adjacent to the car which is to be coupled, is held in a projected position by contact of the end i of the lever I with the butt-end of the hook or link, as shown at the right hand of Fig. 1. This link E enters the opening F′ in the head F of the car to be coupled on, passing through the opening e^3 in the coupling-disk, and beneath the arm h'' of the lever H back into the fixed position shown for this lever on the left end of the car in Fig. 1, throwing the clutch $a\ a'$ on the shaft B into engagement and the clutch $b\ b'$ on the shaft B′ into engagement by the action of the rod J and forks f thereon, and the rod K on the arm i' of the lever I, which latter rod acts on the rod J on the opposite end of the car, thus connecting the coupling-rod B of the coupled and uncoupled car, and at the same time making the connection of the clutch on the opposite rod or shaft for the movement of the brake-actuating mechanism on the car which is coupled on. The coupling-rod B on the first car is turned the necessary number of revolutions to cause it to give the shaft B of the car coupled on a quarter-revolution, which moves the disk D′ at the coupled end of the car sufficiently far to cause it to pass back of the hook e, completing the coupling. The action of the link E on the levers H and I at the end of the car where the coupling is made throws the levers H and I on the other end of the car into the position shown on the right hand of Fig. 1 by the action of the connecting-rods J K, holding the link E on that end projecting in position for coupling on another car, which operation is performed in the manner just described, and is to be repeated as each car is coupled on.

When the train is made up, any car in the train can be uncoupled by turning the actuating-wheel for the coupling-shafts backward until the number on the disk corresponding to the number of the car in the train is reached, when the disk on that car will be in position for the withdrawal of the link E through the opening e^3 of the coupling-disk and the opening in the coupling-head, and after the car which has been uncoupled is side-tracked or switched the other cars can be coupled together again in the manner already described. This arrangement, it will be seen, enables one person to do the necessary work required for coupling and uncoupling cars, and all that is required to be done in this repect is to bring the cars together in coupling until the bumpers strike, when the link E acts on the levers of that car and throws the clutches into engagement, so that by turning the coupling-wheel the coupling-disk will be thrown in front of the catch e on the link. The brakes are set on all the cars of the train from the rotation of the brake-rods or shafts B′, which rotation may be by means of the wheel W or from any other suitable power. This rotation of the shafts or rods B′, by the connection of the clutch $b\ b'$, rotates the pinion C on each rod or shaft, which pinion rotates the wheel N of the brake mechanism on the car, turning the screw-shaft O and advancing the spool or nut P, which moves the lever S, and through the link S′ sets the brake, and any overwinding is prevented by means of the ring R″ and disk R′, as already described. The brakes are released by giving the motive power which operates the rods or shafts B′ a reverse travel, reversing the movement of the shafts and of the pinion C′, wheels N, screw-shaft O, nut or spool P, carrying the lever S in the opposite direction and throwing the brakes off. It will be noticed that one side of the car is provided with an interposed pinion, C″, which pinion is for the purpose of making the shaft B operate as a brake-actuating shaft in case a car is reversed in coupling, as is sometimes liable to be the case, and when a car is reversed it will readily be understood that the shafts or rods B B′ simply change places, and do not in any manner interfere with the operations of coupling and braking.

When all the brakes on the train are not to be set, the clutches on the shafts B′ of the cars which are not to be braked are uncoupled, and those of the cars which are to be braked are coupled, and this coupling of the cars to be braked is performed through the lever M and cam L, by means of which and the secondary connecting-rod J′ the brake-clutches $b\ b'$ can be thrown into engagement, so that as the rod or shaft B′ is turned the brake will be applied to that number of cars only on which the cam has not actuated the lever M. For this operation the actuating-disk W′ may be provided with numbers like those described for the coupling-disk, commencing with zero at the place where the lever M is lifted by the cam L, so that the party having charge of the brakes can tell on which cars the clutches are in position to operate the braking mechanism. The signals U are placed as low as possible on the car, and may be painted in stripes or otherwise, and for use at night luminous paint may be used. Uncoupled cars all show the signals down on each end, as there is nothing to throw and hold them up; but as the cars are coupled the signal nearest the engine is raised out of view, or in a perpendicular position, by the action of the coupling-link and coupling-disk on the lever V, as already described. These signals also enable an engineer to determine just how far from an uncoupled car he is as

he approaches such car, as the stripes will disappear one after the other as the cars on the moving train approach the car to be coupled.

By means of the devices and mechanisms described it will be seen that the coupling and uncoupling of the cars is not attended with any danger to the operator, as he does not pass between the cars to make the coupling; that this coupling and uncoupling can be readily and easily performed, and at the same time the brakeman or operator can tell just what position in the train any one car occupies; that the braking is also under the control of a single person or operator, and is not attended with any danger; that all of the cars or any number of them can be made to do the braking; and it will also be seen that the engineer can tell with certainty the distance the car to be coupled on is from his train, and regulate his speed accordingly, and that all of these operations can be successfully performed without any danger or delay. The levers H may be supported from the bottom of the car by a suitable hanger or otherwise, and the end h^4 of these levers is arranged to be in line with the rear end of the return portion of the link at the respective ends of the cars, so that in case such end fails to engage the end *i* of the lever I it will strike the end h^4 of the lever H, and thus operate these levers H and I. The arm h'' of each lever is arranged to allow the passage of the acting portion of the link beneath it when projected.

Instead of forks *f*, other devices can be used for connecting the sliding sections of the clutches with their actuating-rods, and, instead of a collar, *f'*, grooves may be used in the clutch-sections to make the engagement.

The form and arrangement of the levers H and I may be changed somewhat from that shown, and the form of link which coacts with these levers may also be changed; but in any case the form, construction, and arrangement of these parts should be one that will cause the link, as it recedes, to operate the levers, and when the levers at one end of the car are operated the levers at the other end must also be operated to bring them in position for operating the clutches and the other devices.

The guide-head T may be operated in some other manner than by a coiled spring—as, for instance, by a flat spring secured to the framework of the car and acting to force the head against the side of the link.

The signals U might be arranged to slide in and out instead of being raised and lowered, and when so arranged the incline should be acted on by the side of the link instead of the bottom, and the arm or incline for the disk should be arranged to carry the levers in or out as the disk is rotated.

What I claim as new, and desire to secure by Letters Patent, is—

1. The rods or shafts B B', having clutches *a a'* and *b b'*, and provided with a head, *c*, at one end, and a socket or coupling, *c'*, at the other, for making a continuous line of shafting through a train of cars, substantially as and for the purposes specified.

2. The heads or shafts B B', each provided with couplings *a a' b b'*, head *c*, and socket or coupling *c'*, in combination with pinions C and cog-wheel D, for operating the wheel D, substantially as and for the purposes specified.

3. The rods or shafts B B', each having clutches *a a' b b'*, head *c*, and socket or coupling *c'*, in combination with the pinions C, wheel D, disk D', and a coupling-link, E, for locking the link when in position, substantially as and for the purposes specified.

4. The link E, in combination with the lever H, rod J, having forks *f*, rods or shafts B B', having clutches *a a' b b'*, for automatically setting the clutches by the contact of the link with the lever, substantially as and for the purposes specified.

5. The link E, in combination with the lever H, lever I, rods J, having forks *f*, rods K, rods or shafts B, provided with clutches *a a' b b'*, for operating the clutches, substantially as and for the purposes specified.

6. The link E, lever H, connecting-rod J, and forks *f*, in combination with the clutches *a a' b b'*, rods or shafts B B', pinions C, and wheel D, for giving the wheel D a rotary movement, substantially as and for the purposes specified.

7. The link E, lever H, rods J K, and forks *f*, in combination with the clutches *a a' b b'*, rods or shafts B B', pinions C, wheel D, and disk D', for operating the disk D', substantially as and for the purposes specified.

8. The link E, lever H, lever I, connecting-rod J, and forks *f*, in combination with the clutches *a a' b b'*, rods or shafts B B', pinions C, and wheel D, for giving the wheel D a rotary movement, substantially as and for the purposes specified.

9. The link E, lever H, lever I, rods J K, and forks *f*, in combination with the clutches *a a' b b'*, rods or shafts B B', pinions C, wheel D, and disk D', for operating the disk D', substantially as and for the purposes specified.

10. The shaft or rod B, having a head, *c*, and a socket, *c'*, in combination with a clutch, *b b'*, pinion C', wheel N, screw-shaft O, nut or spool P, and a connection between the nut or spool and the brakes of the car, for applying or releasing the brakes, substantially as specified.

11. The rods or shafts B B', each having a clutch, *b b'*, and a pinion, C', in combination with a pinion, C'', wheel N, screw-shaft O, traveling nut or spool P, and a connection between the nut or spool and the car-brake, for enabling the brakes to be applied and the connections to be made in case of a reverse of a car, substantially as specified.

12. The wheel N, actuated from the rod or shaft B or B' through the pinions C', in combination with the disk R', ring R'', screw-shaft O, traveling nut or spool P, and a connection

between the nut or screw and the car-brakes, for preventing overwinding, substantially as described.

13. The wheel N, driving shafts or rods B or B′, and pinions C′, in combination with the screw-shaft O, traveling nut or spool P, having stops *o o′*, disk Q, having stop *q*, box R, having stops *o″*, disk R′, ring R″, and a connection between the traveling spool and the brakes for preventing overwinding in either applying or releasing the brakes, substantially as specified.

14. The levers H and I, located at each end of the car and connected by suitable rods or links one with the other, in combination with rotating shafts B B′, having clutches thereon, and provided with pinions C′ C″ and link E, for actuating the clutches for coupling and braking purposes, substantially as specified.

15. The lever M and cam or flange L, in combination with the rod J′, clutches *b b′*, and rods or shafts B B′, for throwing the clutches into engagement independently to operate a brake-actuating mechanism through the pinions C′, substantially as described.

16. The signals U and arms or levers V V′, in combination with a coupling-link and a coupling-disk, for raising and lowering the signals, substantially as and for the purposes specified.

17. The wheel W′, provided with numerals on its face, in combination with a driving-pinion and a coupling-shaft, through which a coupling-disk is operated, for indicating the position of different cars when coupled in a train, substantially as specified.

18. The sliding head T, in combination with the link E E′, head F, having slot F′, and disk D, having slot e^3, for holding the link in position to pass into the slots F′ and e^3, substantially as and for the purposes specified.

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Witnesses:
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