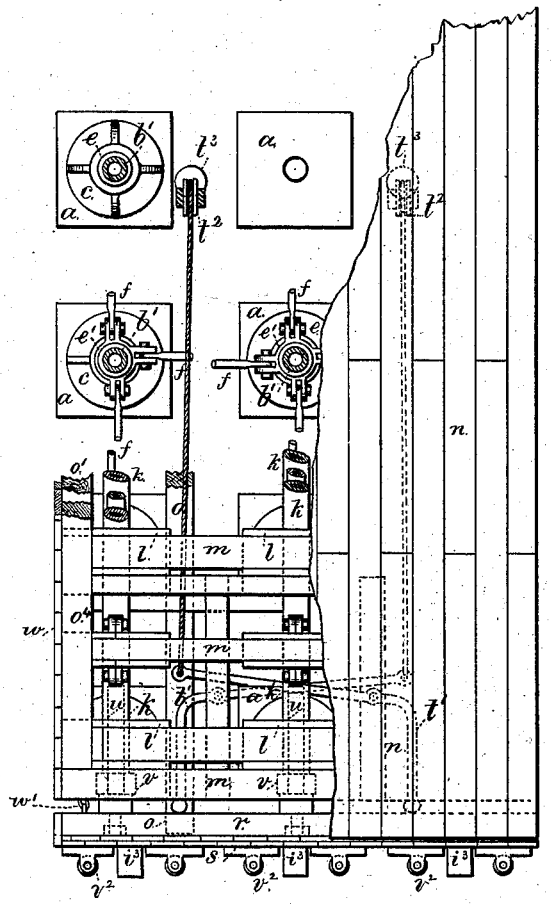
2 Sheets—Sheet 1.

J. JOHNSON.

BULK-HEADS AND PIERS.

No. 192,171. Patented June 19, 1877.

Fig. 1.



Witnesses.

Chas. H. Smith
Harold Serrell

Inventor

Job Johnson.

per Lemuel W. Serrell

atty.

2 Sheets—Sheet 2.

J. JOHNSON.

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Fig. 3.

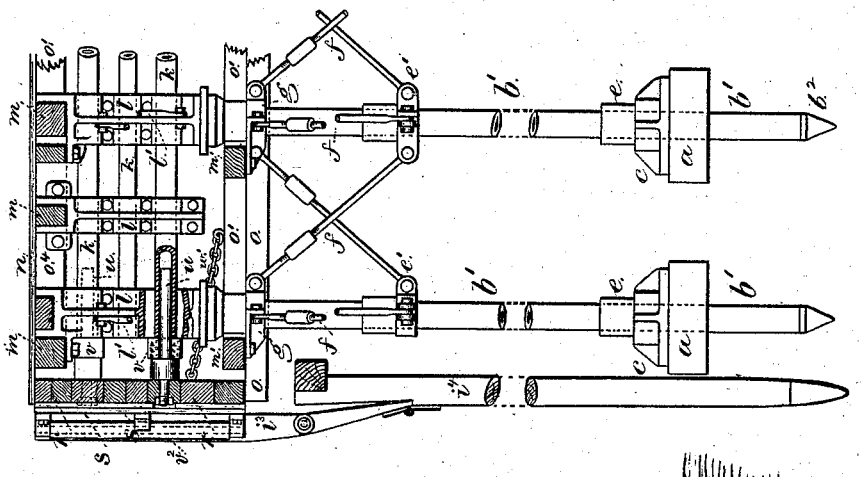
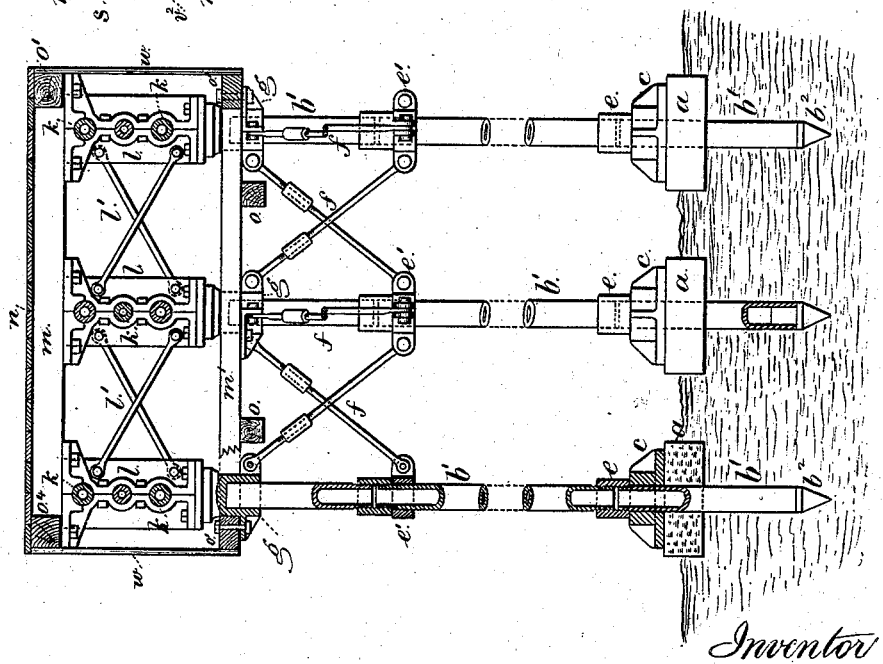


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOB JOHNSON, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN BULK-HEADS AND PIERS.

Specification forming part of Letters Patent No. **192,171**, dated June 19, 1877; application filed April 25, 1877.

To all whom it may concern:

Be it known that I, JOB JOHNSON, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Bulk-Heads and Piers, of which the following is a specification:

Great difficulty is often experienced in obtaining a proper and reliable foundation for piers and bulk-heads where the bottom of river or bay is an alluvial deposit. Piles are liable to sink or become loose, and when wooden piles are used in many districts they are in a short time destroyed by worms. It is also found that when there is rock beneath the sand or mud the wood pile is liable to slip upon the rock and become displaced.

In the drawing, Figure 1 is a plan, partially in section, showing the end of a pier. Fig. 2 is a vertical cross-section of the pier, and Fig. 3 is a longitudinal section at the end of the pier.

I make use of blocks *a*, resting upon and embedded into the alluvion, through which are driven metal or other piles b^1, with hardened-metal-covered points b^2, so as to penetrate into the varied earthy material, and act as a holdfast or stakes to the blocks to retain them in position, and in cases of rocky strata beneath the earth the hardened-metal points of the piles will penetrate the seams and fissures of the rock sufficiently to prevent the piles moving laterally.

When I use welded iron tubes for my piles, in order to obtain the necessary length of pile, I unite the lengths of pipes as usually made by heavy coupling-sockets *e*. When I use wooden piles I place a steel-pointed cap upon the lower end and a strong coupling-socket. I also use a plate, *c*, to set upon the top center of the block *a*. The block *a* and the plate *c* have holes made through their centers of size to nearly fit the size of the pile used.

The block *a* being placed, by means of floats or otherwise, as required, under the pile-driver and the plate *c* set upon the block *a*, the pile is passed through the openings in the plate *c* and block *a*, and the block made fast to the upper part of the pile; then the floats are removed from the block, and they are set down to place in their bottom. The lower point and parts of the pile are then pressed into the earth below until the coupling-socket *e* bears upon the plate *c*, and, the plate *c* resting upon the block, the pile and plate and block are pressed down until the block is firmly set or embedded into the alluvion below the water, establishing a strong foundation and auxiliary support between the lower part of the pile and the block *a*, as also to the pier.

The blocks *a* are made of stone or concrete, formed in plain boxes of wood of any size or shape to meet requirements, having the necessary opening through the center of the blocks to admit the piles to pass through. When ready for use the block is floated under the pile-driver or other press and placed in position for use. The amount of length of the top section of the pile, when made of welded tube, determines the equality in height of piles. The piles are made of any length desired to suit the depth of water.

The upper ends of the piles are provided with capitals *g*, having laterally-extending bracketed seats, which seats are designed to receive lateral and longitudinal supports o^1 m' of timber or iron beams for the pier.

On the capitals *g* I place girders from one capital to another, longitudinally or laterally, or both ways, as requirements may dictate.

These girders are formed with longitudinal tubes *k* and trestle-blocks *l*, similar to those shown in Letters Patent No. 184,968, granted to me December 5, 1876.

These girders and piles are connected together transversely by diagonal braces l', so as to form a firm structure, adapted to resist lateral concussions and support the weight that may be placed upon the pier or bulk-head.

There are flanged joint-pieces e' e' for the tie rods or braces *f*, that extend diagonally from one pile to the next, and stiffen the structure laterally.

The top parts of these trestle-blocks are so formed as to receive timbers or iron beams o^4 *m*, to be set longitudinally or transversely to suit requirements. On these timbers or iron beams the planking or other floor of the pier is laid.

I place on the front or sides of the pier or landing-bridge a relieving movable spring

casing or fender of any shape or size required, made with horizontal timbers or iron bars r and vertical planks s, and having attached to its back surface rams u, which rams are so positioned as to enter the open ends of the tubes k, which form a part of the girder for the pier.

The tubes being closed air-tight at their opposite ends, or at any intermediate point, serve as an air-chamber, and the fenders are so arranged as to move to and from the front of the pier, when struck by a vessel coming against them, to give relief, as the air in the tubes is compressed; and there are also placed against the rear part of this fender two or more levers, t^1, (see Fig. 1,) each having two double reverse beams and chains, which chains are carried over rollers t^2 and provided with heavy weights t^3, to exert a great force upon the inside of the fender to allow it to yield and gradually moderate the concussion of the vessel when it strikes the fender, preventing injury to the vessel or the pier.

I also place rubber rings v on the rams, between the flanges of the rams and ends of the air-tubes h, as additional springs for the purposes before mentioned.

I place chains w' on each side of the fender and connect them to adjacent parts of the pier, by which the fender is held to place on the pier, to prevent the fender being moved too far from the pier.

I use timbers or iron beams o projecting from the pier, to set and slide the lower part of the fender upon, which, together with the rams standing in the tubes, form the bearings for the movable fender.

I prefer to place rollers v^2 vertically along the face of the fenders, in front of the vertical planking s, to reduce the friction or sliding thrust of the vessel upon the fenders.

I use vertical guides i^3 secured to the fenders, and connected by strong hinges to the sunken piles i^4.

The faces of the guides i^3 project beyond the rollers v^2, and their lower portions are slightly inclined toward the piles i^4, so that at low water the guards of the vessels, in rolling against the pier, may slide up the guides i^3 without damage to the lower ends of the rollers, fenders, or vessel.

I claim as my invention—

1. In combination with the metallic tubular piles, the foundation-blocks a, with holes through them for such piles, and the metallic caps c, resting upon such blocks, substantially as set forth.

2. The combination, with the tubular metallic or other piles and foundation-blocks, of the tubular or other girders k, cap-pieces g, and braces $f\ l'$, substantially as set forth.

3. The combination, with the tubular girders and piles, of the yielding fenders and the supporting-plungers u, that pass into the ends of the girder-tubes, substantially as set forth.

4. The combination, with the yielding fenders and pier, of the sliding plunger u, guides i^3, and the levers t^1, and weights t^3, substantially as set forth.

5. The fenders for piers and bulk-heads, made of the vertical guides i^3 and rollers v^3, substantially as set forth.

Signed by me this 23d day of April, A. D. 1877.

JOB JOHNSON.

Witnesses:

GEO. T. PINCKNEY,

CHAS. H. SMITH.