(No Model.)

W. E. HILL.

BUMPER.

No. 533,894. Patented Feb. 12, 1895.

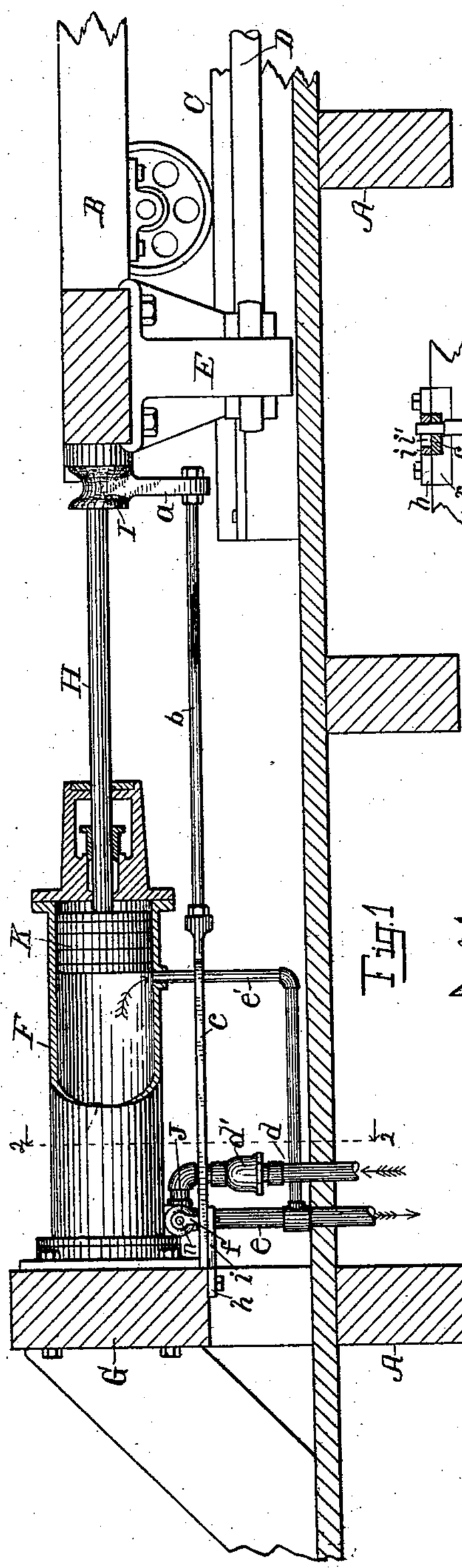

Fig. 1

Fig. 5

Fig. 3

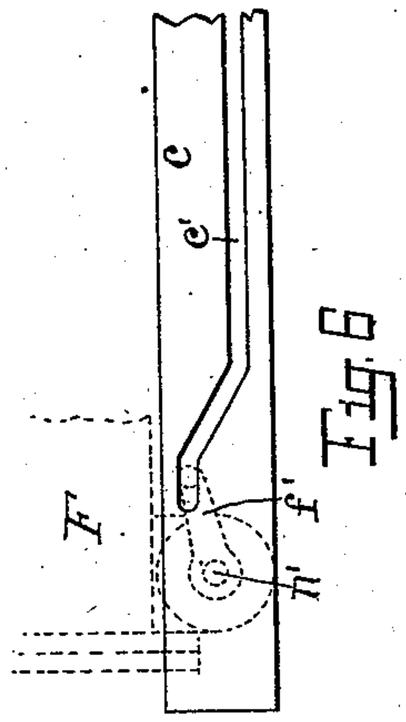

Fig. 6

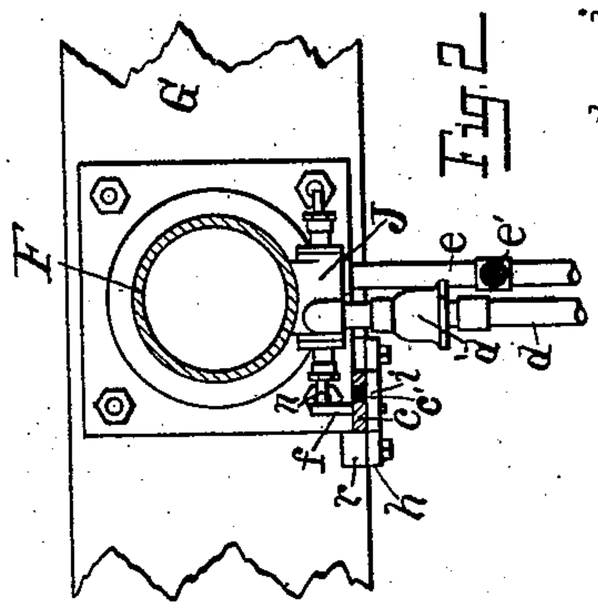

Fig. 2

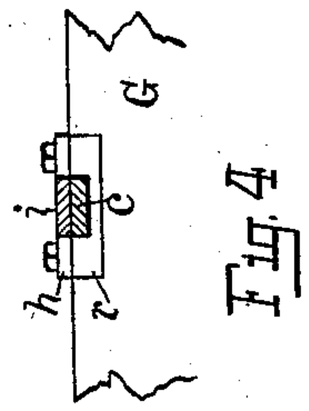

Fig. 4

Witnesses:
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BUMPER.

SPECIFICATION forming part of Letters Patent No. 533,894, dated February 12, 1895.

Application filed February 13, 1893. Serial No. 462,167. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. HILL, a citizen of the United States, residing at the city of Kalamazoo, in the county of Kalamazoo and State of Michigan, have invented a certain new and useful Bumper, of which the following is a specification.

My invention relates to bumpers or buffers for stopping saw-mill carriages and for other similar purposes.

I use my invention in connection with saw-mill carriages but it is equally well adapted for use wherever a buffer or bumper is required.

The objects of my invention are, first, to provide a bumper that shall have all the advantages of a steam or air cushion; second, to provide automatic means for operating the same; third, waste as little steam or other fluid used as possible, and fourth, have a cushion that can be under a considerable pressure at the start. I accomplish these means by the mechanism shown in the accompanying drawings, in which—

Figure 1 shows a side view of my device with a part of the cylinder broken away. Fig. 2 is a view on line 2—2 partly in section looking in the direction of the arrows. Fig. 3 is a view of the under side of my device. Fig. 4 is a section view on line 4—4 of Fig. 3. Fig. 5 is a detail section view on line 5—5 of Fig. 3. Fig. 6 shows a modification of the valve operating mechanism.

Similar letters of reference refer to similar parts throughout the several views.

A, is the floor and floor timbers of a saw-mill.

G, is a braced support of heavy timbers to which my invention is attached.

B, is the carriage of a saw-mill on the track C, which is operated in the usual manner.

The steam cylinder F, is atiached in a horizontal position by bolts to the braced support G. The cylinder F contains the piston K, to which is attached the piston rod H bearing the enlarged head I. A valve J is at the rear end of the cylinder with an inlet pipe *d* connecting with a boiler or steam chest and an outlet pipe *e*. The inlet pipe *d* contains a check valve *d'* that prevents a return of steam from the cylinder F. An auxiliary outlet pipe *e'* opens from near the head end of the cylinder F, at a sufficient distance from the end to allow the piston head K to pass beyond it toward the head of the cylinder. An arm *f* projects at right angles from the valve stem *n*, through the cam slot *c'* in the plate *c* and the guide slot *i'* in the plate *i*. A lateral arm *a* projects down from the head I and is connected by the rod *b* to the plate *c*, which contains the cam slot *c'*. A notch is mortised in the timbers G to allow the cam plate *c* to pass through, and the plate *i* is bolted below it by the bolts *h* passing through the guide *r* and holding it in place.

When the carriage B runs against the head I, of my improved bumper, the piston head K is driven toward the rear of the cylinder compressing any air or steam there may be inside. The arm *a* by means of the rod *b* carries the cam plate *c* in the same direction. The oblique portion of the slot *c'*, carries the valve stem *n*, by the arm *f* to one side thus operating the valve and admitting steam from the pipe *d* into the rear end of the cylinder F. When the force of the carriage overcomes the pressure of the steam in the pipe *d* the check valve *d'* retains it within the cylinder and the force of the carriage is consumed in compressing the steam which acts as a cushion and prevents a violent blow that would be very likely to cause injury.

When the carriage B is moved back away from the bumper head I, steam enters from pipe *d* and carries the piston head K back to the position shown in Fig. 1, the motion of the valve J will then be reversed the inlet pipe *d*, being closed and the outlet pipe *e* opened. Steam and air will also exhaust from the auxiliary pipe *e'*. The port of the pipe *e'* is placed a little distance from the end of the cylinder F so that a little steam or air will cushion the piston and prevent its coming against the cylinder head with a blow.

In Fig. 6, I have shown the cam plate *c*, in combination with a cylindrical valve indicated by the dotted lines; the cam rocking the valve instead of causing it to reciprocate.

It is not really necessary to use the valve J to make my device effective. An inlet pipe

d, with the check valve *d'*, opening into the rear end of the cylinder F, would be really all that is necessary. In that case, however, the cylinder F would be full of steam under pressure at all times when in use. This would occasion considerable waste from condensation and that is the reason I prefer to use the engine valve J and the connecting pipes shown. Of course with only the single pipe it would be desirable to have a small drip cock in the lower side of the cylinder F to allow water to escape. When there was only a little steam condensed it would find its way back into the pipe *d*, past the check valve *d'*.

I have spoken of steam as the fluid used in my device. Any other vapor, air or gas would answer the same purpose.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a bumper the combination of the support G, the steam cylinder F, the piston head K, the piston rod H, the bumper head I at the end of the piston rod, the arm *a*, the connecting rod *b*, the cam plate *c* adapted to reciprocate in guides *r* and operate the valve J, and the inlet pipe *d*, containing the check valve *d'*, and the outlet pipes *e* and *e'* substantially as described for the purpose specified.

2. In a bumper, a cylinder containing a piston and piston rod bearing a head adapted to reciprocate in the line of the track of the carriage, in combination with an engine valve at the rear end of the cylinder, with suitable means for operating the valve to admit steam when the bumper is in operation and allow it to exhaust when the pressure is released for the purpose specified.

3. In a bumper, a cylinder containing a piston and piston rod bearing a bumper head at its outer end, in combination with a valve at the rear end of the cylinder; and suitable means of operating the valve to admit steam when the bumper is in operation and allow it to exhaust when the pressure is released, for the purpose specified.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

WILLIAM E. HILL. [L. S.]

Witnesses:
CORA EVELYNE WESTBROOK,
E. S. ROOS.