No. 672,115.

Patented Apr. 16, 1901.

G. WESTINGHOUSE.

AIR BRAKE.

(Application filed Aug. 1, 1900.)

(No Model.)

3 Sheets—Sheet 1.

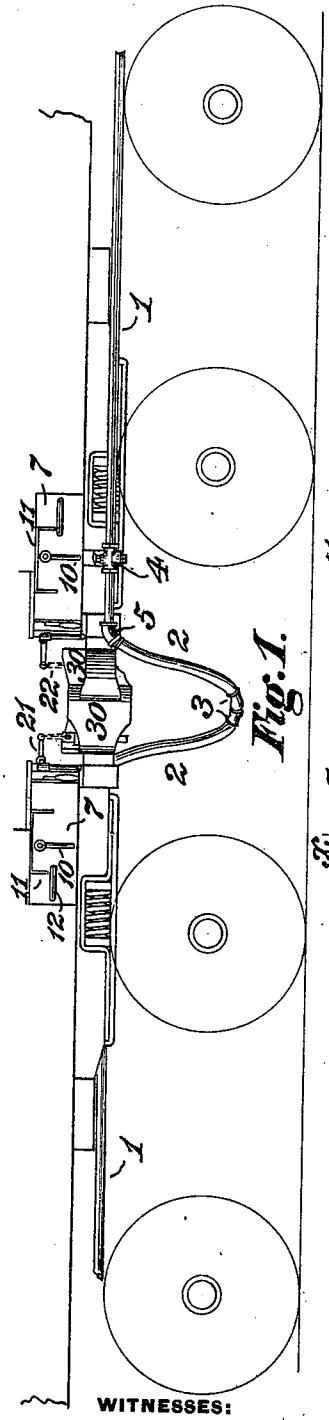

Fig. 1.

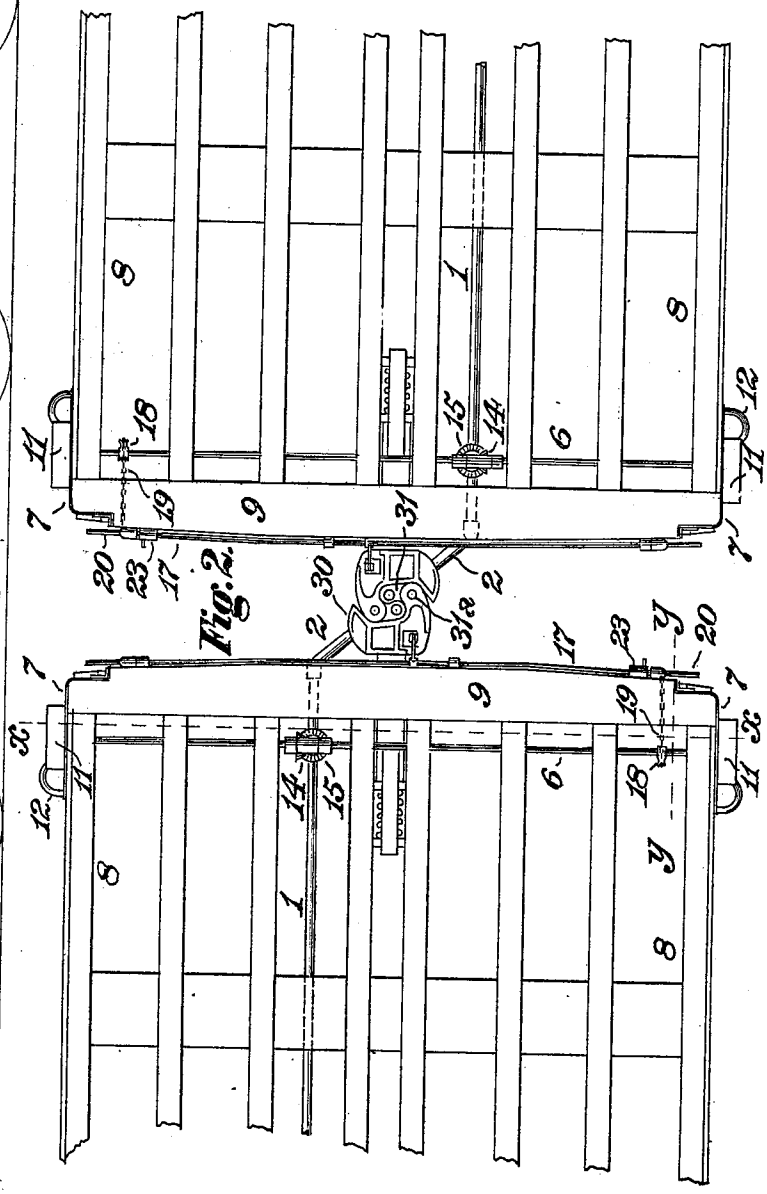

Fig. 2.

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3 Sheets—Sheet 2.

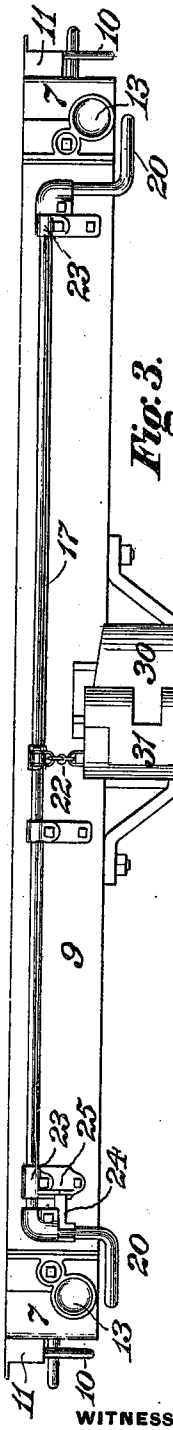

Fig. 3.

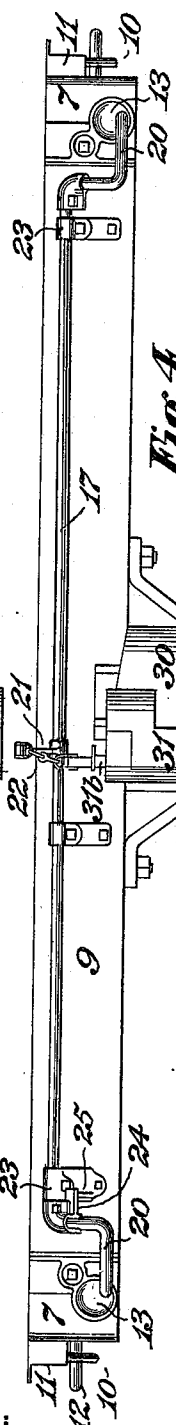

Fig. 4.

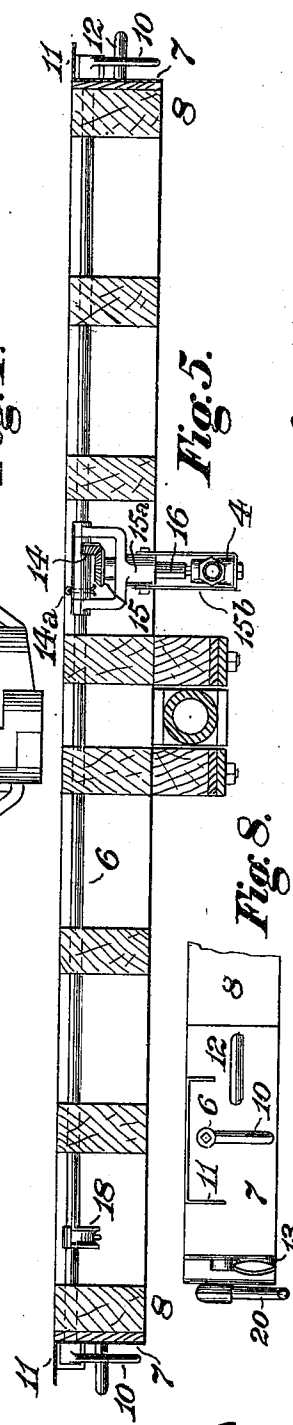

Fig. 5.

Fig. 8.

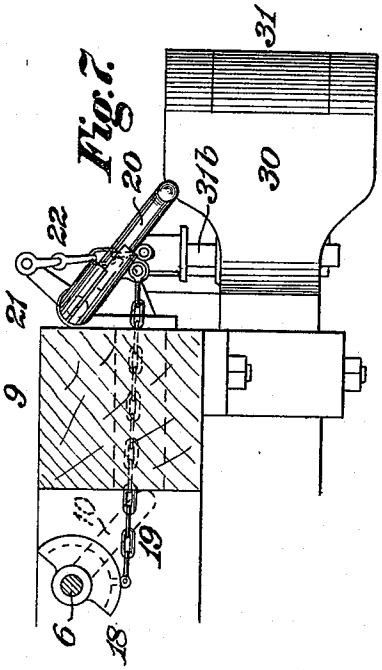

Fig. 7.

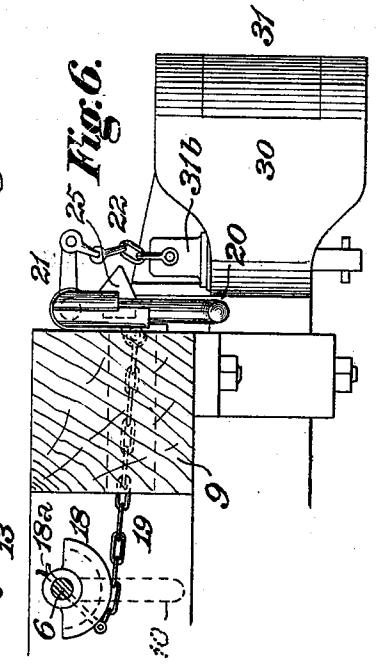

Fig. 6.

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(Application filed Aug. 1, 1900.)

(No Model.)

3 Sheets—Sheet 3.

Fig. 9.

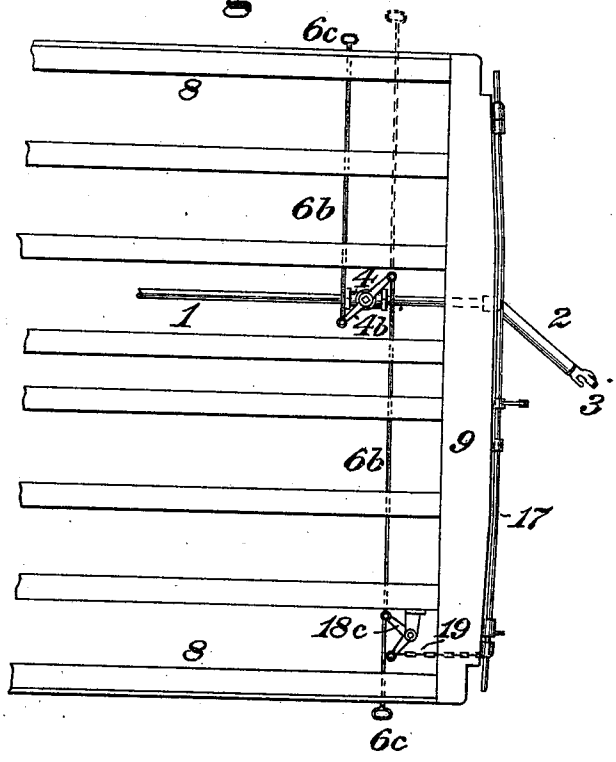
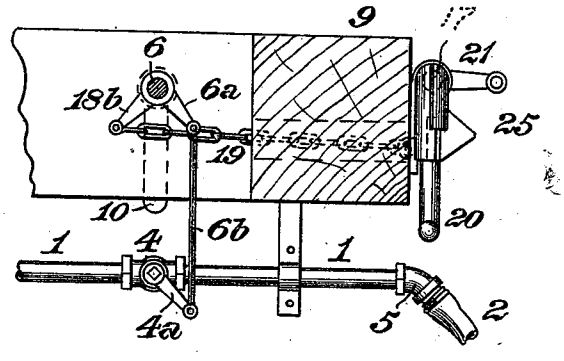


Fig. 10.



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UNITED STATES PATENT OFFICE.

GEORGE WESTINGHOUSE, OF PITTSBURG, PENNSYLVANIA.

AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 672,115, dated April 16, 1901.

Application filed August 1, 1900. Serial No. 25,538. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Air-Brakes, of which improvement the following is a specification.

The universal recognition of the urgent necessity of minimizing the liability to accidents resulting in the death or serious injury of employees of railroads engaged in the operation of trains has, naturally and properly, induced legislation, both by the Federal Government and the legislatures of different States, compelling the employment, by railroad companies and others operating cars, of appliances tending to reduce such liability, the most important step in this direction being the act of Congress under which all railroad-cars used in interstate commerce are required within a limited time to be fitted with continuous brakes and automatic couplers. A large proportion of the annual casualties to railroad operatives, which are, unfortunately, great in number, is due to the necessity of their going between cars in the performance of their duties; and my present invention is designed to enable the intent of the act of Congress above referred to to be more fully and effectively carried out by the provision of means whereby the necessity of going between cars may be to a material extent, if not wholly, avoided.

As is familiar to those skilled in air-brake practice, the train or brake pipes of the several vehicles of a train are connected one to another by sections of flexible hose and couplings and the ends of the train-pipes of each car are controlled by what are known as "angle-cocks," each of which is interposed between and connected to one end of the train-pipe and the adjacent hose-section thereof. Before cars are uncoupled, which is frequently done while the cars are in motion, it is necessary to close the angle-cocks at the adjoining ends of the two cars which are to be uncoupled in order to prevent the escape of air from the train-pipes of the two separated sections of the train and the consequent undesired application of the brakes thereon, and when cars are coupled together the angle-cocks must be opened in order to permit the free traverse of air throughout the entire length of coupled train-pipes of the vehicles of the train. The angle-cocks being located near the longitudinal central plane of the cars, it is necessary for the trainmen to go between the cars to open and close them, and this necessity involves danger to the operator and some slowness in operation by reason of the location of the angle-cocks being such that the trainmen cannot manipulate them from a convenient standing position.

The object of my invention is to eliminate the danger and obviate the objections of comparatively slow and inconvenient operation of the angle-cocks as heretofore practiced by the provision of means whereby they may be readily and quickly opened and closed as required by an operator when standing at either side of a car or cars.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a side view in elevation of portions of the ends of two coupled freight-cars, illustrating an application of my invention; Fig. 2, a plan or top view showing the end framing thereof with the side and end casing and roof removed; Fig. 3, a view in elevation of the end sill with the members which relate to my invention in the positions occupied when the adjacent train-pipe cock is open; Fig. 4, a similar view showing said members in the positions occupied when the train-pipe cock is closed; Fig. 5, a transverse section through the car-frame on the line $x\,x$ of Fig. 2; Figs. 6 and 7, longitudinal sections, on an enlarged scale, at the line $y\,y$ of Fig. 2 and corresponding, respectively, with open and with closed positions of the train-pipe cock; Fig. 8, a side view in elevation of one of the corner-plates; Fig. 9, a plan view of the end portion of a car-frame, illustrating a structurally-modified form of my invention; and Fig. 10, a longitudinal section, on an enlarged scale, at the line $y\,y$ of Fig. 2, illustrating a further structural modification.

In the practice of my invention each railroad-car or other vehicle to which it is applied is, as heretofore, provided with a main air or train pipe 1, to each end of which is suitably connected a section of flexible hose 2, having on its outer end a half-coupling 3,

which may be of any suitable and preferred construction and be either of the hand-operated or of the automatic type.

My invention is more particularly designed for, although it is not limited to, application on railroad-vehicles which are provided with automatic couplers, and the cars are therefore shown as fitted with those of the "vertical-plane" or Master Car-Builders' type. The coupler-heads 30 carry the usual knuckles 31, which are pivoted to them by vertical knuckle-pins 31^a and are provided with locking-pins 31^b, by the adjustment of which in the ordinary and well-known manner the knuckles 31 may be locked in or released from the positions in which they connect the cars one with the other.

The train-pipe-controlling function of the angle-cock ordinarily heretofore employed is under my invention performed by a train-pipe cock 4 of the plug type, one of which is connected in the line of the train-pipe 1 adjacent to each of its ends, the axis of the plug being preferably substantially perpendicular to that of the train-pipe. The hose-sections 2 may be connected to the train-pipe by elbows 5. An operating-shaft 6 is journaled transversely to the car-body, at each end thereof, in bearings formed in corner-plates 7, which are secured to the side sills 8 and end sills 9 of the car, and carries on each of its ends a handle 10, by which it may be rocked in its bearing to effect the opening and closure of the train-pipe cock 4, as may from time to time be desired. The metal of the corner-plates 7 is turned outwardly and downwardly above and on each side of the outer ends of the operating-shafts 6, so as to form a shield or cap 11, by which the adjacent handle 10 is protected from accidental displacement from adjusted position. The corner-plates 7 are also advantageously used as a part of the car construction, as they serve as a protection for the corners of the car and also for the attachment of staples 12 for the hooks used in roping cars and for that of poling-sockets 13, and the shields 11 also serve as steps for the use of trainmen in getting on and off the car. The corner-plates are shown as of wrought-iron, but may be of cast malleable iron or steel in suitable forms. In some classes of cars the transverse operating-shaft may be required to be located at a somewhat greater distance from the end of the car, in which case special bearing-plates independent of the corner-plates may be employed.

Each of the operating-shafts 6 carries a segmental bevel-pinion 14, which is secured to the shaft 6 by a split pin 14^a and meshes with a bevel-pinion 15, fixed upon a stem 16, which engages with the plug of the adjacent train-pipe cock 4. By rocking the operating-shaft 6 in its bearings in one or the other direction by proper movement of either of its handles 10 it will be seen that the train-pipe cock may be conveniently and quickly opened or closed, as desired, by a trainman while standing at either side of the car. The pinion 15 is journaled in a bearing 15^a, having upwardly-projecting arms provided with eyes through which the operating-shaft 6 passes freely, the bearing being thereby suspended from said shaft with the capacity of movement about the axial line thereof without interference with the normal engagement of the pinions 14 and 15. The train-pipe cock 4 is supported by a strap or hanger 15^b, connected to the bearing 15^a. The parts are so constructed and operatively combined that they can be put together only in proper operative relation. By this construction the pinions are maintained in gear one with the other and the train-pipe cock is held in proper relation to the operating mechanism irrespective of movement of the train-pipe out of normal position, as may be caused by strain or distortion of members of the car-frame. The pinions are also protected from injury and the train-pipe cock prevented from being turned by flying stones or other material which may be thrown upwardly in the movement of the train.

My invention is not limited to the specific means hereinbefore described for imparting movement to the plug of the train-pipe cock, as various modifications thereof may be made by those skilled in the art without departure from the spirit or operative principle of my invention. Thus, for example, as shown in Fig. 9, two longitudinally-movable pull-and-push rods 6^b, coupled to opposite arms of a lever 4^b, secured to the plug of the train-pipe cock 4, and having handles 6^c on their outer ends, may be substituted for the vibratory shaft 6 and pinions 14 15, before described. By appropriate movement of either of the rods 6^b the train-pipe cock will be opened or closed, as desired. If preferred, a single rod, as shown in dotted lines, may be employed, and in such case proper indications of open and closed position should be added. One of the pull-and-push rods is coupled to one arm of a bell-crank lever 18^c, the opposite arm of which is connected to the uncoupling-rod 17 of the automatic coupler by a chain 19.

Fig. 10 shows a construction in which the plug of the train-pipe cock is located horizontally and is provided with a lever-arm 4^a, which is coupled by a link 6^b to an arm 6^a on the operating-shaft 6. The operating-shaft is rocked in its bearings by end handles 10, as in the instance first described, and may be provided either with a sheave 18, as in Fig. 6, or an arm 18^b, to which the uncoupling-rod 17 is connected by a chain 19.

In order to insure the closure of the train-pipe cocks 4 preparatory to uncoupling the cars, the operating-shafts are preferably so connected with the uncoupling-rods 17 of the automatic couplers that the closure of each train-pipe cock is positively and coincidently effected in and by the movement of the adjacent uncoupling-rod to the position in which it unlocks the knuckle to admit of the uncoupling and separation of the cars, and the

closure of the train-pipe cock is maintained by such connection during the period in which the uncoupling-rod remains in said position. To this end each operating-shaft may be provided with a sheave 18, fastened to the shaft by a split pin 18^a, which serves for the attachment of a chain 19 or other suitable flexible connection, as a rod with a slip-joint, the opposite end of which is connected to one of the end handles or operating-arms 20 of the adjacent uncoupling-rod 17, or it may, if preferred, be connected to an independent arm on said rod. Movement of the unlocking-rod into position to unlock the knuckle effects, through the connection 19, a coincident movement of the adjacent operating-shaft, which closes the train-pipe cock 4. Arms 21 on the uncoupling-rods are coupled by chains 22 to the locking-pins 31^b in the ordinary manner.

The uncoupling-rods are fitted, as in some prior constructions, with a small amount of end play in bearings 23, secured to the end sills 9 of the car, and a locking projection 24 is formed upon one of the operating-arms 20 in position to abut against an inclined stop 25 on the adjacent uncoupling-rod bearing 23 when the uncoupling-rod is moved into position to unlock the knuckle and is moved longitudinally through the extent of end play which it is allowed in its bearings. When in this position, as shown in Figs. 4 and 7, movement of the operating-shaft 6 is prevented by the engagement of the projection 24 and stop 25 and the connection of the uncoupling-rod and operating-shaft by the chain 19. The train-pipe cock 4 cannot, therefore, be opened until the projection is released from the stop, and the uncoupling-rod is thereby permitted to be moved into the locking position, (shown in Figs. 3 and 6,) whereupon the operating-shaft is free to be moved by either of its handles 10 into position to open the train-pipe cock.

I claim as my invention and desire to secure by Letters Patent—

1. In an air-brake apparatus, the combination of a train-pipe, a cock controlling the passage of air through said pipe, an operating-shaft journaled transversely to the train-pipe and accessible from the side of a railroad-vehicle, connections for effecting the opening and closure of the train-pipe cock by movement of the operating-shaft, an unlocking-rod controlling the locking mechanism of an automatic coupler, and a flexible connection from the unlocking-rod to the operating-shaft.

2. In an air-brake apparatus, the combination of a train-pipe, a cock controlling the passage of air through said pipe, an operating-shaft for actuating said cock, an unlocking-rod controlling the locking mechanism of an automatic coupler, a connection from the unlocking-rod to the operating-shaft, and means for locking the train-pipe cock in closed position when the automatic coupler is unlocked and free to be uncoupled.

3. The combination, with a car-frame, of a train-pipe, a cock controlling the passage of air through said pipe, corner-plates secured to the side and end sills of the frame, an operating-shaft journaled in the corner-plates and having arms or handles on its ends, connections for effecting the opening and closure of the train-pipe cock by movement of the operating-shaft, and caps or shields on the corner-plates for protecting the handles of the operating-shaft against accidental displacement from adjusted position.

4. The combination, with a car-frame, of a train-pipe, a cock controlling the passage of air through said pipe, an operating-shaft journaled on the frame transversely to the train-pipe, connections for effecting the opening and closure of the train-pipe cock by movement of the operating-shaft, an automatic-coupler-unlocking rod journaled in bearings on the end of the frame and having end play in its bearings, a locking projection on the unlocking-rod, a fixed stop adapted to be engaged by or disengaged from said projection by longitudinal movement of the unlocking-rod in its bearings, and a connection from the unlocking-rod to the operating-shaft.

5. In an air-brake apparatus, the combination of a train-pipe, a cock fitted in the line of, and controlling the passage of air through, said pipe, an operating-shaft journaled transversely to the train-pipe, a bevel-pinion fixed on said shaft, a bearing suspended on said shaft, and a bevel-pinion journaled in said bearing and having a stem engaging the plug of the train-pipe cock.

6. In an air-brake apparatus, the combination of a train-pipe, a cock fitted in the line of, and controlling the passage of air through, said pipe, an operating-shaft journaled transversely to the train-pipe, a bevel-pinion fixed on said shaft, a bearing suspended on said shaft, a bevel-pinion journaled in said bearing and having a stem engaging the plug of the train-pipe cock, and a hanger connected to said bearing and supporting the train-pipe cock.

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