

3 Sheets—Sheet 1.

A. D. MOORE.

Patented July 16, 1895.

A. E. Hansmann

by *L. J. Freeman*
Attorneys

(No Model.)

3 Sheets—Sheet 2.

A. D. MOORE.
MAIL AND PARCEL PIPE EXPRESS.

No. 542,682.

Patented July 16, 1895.

Fig. 5.

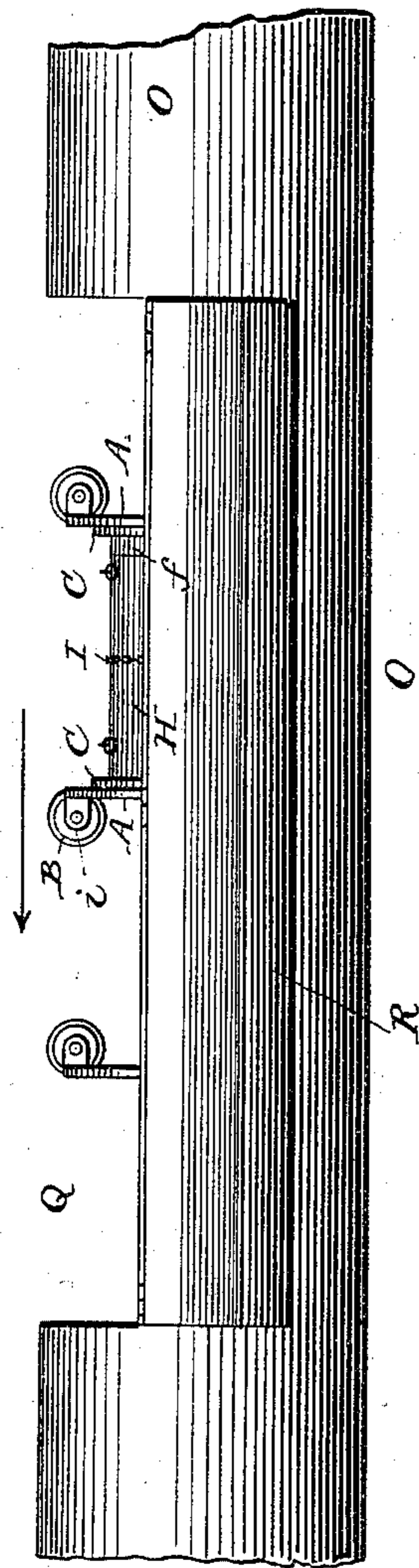


Fig. 4.

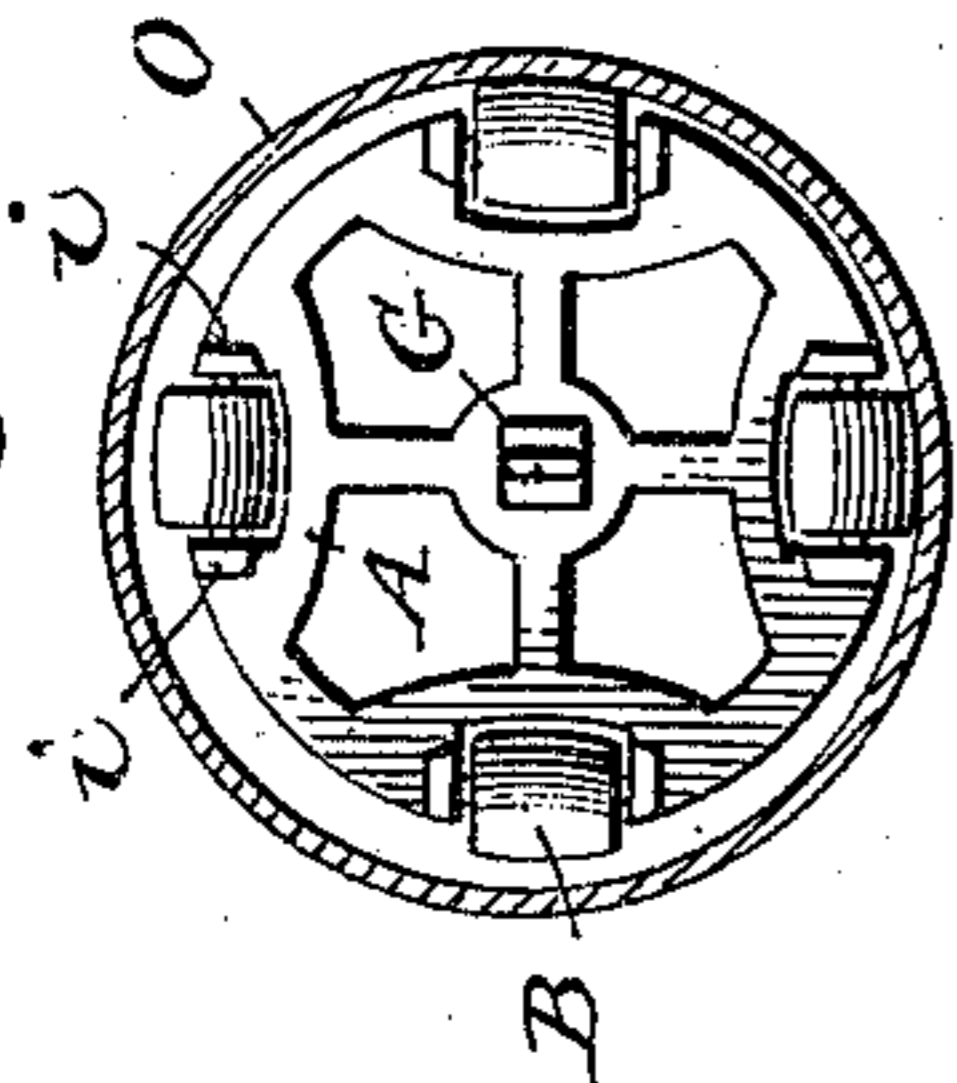


Fig. 6.

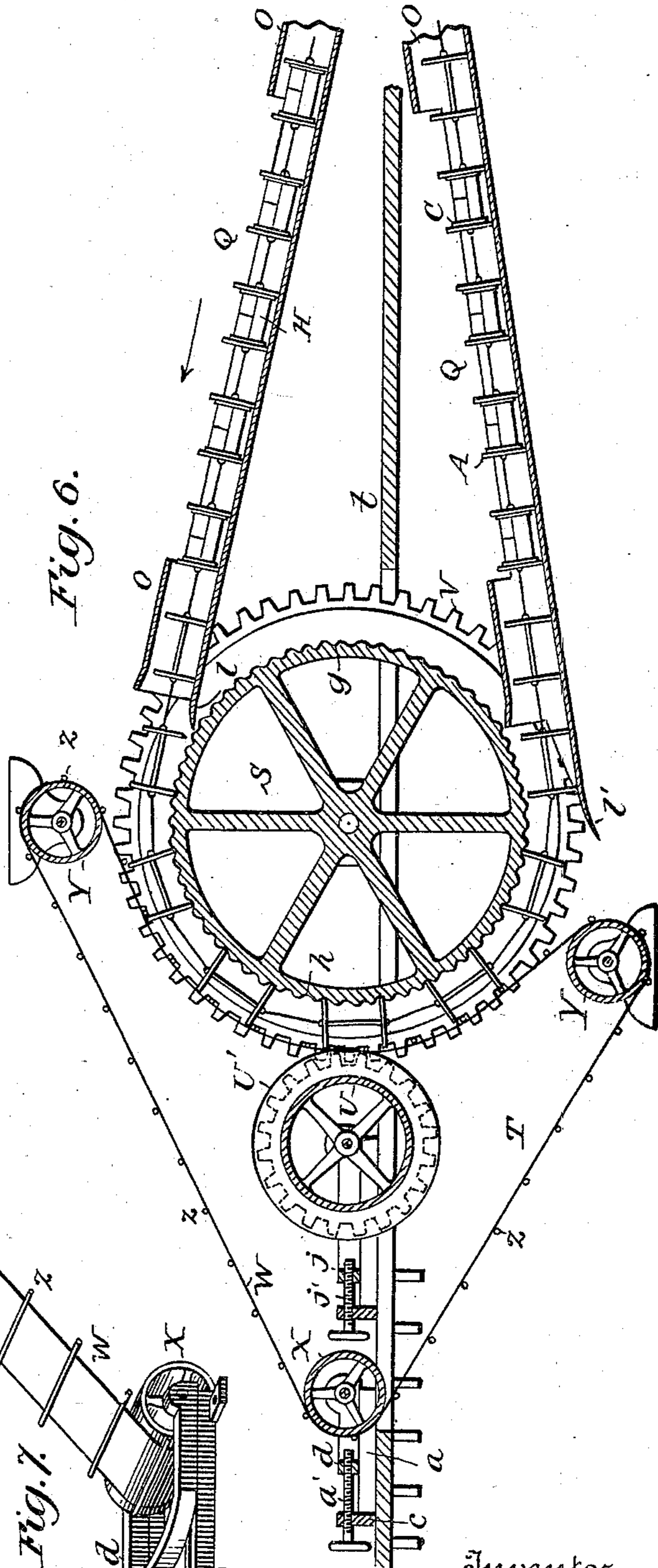
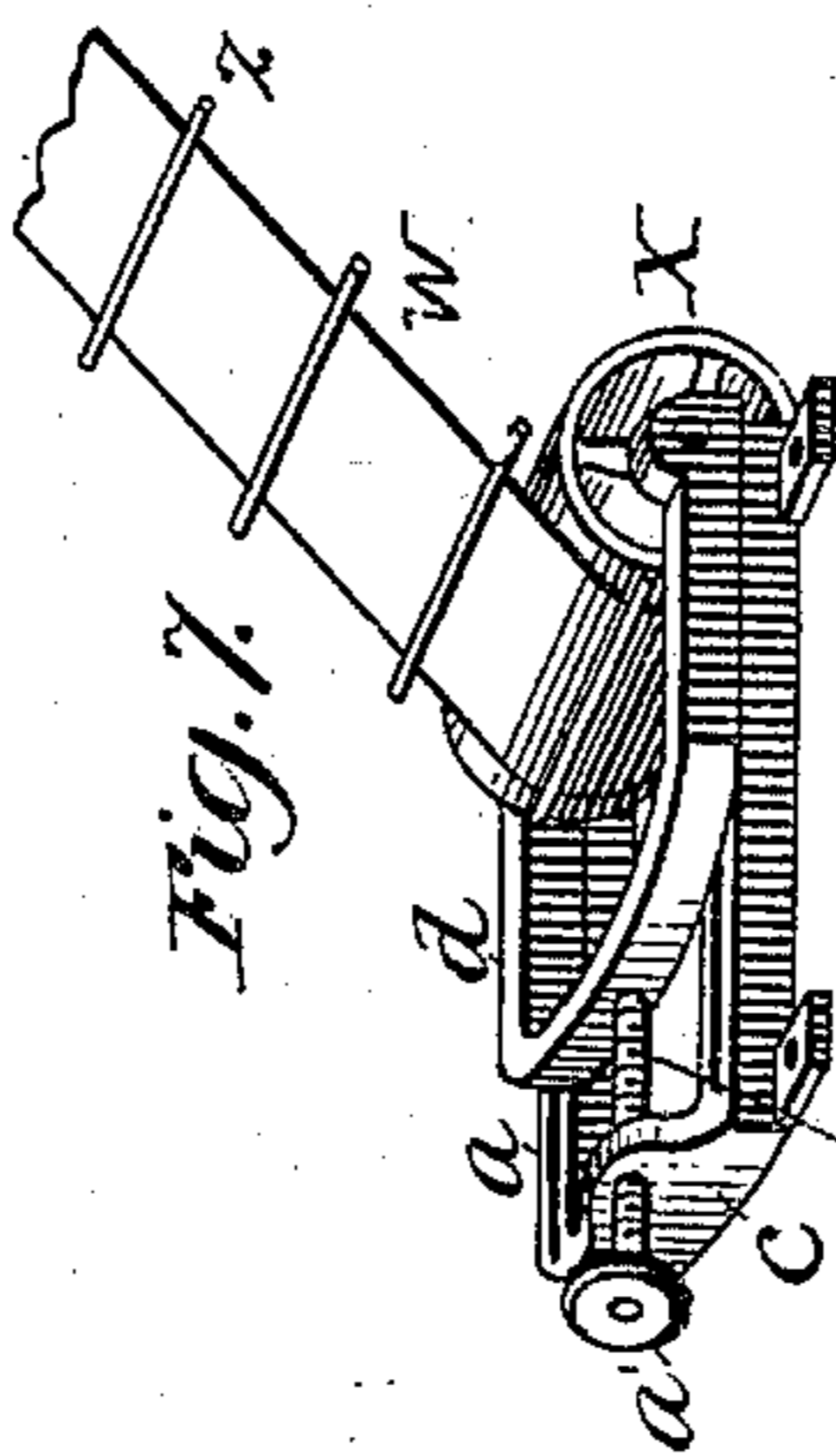


Fig. 7.



Witnesses

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(No Model.)

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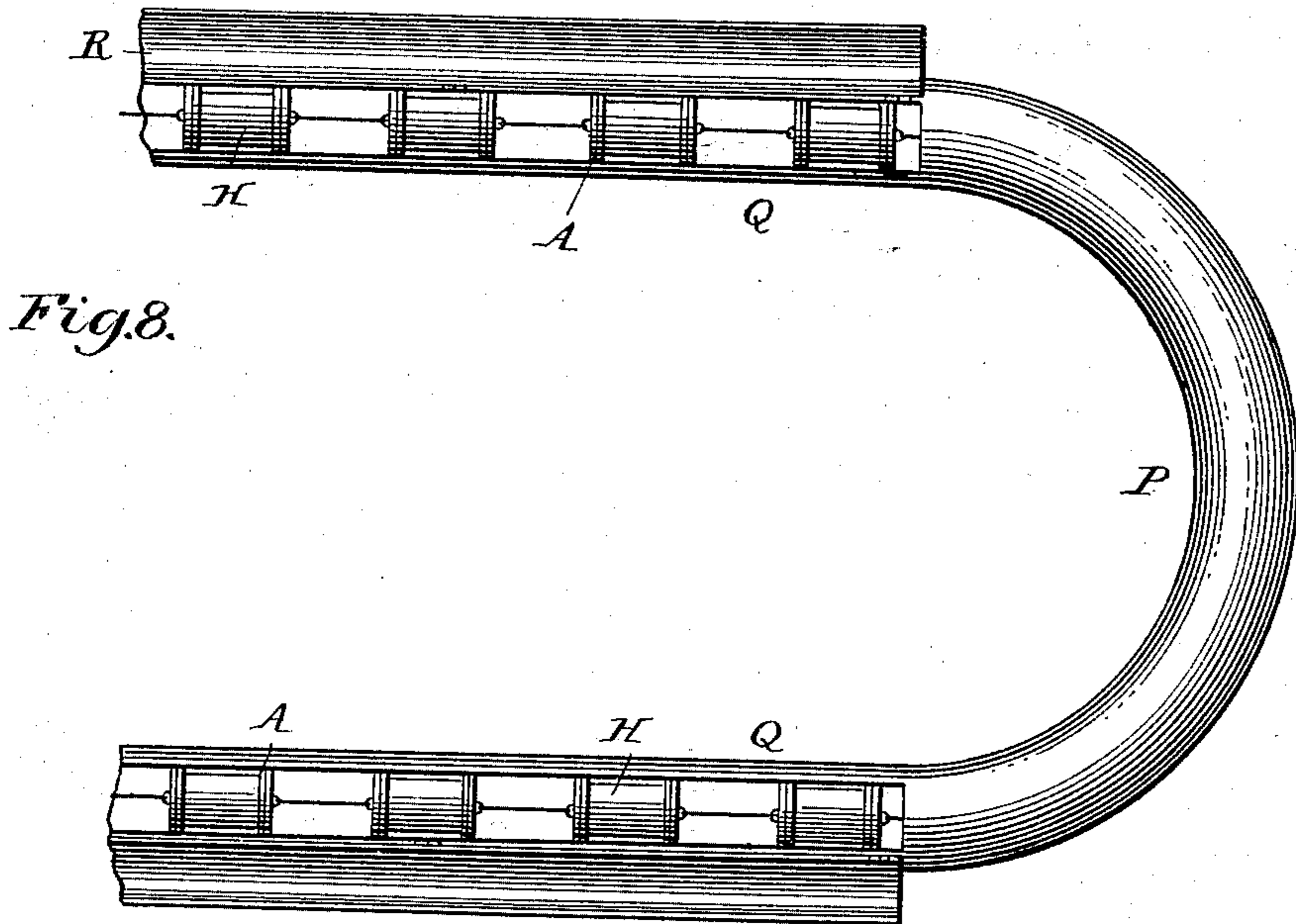


Fig. 8.

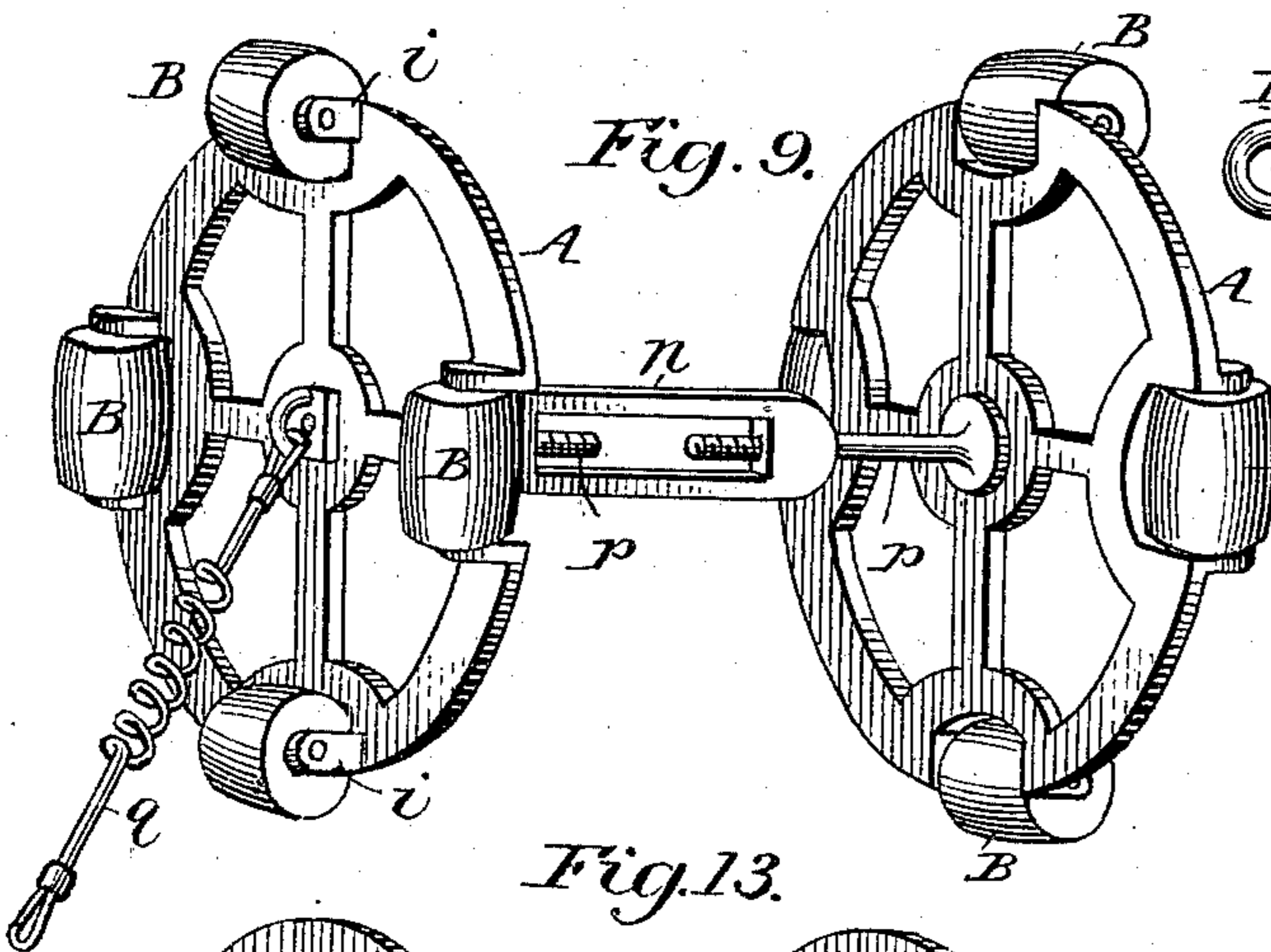


Fig. 9.

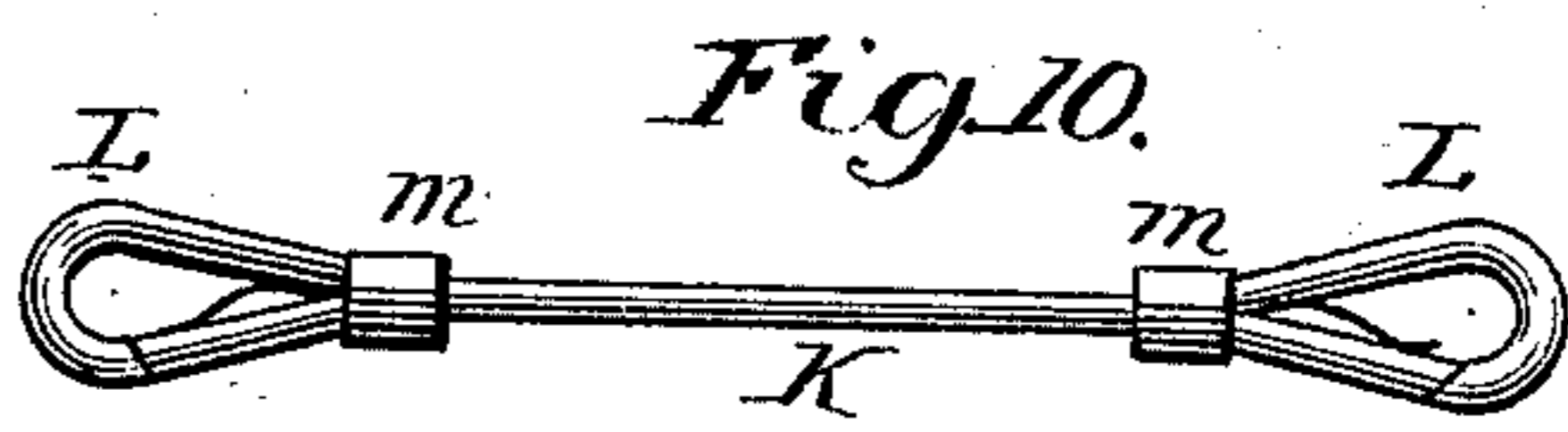


Fig. 10.

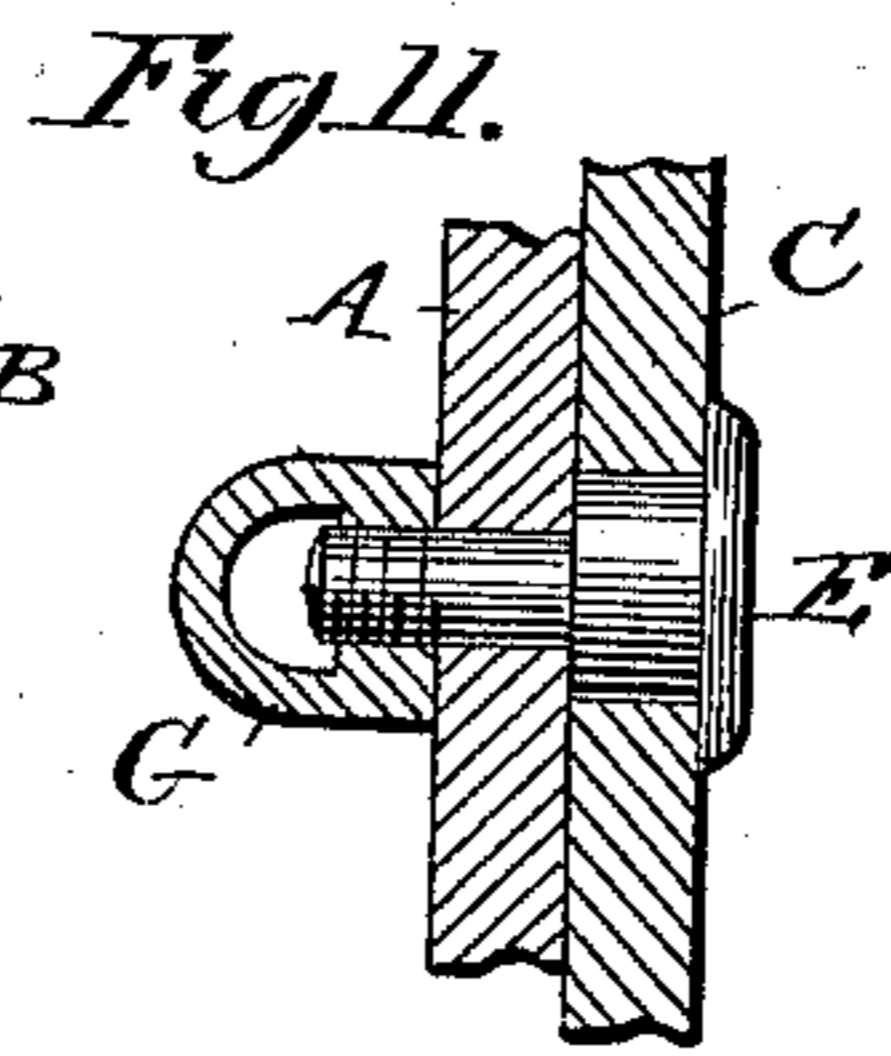


Fig. 11.

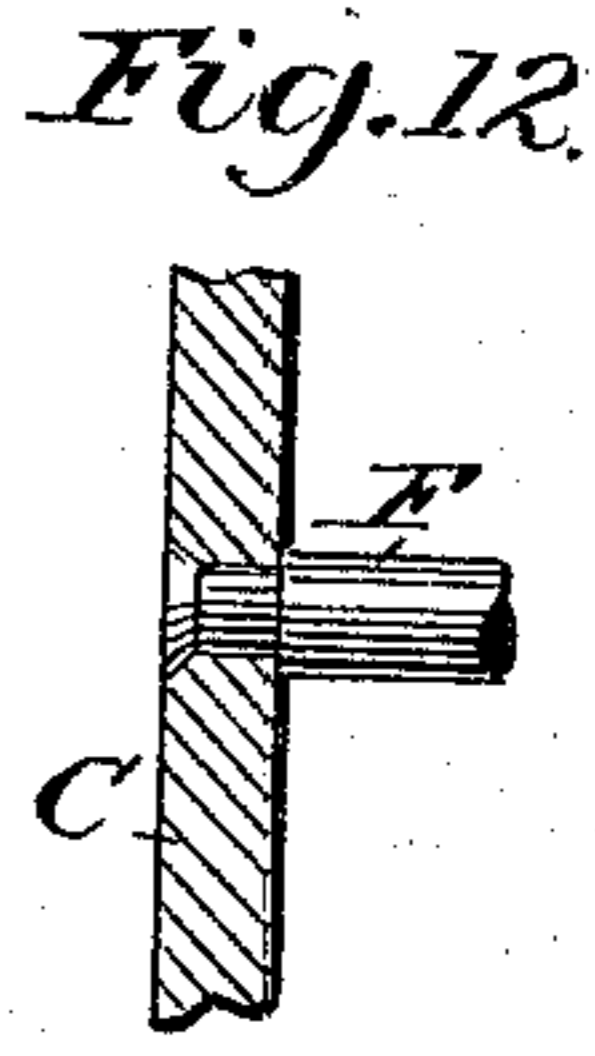


Fig. 12.

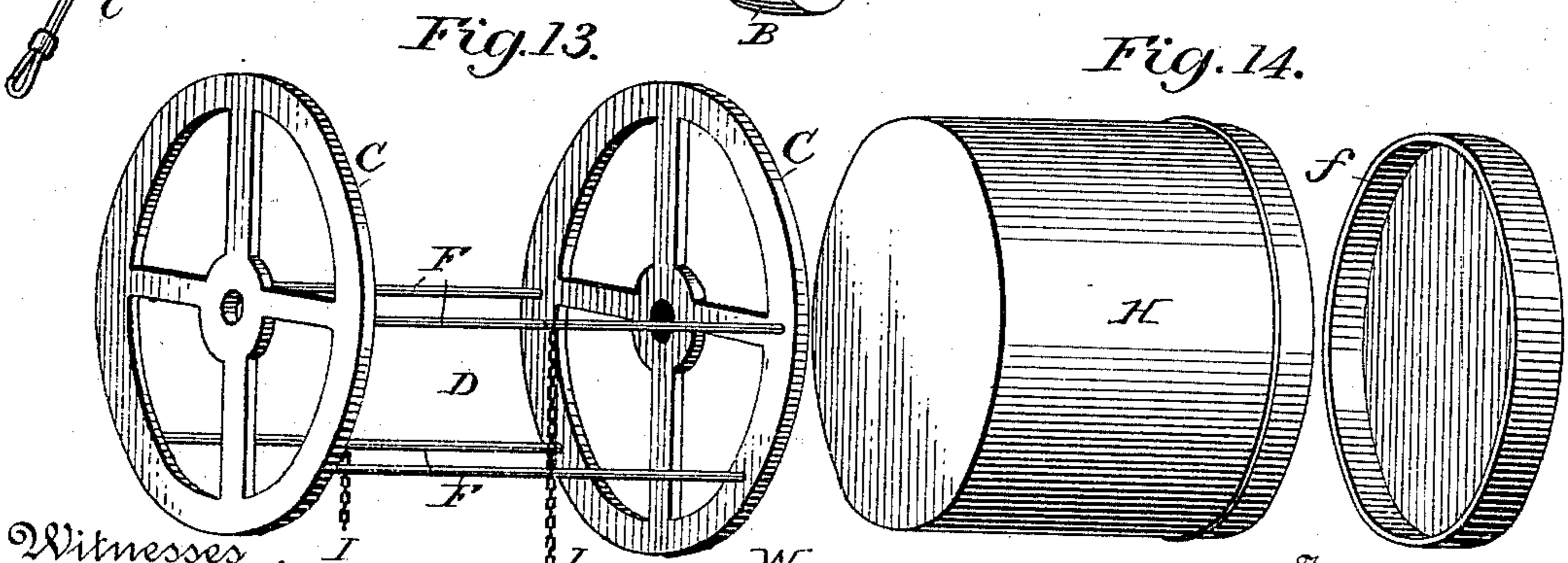


Fig. 13.

Fig. 14.

Witnesses
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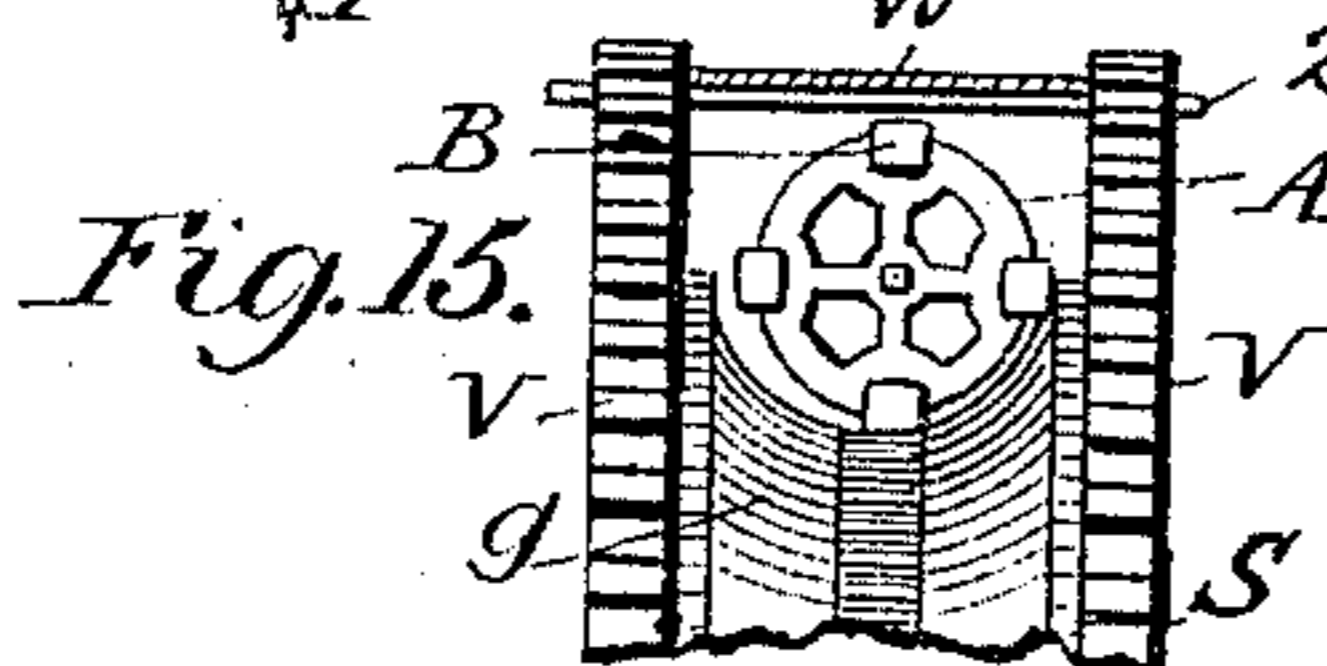


Fig. 15.

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UNITED STATES PATENT OFFICE.

ALEXANDER DAVIS MOORE, OF MOORE, PENNSYLVANIA.

MAIL AND PARCEL PIPE-EXPRESS.

SPECIFICATION forming part of Letters Patent No. 542,682, dated July 16, 1895.

Application filed July 19, 1894. Serial No. 518,059. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER DAVIS MOORE, a citizen of the United States, residing at Moore, in the county of Delaware and State of Pennsylvania, have invented a new and useful machine or mechanism entitled Mail and Parcel Pipe-Express, of which the following is a specification.

The objects of my improvements are, first, to provide a method of transportation through conduits or ordinary metal pipes laid underground, by which mail or express packages may be carried in large quantities from place to place, as from the principal office to sub-stations or to railroad stations without the delay attending the use of wagons in crowded thoroughfares, and, secondly, to accomplish this at a fair rate of speed and at a comparatively low cost by simple mechanical appliances and by the expenditure of an ordinary amount of power. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of one of the carriages employed for traveling through the conduit or pipes and conveying letters or goods, the carriage being provided with a revolving cradle which is represented as empty or without its receptacle. Fig. 2 is a similar view of the carriage when loaded—that is, with its receptacle secured in place in the revolving cradle, the carriage being represented as in a curved portion of the conduit or pipe, which is shown in longitudinal section. Fig. 3 is a perspective view of one of the dummy-carriages or dummies used merely for filling up the line between the carriages proper. Fig. 4 is a cross-section of the conduit or pipe with one of the carriages in position therein. Fig. 5 is a side view of the conduit or pipe at one of the stations, showing one of the carriages in position to be loaded or unloaded. Fig. 6 is a vertical sectional view of the power-station, showing the driving-wheel and the belt-compress and the carriages in position on the wheel and in the open pipes leading to and from the wheel; Fig. 7, a detail view in perspective of the pulley-slide for tightening the compress, showing also the transverse rods on the compress-belt; Fig. 8, a plan of the opposite terminal where the conduit or pipes are preferably arranged in semicircle,

around which the carriages pass on their return trip, and adjoining which are the open pipes or stations where the carriages may be loaded or unloaded. Fig. 9 is a perspective view of a swivel dummy used for shortening or lengthening the train. Fig. 10 is a side view of one of the coupling-rods. Fig. 11 is a broken sectional view of one end of the carriage, showing how the axle upon which the cradle revolves is fastened to the head of the carriage. Fig. 12 is a broken sectional view of a portion of the rim of the cradle. Fig. 13 is a perspective view of the cradle detached from the carriage. Fig. 14 is a perspective view of the receptacle or can which fits within the cradle, the lid being removed. Fig. 15 is an elevation of a portion of the face of the driving-wheel, showing a carriage in position in the groove and under the belt and cross-rod of the cog-wheel compress.

Similar letters refer to similar parts throughout the several views.

The general plan, which is too extended to be represented in a single view, comprises a continuous line of carriages of circular form, lightly but strongly constructed, closely coupled, and running on rollers. These carriages after passing over a driving-wheel leave the power-station by one conduit or pipe, and after traversing the intervening distance underground, reach the opposite terminal, pass around the semi-circle there and return to the power-station by another conduit or pipe. From station to station the conduits or two lines of pipe are preferably laid side by side, although they may be otherwise arranged if necessary or desirable.

In Fig. 1 the heads A A of the carriages are preferably made of cast metal in open work and circular in form. Set into recesses at equal distances apart in the periphery of the heads are four rollers B, journaled in bearings in lugs *i i* at the sides of the recesses and cast with the heads. The broad portion of these rollers, as shown, is curved to conform to the interior surface of the conduit, and the rollers project sufficiently far from the periphery of the heads to prevent any other part of the carriage from touching the conduit, even when passing around comparatively short curves. The heads, with their projecting rollers, are to be within a fraction

of the same diameter as the interior of the conduit in order to properly guide the carriages in their travels and prevent unnecessary play. Between the heads A A are circular heads C C of a revolving cradle D, which turns on a pivot or axle having a strong head E. This axle projects from the center of the carriage-head A and terminates in a ring G. The heads of this cradle are of light iron work, and, as shown, are connected by four light rods F, which have shoulders where they abut against the inside of the heads and are riveted in sunken holes on the outside. (See Fig. 12.) The heads of the cradle are of smaller diameter than the heads of the carriage, so that the cradle will not come in contact with the interior of the conduit in passing around curves. The abruptness of the curves in the conduit is limited by the distance of the rods F from the outer line of the rollers B.

Each carriage is provided with a receptacle or can H, preferably of cylindrical shape, corresponding to the size of the cradle, and having a removable cover *f* or top at one end. These cans hold the letters or articles to be conveyed. In Fig. 2 the can H is represented in position in the cradle and is secured in place therein in any suitable manner, as by two short chains I, fastened to the upper rods F of the cradle and meeting in the center above the can, where they are joined by a clasp. Instead of chains, straps may be employed, or a light rod can be hinged to one head and shut down in a clasp at the other. The receptacle or can is placed in a revolving cradle, so that if the carriage, in its passage around the driving-wheel or through the conduit and around the curves should turn over and finally appear at its destination upside down, it can be easily turned to its proper position, and by means of small rings J J the can with its contents can be removed. In some instances the receptacle or can may be permanently secured within the cradle of the carriage, and in such cases the upper side of the receptacle is open and provided with a hinged cover, by opening which access may be had to the interior. A carriage provided with a receptacle of this character is especially serviceable for transporting parcels and other comparatively large articles.

Attached to the ring G of the carriage is a coupling-rod K, which joins one carriage to the one following, being preferably of about one-half the length of the carriage. It is provided at both ends with strong snap-hooks L, one or both of which revolve on swivels *m*, so as to allow the carriages to turn freely without twisting the coupling-rods. The snap-hooks fit closely in the rings G to prevent play.

As in a circuit of a mile or more long it is not necessary to provide each carriage with a receptacle or can, the intervening spaces are filled up and the endless train completed with carriages of the lightest, cheapest form, which may be designated "dummy-carriages" or

"dummies." Fig. 3 shows such a dummy, in which the heads A' are substantially the same as the heads of the regular carriages shown in Figs. 1 and 2, but instead of having a cradle and a receptacle therein, the heads are simply connected by a rod M, passing through the center of the heads and having shoulders N on the inside of the heads and a ring-nut G' screwed on the end of the rod outside, the end of the screw being slightly riveted or nicked to prevent the ring-nut from turning off. The heads are thus securely held in position. As stated, the heads of the dummies being exactly the same as the heads of the regular carriages, the dummies are readily convertible into carriages when needed, and as the coupling-rods have snap-hooks, a dummy can easily be detached and removed from the train and a carriage with a receptacle or can substituted therefor.

As neither the dummies nor the coupling-rods have to be of an exact length, but may be a little shorter or longer when so desired, in making up the line (in the beginning) a few of the coupling-rods may be so shortened or lengthened as to make the line exactly compass the circuit; but after this is done, in order to tighten the line, if it should wear loose, or in order to loosen it, if deemed too tight, an adjustable dummy, as shown in Fig. 9, is provided, which, instead of having a simple rod passing through from head to head, has a strongly-constructed turnbuckle placed upon the screw-threaded ends of rod *p*, by which the heads of the dummy can be drawn nearer together or separated at will; and then, to provide against any incidental contraction by cold or accidental strain these dummies are preferably provided with strong spiral spring-couplers *q*, instead of rigid coupling-rods. One of these spring-couplers should be in each half of a circuit.

Fig. 4 shows the head of a carriage in position in the conduit or pipe O. It will be seen that the head A, with its rollers B, is nearly of the same diameter as the interior of pipe, there being but a small space at the top. Only the rollers come in contact with the pipe, while the periphery of the head is kept away. By decreasing the diameter of the head the periphery will be kept still farther from the pipe, but the diameter or capacity of the can will be decreased thereby.

The conduit is preferably made up of ordinary cast-iron pipes, care being taken to see that they are of the proper diameter inside, and that they are so joined together as to present a smooth surface for the rollers to pass over. There is no limit to the size of the pipe. As setting forth one of the objects of the invention—namely, to transmit large quantities of mail or other matter—it may be said that a pipe two feet in diameter would be suitable for a carriage with a receptacle or can holding about two bushels, although the size of the receptacle will of course vary according to circumstances. It will also be seen in Fig.

4 that the weight of the carriage rests on the two lower rollers. Sometimes it is mainly on one. As the rollers follow no prescribed path, and as they are of the same curve as the interior of the conduit or pipe, there will be little wear and no ruts.

In Fig. 2 the carriage is represented as in a curved section of the conduit or pipe.

In Fig. 5 is exhibited a carriage in an open pipe Q, where the carriages are loaded or unloaded by the insertion or removal therefrom of the receptacles or cans. These pipes are found at the terminals or at intermediate stations along the route. They have the same diameter as the closed pipes O, but with about one-third of the upper portion removed. This portion cut out (or left out in casting) is covered with a hinged lid R, which is to be opened for the removal or insertion of goods and closed down when the carriages are in motion. The aperture is to be of sufficient width to allow the receptacle or can to be taken out or replaced, and to be as long as the number of carriages would require or the depth of the building would allow, may be suitably shaped, and as only about one-third of the pipe is removed the carriages cannot escape therefrom even when the lid is open.

Fig. 6 shows in sectional view the driving-wheel S, the compress T, which presses the carriages against the wheel and prevents them from slipping thereon, and the carriages passing to and from the wheel in the open pipes Q Q. The driving-wheel S has the dimensions of a broad-faced fly-wheel. In the drawings it is represented with its shaft about on a line with the first floor *t* of the power-station, the lower half being in the basement. On its face is a semicircular groove *g*, Fig. 15, in which the carriages are about half embedded and in which they fit loosely. The dimensions of the face correspond substantially with the diameter of the conduit or pipe employed. The wheel is so large or has so long a curve that when the carriages are upon it the lowermost rods F of the cradles D do not touch the bottom of the groove *g*. The groove must be so large that the rollers will not prevent the heads from resting on the bottom of the groove, which is flat, (not following the regular curve of the sides,) so that the periphery of the heads of the carriages may rest upon it and cling to it when the carriages happen so to roll upon it from the pipes. This bottom is preferably formed of hard wood laid crosswise, and in it at intervals are transverse curved depressions *h*, in which the heads of the carriages or the rollers may sink and be the more firmly held onto the wheel. These depressions are both shallow and curved, so that when the carriage is delivered to the wheel from the conduit or pipe the initial head of the carriage can "creep" forward, when the following head seemingly falls into place on the wheel.

As seen in the drawings, the pipes Q Q are open until within a short distance of the

driving-wheel. They enter the front of the building from under the ground, and the upper one gradually ascends from the floor until it reaches the top of the wheel, while the lower one gradually descends until it reaches the bottom of the wheel, the pipes being suitably supported. Near the driving-wheel the pipes are closed or circular, as at O O, and their ends are slightly expanded or trumpet-shaped, so that the carriages may have full room for entering the pipe. The bottom of the upper pipe is extended into a projecting lip *l*, curving downward and approaching as close to the bottom of the groove in the wheel as possible, so as to properly guide the carriages to the wheel from the pipe; and from the bottom of the lower pipe is a longer projecting lip *l'*, which passes under the wheel to guide the carriages therefrom to the pipe, so that if there should be any loosening or slack in the train when the carriages leave the compress they would be properly guided into the pipe. It is at this point that the coupling-rods K K, fitting closely in the rings G of the carriages, keep the carriages apart if there is any disposition to crowd.

As seen in Figs. 6 and 15, the farther sides of the semicircular groove *g* are extended into cogs, forming cog-wheels V V around the wheel. These cog-wheels are used in the working of the compress T, which consists of an endless belt W of the width of the circular groove of the driving-wheel and long enough to extend partly around the latter and over the three pulleys X Y Y. Fastened to the outer side of this belt transversely, at equal distances apart, are rods *z z*, which project beyond the sides of the belt and fit into the cog-wheels V V, and when the driving-wheel turns it carries the belt positively with it. The belt is padded between the cross-rods, and the spaces between the cogs are sunk just so deep that the belt presses upon the heads of the carriages, and, with the aid of the cross-rods and the depressions in the bottom of the groove *g*, holds the carriages tightly in their place until they pass out from beneath the compress. At least three of the carriages are under the compress at the same time, while two or three other carriages are on the wheel, but not under the compress. The pulley X is set in a slide *a*, adjustable by a screw *a'*, by which means the belt may be tightened and the pressure on the carriages increased, as shown more clearly in Fig. 7.

At U, in Fig. 6, is seen an auxiliary cog-wheel compress. This cog-wheel compress is of the same width as the driving-wheel S, and is provided at the sides with teeth or cog-wheels (see dotted lines, Fig. 6), adapted to engage with the teeth or cog-wheels V, so that the auxiliary compress will be positively driven by the wheel S. The face U' of the auxiliary compress is of leather padding, which extends out beyond the line of the teeth or cogs and at the point of contact with the driving-wheel presses against the intermedi-

ate belt-compress and holds still more firmly in their place the carriages as they come under its pressure. This auxiliary compress is supported in a movable slide *j*, adjustable by means of a screw *j'*, as shown in Fig. 6, so that its pressure can be increased or lessened.

Power is communicated to the driving-wheel at its shaft, and while the carriages are best delivered to the wheel by going over the top and passing out from beneath, as indicated by the arrow, Fig. 6, the driving-wheel is so constructed that it may be turned either way and the carriages sent backward or forward.

In Fig. 7 is seen in perspective the pulley-slide *a*, in which is placed the pulley *X*. The screw *a'*, which is set in the frame *c*, passes through the yoke *d*. By turning this screw the belt-compress is tightened and the pressure on the carriages in the groove of the drum increased.

Fig. 8 is a plan of the opposite terminal consisting, preferably, of curved pipes *P P*, laid in a semicircle, connected with straight open pipes *Q Q*, in which are seen the carriages at rest. The curve of the semicircle must be sufficiently long to allow the carriages to pass around without any part touching the pipe except the rollers. While the curved pipes of the semicircle are preferably closed the straight pipes (supposed to be at the stations or sides of a room) are open, so that the mail or parcels may be placed in the carriages or taken from them.

The line of carriages and dummies is ordinarily so formed that when the open pipes adjoining the driving-wheel at the main station are filled with carriages the open pipes at the opposite terminal will also be filled, and that when the carriages from the said wheel reach the said terminal the carriages from the terminal will be at the driving-wheel. If the line is long enough to admit of an intermediate station exactly half way, through which the pipes may be carried, the open pipes there will always be filled with carriages when the open pipes at the power-station and terminal are filled.

I claim—

1. In a mail and parcel express, the combination of a railless conduit consisting of two branches connected at one end by a continuous curve, a driving wheel at the opposite end, and an endless train of connected carriages free to turn axially within the conduit and passing over said wheel, substantially as described.

2. In a mail and parcel express, the combination of a railless conduit consisting of two branches connected at one end by a continuous curve, a driving wheel at the other end, the terminal portions of the conduit adjacent to the wheel being enlarged, lips extending from the bottoms of said enlarged portions to the wheel to form guides for the entrance to the conduit, and a series of connected carriages free to turn axially within the conduit

and passing around the wheel, substantially as described.

3. In a mail and parcel express, the combination with the conduit, the driving wheel, and a series of connected carriages arranged within the conduit and over said wheel, of an endless belt compress extending in a curved line around part of the periphery of said wheel and bearing upon the carriages thereon, substantially as described.

4. In a mail and parcel express, the combination with the conduit, the driving wheel, and a series of connected carriages passing through the conduit and over said wheel, of an endless belt compress extending in a curved line round part of the periphery of said wheel, and bearing upon the carriages thereon, and adapted to be driven positively by engagement with said wheel, and means for tightening the compress to press the carriages against said wheel, substantially as described.

5. In a mail and parcel express, the combination with the conduit, the driving wheel having a peripheral groove and gear teeth at the sides, and a series of connected carriages passing through the conduit and over said wheel, of an endless belt compress extending partly around the wheel and in contact with the carriages thereon, cross-bars on the compress in position to engage said gear teeth, and means for tightening the compress to press the carriages against the wheel, substantially as described.

6. In a mail and parcel express, the combination with the conduit, the driving wheel, and a series of connected carriages passing through the conduit and over said wheel, of an endless belt compress extending partly around said wheel in contact with the carriages thereon, an auxiliary compress, and connections substantially as described whereby said endless belt compress and auxiliary compress are positively driven by said driving wheel, as set forth.

7. In a mail and parcel express, the combination with the conduit, the driving wheel having a peripheral groove and gear teeth at the sides, and a series of connected carriages passing through the conduit and over said wheel, of an endless belt compress extending partly around the wheel and in contact with the carriages thereon, a series of cross bars on the belt in position to engage said teeth, an auxiliary compress having a padded periphery and cog teeth at the sides adapted to engage the teeth on the driving wheel, and means for tightening said belt and for adjusting the auxiliary compress, substantially as described.

8. In a mail and parcel express, the combination with a conduit having a curve at one end and a driving wheel at the other, the periphery of the wheel having a semi-circular groove therein, the bottom of said groove being provided with depressions, and the side walls of the groove being formed into gear

teeth, a compress around the periphery of the wheel opposite the ends of the conduit, cross bars on the compress fitting between the gear teeth, and a series of connected carriages in the conduit and around the wheel, the ends of which fit within the depressions in the bottom of said groove and are held therein by the compress, substantially as described.

9. In a mail and parcel express, the combination of a cylindrical railless conduit, a driving wheel, and a series of carriages free to turn axially within the conduit, and each having two heads of less diameter than the interior diameter of the conduit, rollers carried by said heads and projecting beyond the latter, and means for connecting the carriages into a train, substantially as described.

10. In a mail and parcel express, the combination with a cylindrical railless conduit, of a driving wheel at one end thereof, a series of carriages free to turn axially within the conduit, and each having two circular heads provided with axles, a cradle pivotally secured between the heads upon said axles, the ends of the cradle being of a less diameter than the diameter of the heads of the carriage, rollers journaled in the periphery of the carriage, a can within the cradle, and means for connecting the carriages into a train, substantially as described.

11. In a mail and parcel express, the combination with a cylindrical conduit, of a driving wheel at one end thereof, a series of carriages within the conduit and around the wheel, the heads of each carriage being circular and provided with peripheral rollers, a cradle within each carriage, the ends of which are of a less diameter than the diameter of the heads of the carriage, an axle through each of the ends of the carriage and the cradle, a ring upon the outer end of each axle, a can within the cradle, and a series of rods each having a snap-hook at its end for engaging with the ring of the axle to join the carriages together, one of the hooks being swiveled, substantially as described.

12. In a mail and parcel express, the combination with a cylindrical conduit, of a driving wheel at one end, a series of carriages within the conduit and around the wheel, the heads of each carriage being circular and provided with rollers, a cradle within each carriage, the ends of which are of a less diameter than the heads of the carriage and are joined together by means of rods, a can within the cradle, rings on the can for manipulating it, chains upon the rods of the cradle the ends of which are adapted to be secured together above the can to hold it in place, and rods for securing the carriages together, substantially as described.

13. In a mail and parcel express, the combination with a railless conduit, of a driving wheel, at one end thereof, a series of carriages and dummies free to turn axially within the conduit, and swiveled rods for detachably connecting the carriages and dummies together, one of the dummies having a turn-buckle between its two end portions, and having a coupling rod with a spring in the line thereof, substantially as described.

14. The combination in a carriage of the character described of two heads having peripheral rollers, a cradle pivotally mounted to turn between the heads, and a receptacle within the cradle, substantially as described.

15. The combination in a carriage of the character described, of two circular heads having peripheral rollers, a cradle pivotally mounted to turn between the heads, a receptacle detachably supported within the cradle, and means for securing the receptacle in the cradle, substantially as described.

16. The combination in a carriage of the character described, of two heads having peripheral rollers, and a receptacle pivotally supported to turn between said heads, substantially as set forth.

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Witnesses:

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