MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

UPON THE SUBJECT OF

Commodore Rodgers' Marine Rail-way,

OR

Inclined Plane.

JANUARY 27, 1823.
Read, and referred to the Committee on Naval Affairs.

WASHINGTON:

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1823.

To the House of Representatives of the United States:

I transmit, herewith, a letter from the Secretary of the Navy, containing one from Captain John Rodgers, President of the Naval Board, accompanied by a description of the Inclined Plane, Dock, and fixtures, for hauling up ships, and an estimate of the cost of materials and workmanship necessary for the completion of a dock and wharves, proposed to be connected with the Inclined Plane constructed at the Navy Yard, Washington, and recommend the same to the attentive consideration of Congress.

It is confidently believed that this invention combines advantages so highly useful as to justify the appropriation required.

JAMES MONROE.

NAVY DEPARTMENT,
January 17th, 1823.

SIR: I have the honor to submit to your consideration a letter received from Captain John Rodgers, President of the Naval Board, accompanied by a description of the Inclined Plane and Dock, and a specification of their properties, and advantages for building, preserving, and repairing ships of war, of every class.

I have carefully examined the subject detailed in these papers, and I fully accord with the President of the Naval Board as to the utility and great importance of the Inclined Plane and Dock, for the purposes mentioned in the specification; and I recommend the same to your favorable consideration, with a view to obtain your sanction to an application to Congress for an appropriation of a sum of money sufficient for the construction of a dock and wharves, in connection with the Inclined Plane erected in the Navy Yard, Washington.

I transmit, herewith, an estimate of the cost of materials and workmanship deemed necessary by Mr. Doughty, the naval constructor, for the completion of the dock and wharves contemplated to be constructed at the Navy Yard, if the same shall meet your approbation, and an appropriation be obtained for the object.

A model and draught of the dock and wharves are deposited in this Department, and they will be submitted to examination, and the several parts be fully explained by Captain Rodgers, at any place that may be designated as most convenient for the purpose.

I have the honor to be, with great respect,

Sir, your most obedient servant,

SMITH THOMPSON.

The PRESIDENT *of the United States.*

WASHINGTON, 23*d December*, 1822.

SIR: The accompanying description and specification as to the properties and advantages of the Inclined Plane and Dock, for preserving, building, and repairing ships of every class, are respectfully submitted to your consideration. The invention is of so much national importance, in my estimation, as to induce me to request that you will be pleased to examine it particularly; and, should the result of such examination produce in your mind the same conviction that it has in mine, I would, respectfully, request of you to lay the subject before the President of the United States, who will dispose of it in such a manner as the best interests of the Nation may, in his opinion require.

The experiment made at this yard, under many disadvantages, has established the fact, that a ship of any magnitude may be hauled up on an inclined plane, and placed under cover, perfectly protected from the sun, rain, &c. without incurring the least risk; and universal experience fully proves, that a vessel placed in such a situation, may be preserved for almost any length of time. The Frigate Potomac, the vessel hauled up, may be seen under a house at the Navy Yard, where she may be preserved, *without further expense*, until she shall be required for actual service.

The whole plan, which is shown in the drawings herewith, embraces a dock and wharves on each side, in addition to the inclined plane and house, as now erected in this yard. Such dock and wharves would afford all the advantages and facilities of any other dock now in use, intended for the repair of vessels, while they can, probably, be completed for less than one sixth of the expense of such as are used by other Nations, for similar purposes. It is believed, that the sum of $40,000 would be sufficient to complete the dock and wharves.

From various experiments, made since the Potomac was hauled up, it has been satisfactorily ascertained, that, by using friction rollers, as suggested in the specification, the time required, and power necessary to haul a ship up, may be diminished so far, that the expense of the operation would not amount to a sum worthy of any consideration. With a plane having the inclination of the ways on which ships are ordinarily built, 140 men, with three three-fold purchases, (falls of ten inch rope,) would, I am fully persuaded, be sufficient to haul up, at the rate of four feet in a minute, the largest three decker in the world, and this, too, without straining her in the slightest degree.

I have the honor to be,
With great respect, Sir,
Your most obedient servant,
JOHN RODGERS.

Hon. SMITH THOMPSON,
Secretary of the Navy.

General description of "Rodgers' Marine Rail-way, or Inclined Plane, Dock, and fixtures, for hauling up Ships."

Two walls, of stone or brick, solid or arched as far as high water mark, or a double tier of piles, firmly driven, and so braced, transversely, diagonally, and horizontally, that each pile, by which the plane or rail way is supported, shall receive its necessary proportion of the weight it is intended to bear in a perpendicular direction, without, in any degree, being liable to the effect of lateral pressure, which is to be carefully guarded against. These walls, or tiers of piles, are erected or driven parallel to each other, at such distance apart, depth, and height, and projecting so far into the water, as to adapt them to the largest size vessel proposed to be hauled up for repair or preservation, or to be built and launched. They are raised or driven so as to form inclined planes, (precisely) of the same height and inclination. The inclination may be as much as half of an inch to a foot, or more if necessary: though the greater the inclination, the greater must necessarily be the purchase to haul up a vessel. Above high water mark, on fast ground, strong pillars of stone, or substantial wood piles must be used, and the walls or tiers of piles may be extended at pleasure.

On these walls or tiers of piles, two platforms or rail-ways are erected, fixed and braced so as to be immoveable, the inner sides forming clear uninterrupted parallel lines, of 20 inches width, more or less, and constituting what is called the ways. These ways may, and for very heavy vessels ought to, be plated with iron, or other metalic substance. The surface may be perfectly smooth, or grooved so as to admit cylinders on the male and female groove, or friction rollers. The sides of the cradle, which move on these ways, and come immediately in contact with them, ought also, for very heavy vessels, to be plated underneath with iron, or other metallic substance, and may be perfectly smooth, or grooved so as to admit cylinders or the male and female groove or friction rollers, adapting them to the ways, and easing the friction. The inner sides of the ribbands to be fixed with friction rollers, and the outer sides of the slides plated with iron, or other metallic substance—or the outer sides of the slides may be fixed with friction rollers, and the inner sides of the ribbands plated.

In the experiment made of hauling up the frigate Potomac, it was an object with the inventor to demonstrate the correctness of the principle at the least expense, consistently with public utility. He was fully apprised of the various means, hitherto discovered and used, by which friction and the attraction of cohesion might be overcome; but he was at the same time sensible, that the adoption of those means would unavoidably involve additional expense. Perfectly confident of success without them, from a full persuasion that the principle was correct—a confidence arising from his own long and deliberate reflections upon the subject, and from a successful experiment upon a small scale—he made the experiment of hauling up the

Potomac in the presence of the President of the United States, Senators, and Representatives, Heads of Departments, foreign Ministers, and a numerous concourse of citizens, without any apprehensions as to the result, using only for, both slides and ways, wood of perfectly smooth surfaces. He well knew that two soft yielding bodies, pressing against each other with a weight, equal to 1,700 tons, would occasion great friction and cohesion. Yet, notwithstanding these great disadvantages, the experiment fully confirmed his anticipations, and the ship was hauled up with comparative ease and perfect safety.

By rail-ways or inclined planes, thus constructed, ships of every class, from a first rate down to a schooner, may be drawn up with ease and convenience, under a house above high water mark, either for preservation or repair; or a ship may be built under a house, having such ways attached to it, and launched with more facility and ease, and at the same time without any of the risks of straining or hogging her, incident to every mode of launching now in use.

They have important advantages over the docks now in use, of hauling up for preservation one or more ships, according to the extent of the plane; while, at the same time, the space between the rail-ways, at the outer part of the planes, projecting into the water, forms a complete wet and dry dock for repairing vessels of every denomination, with the greatest ease, convenience, and expedition. To make the outer part of the plane a dry and wet dock, nothing more, it will be observed, is necessary, than to build a narrow wharf on each side, 20 or 30 feet wide, according to the depth of water and strength required, parallel to the inside of, but embracing both tiers of piles, so as to form a gun wharf on one side, and a spar wharf, or wharf for any other purpose, on the other side, of such dimensions as may be required. The inner part of the dock thus formed, ought to be faced with stone, by which means it will be rendered permanent. In the experiment already made in hauling up the frigate Potomac, of 1,700 tons weight, including the chains, beams, &c. confining the cradle in which she was suspended, there was nothing to give efficiency to the piles on which the planes or rail-ways rested, but wooden braces and shores to prevent lateral pressure; of course, the two wharves before mentioned would, in addition to them, not only render the work permanent, but insure it against the effect of lateral pressure.

In some situations, building several sucesssive planes abreast of each other, at the required distances apart, might be found expedient, and probably more economical, than to give them great extent in length. For instance, three planes properly constructed, the centre one proportionally stronger than either of the others, because it would have two ways, one on each side, would admit of one or more vessels abreast, and there would be a saving in the cost.

FOR HAULING UP.

Beam pieces of sufficient size and length, and scarfed in the middle for convenience, are placed athwart the vessel, through each low-

er gun-deck port, projecting sufficiently from the sides of the vessel so as to embrace, with firmness, the sides of the cradle, on which she is drawn out of the water; and to effect this by uniting all parts firmly, blocks under the beams, of a size corresponding to the sheer of the vessel, are placed so as to make the plane of the lower surface of the slides of the cradle correspond with the surface of the plane on which she is hauled up. To these beams, blocked and wedged according to rise and fall of tide, or length of piles, and secured both above and below, as well as laterally, by braces connecting them to the vessel, so as effectually to prevent their yielding, in any degree, from the position they are meant to maintain, and connected underneath by the slide part of the cradle, on each side the cradle is firmly attached.

The cradle consists of various parts, shown in the drawings; and, among others, the following:

The slides, which come immediately in contact with the ways.

The wooden braces, or shores, auxiliary to, and supporting, the chains, to sustain the upper works of the ship, independent of the chains; thereby relieving the chains of the weight of all that part of the ship above the lower gun-deck beams.

The vertical slings, composed of chains of iron, of strength adapted to the size and weight of the vessel to be hauled up. They embrace the vessel from her keel to her lower gun-deck ports. They are shackled to the keel-straps, and are thence taken up to the beams, to which they are attached by a strong screw shackle by screws and wedges, or by wedges alone: the latter is, probably, the better mode. Strong beam stirrups are shackled to the chains, admitting of wedging, &c. to tighten the chains. The keel-straps pass under the blocks, to which they are firmly bolted or screwed. The blocks prevent the keel from galding. They have each a jog on one side, and are let down so as to jog, alternately, starboard and larboard; so that, when the chains are secured or wedged to their proper positions, the vessel is perfectly steady on her keel. All these fixtures are put on when the vessel is afloat.

The vertical slings, which form so essential a part of the cradle, and constitute so great a portion of the expense, if made full large for a frigate, will answer for hauling up a 74 or 100 gun ship. The height of those ships being so much above the rail-way, admits two or three tiers of shores, or wooden braces, from the sides to the ends of the cross-beams, instead of one, as is used in a frigate; thus taking off from the slings all the weight of the vessel above the lower gun-deck.

The purchases for hauling up a vessel may be multiplied at pleasure; but it would not be adviseable to apply any main purchase that should not embrace the whole body of the ship, so as to avoid every possible injury from a strain on any particular part of the ship. The main purchases used in hauling up the Potomac, embraced the whole body of the ship. The side purchases were attached to the slides.

Steam or horse power may be used in hauling up; though men will be found abundantly sufficient; and they are manageable, and will generally be the cheapest.

Iron chains may be used instead of rope for the main purchases; though either will answer well.

The wharves heretofore mentioned being finished, a coffer dam is formed across the entrance of the dock, (or, in this state, more properly a slip. The gate made, hung, and shut, the water is pumped out, the foundation laid for the vessel, and the dock will be complete.

Sloops, or other small vessels, if similar docks and planes are not constructed for their particular use, may, with facility, be repaired, or preserved, in the docks and planes intended for larger vessels.

Small vessels may, and, perhaps, large vessels might, be hauled up, upon skids, with or without rollers. It is thought, however, for vessels larger than a sloop of war, that a rail-way will be found greatly preferable.

Advantages of Rodgers's Marine Rail-way, or Inclined Plane, Docks, and Fixtures, for Hauling up Ships.

For repairing ships, this invention combines all the advantages of a dry dock.

For building, no preparation hitherto known is equal to it: because, while it furnishes all the facilities of a building slip, upon the most approved construction, it has, in launching, a decided preference over every other means heretofore practised. A vessel built on the inclined plane, may be launched without incurring the slightest risk of hogging. She would descend the plane gradually, bearing equally upon it, until she becomes completely water-borne. There can be no plunge, as is the case from a slip.

For the preservation of ships not wanted for immediate service, it is confidently believed that no plan can be superior to it. A ship, when built, may be suffered to remain on the stocks until she is wanted; or a ship afloat may be taken up with perfect ease and safety, and placed in a state of preservation, under cover, protected from the sun, rain, &c. and all the evils thence arising.

It may, then, safely be affirmed, that this invention combines all the advantages of all the various and most improved means heretofore used, for repairing, for building, and for preserving. That for launching, it is greatly preferable to any plan heretofore practised or made known; and the experiment made in hauling up the Potomac, has demonstrated, beyond all question, that any ship, however large, may, by the means embraced by this invention, be taken out of the water, and moved up on fast land, any distance required, with perfect ease, and without incurring the slightest risk of straining the ship, or otherwise injuring her in the slightest degree.

All practical men concur in the opinion that many and great advantages arise from building ships under cover; and that mechanics can, in the same period of time, taking the year throughout, do more work when under cover, and protected from the scorching sun and rains of summer, the piercing cold, frost, snow, sleets, and rains of winter, than they can possibly do exposed to all these disadvantages, will not, it is presumed, be contended by any person of any experience.

Mechanics will work under cover for reduced wages: at 12½ per cent. less wages, they can make more money—because they lose no time.

They can perform at least 20 per cent. more work throughout the year, under cover, than they can do if exposed to the weather.

By building under cover, there is, then, a mutual gain on the part of the mechanic and his employer. The mechanic makes more money, and his employer gains in reduced wages, and in having 20 per cent. more work done in the same time at such reduced wages. Suppose the wages of mechanics, building in the ordinary way, to amount to $100,000; by building under cover you save $32,500; or 32½ per cent. whatever the wages may amount to.

This, however, is not all. The gain of time is a highly important consideration, and this the employer gains. In time of war, the gain of a single day, and sometimes the gain even of an hour, is all important.

On examining the invention, it will be found, that none of these important advantages have been overlooked. It embraces them all, and in the best and most improved way.

A ship built under cover is known to be far more durable than one built in the ordinary way. If circumstances would permit her remaining under cover until she should become thoroughly seasoned, or should her timbers be thoroughly seasoned before she is built, there would be no computing her increased durability. Her repairs in twenty years would, probably, not be equal to 75 per cent. of her original cost; whereas, built in the ordinary way, they might, in that period, be safely estimated at 150 per cent. more than her original cost.

If the system of building under cover had been adopted at the commencement of the navy of the United States, say in 1798, there would have arisen, by this period, a saving certainly not less than *five millions* of dollars, arising from the increased durability imparted to the vessels by building them under cover; exclusively of the saving of 32½ per cent. in the first cost of the vessels, as heretofore stated.

In the United States we have no docks; nor have we any way of preparing our ships for repair, but by heaving them down; a process tedious, very expensive, and highly dangerous, particularly to large ships, which are always, in a greater or lesser degree, injured by it: nor is it possible to place a vessel hove down in such a situation as to enable the mechanics employed in her repair, to work on her to the best advantage: much time, will, unavoidably, be lost.

The advantages and economy of docks, upon the principle of this invention, in repairing ships, when compared with the ordinary mode in the United States of heaving down, are innumerable. The vessel can be taken into dock with perfect ease and safety, and there placed in the position most favorable for her thorough examination and repair, from her keel up. Every facility to a minute examination and repair, and every advantage to the mechanics in performing their work, is afforded. Putting aside the risks and the loss of time in heaving down, it may be safely stated that the labor of repairing

in a dock of this description, would be at least one-third less than the labor of repairing a vessel hove down.

Docks upon the principle of this invention, are preferable to the docks in ordinary use; because when the ship shall be taken into dock, and the gates or entrance way closed, there would not be more than half the usual quantity of water to pump out. Their cost, too, is infinitely less, while their durability will be equal.

The cost of the rail-way, and house over it, if the whole should be charged to the invention, would not exceed the expense of heaving down a 44 twice, if the additional labor of repairing in this way be included; nor would it exceed the cost of repairing a ship, built in the ordinary way, after remaining five years in ordinary afloat.

The railway, with the house, dock, and all the fixtures for hauling up, would not, it is confidently believed, cost exceeding 100,000 dollars. It is indeed believed that 95,000 dollars would be sufficient to construct them of sizes sufficient for the largest sized ship; and this estimate is predicated upon an extent of railway sufficient to admit of one such ship being laid up in ordinary in a state of perfect preservation above the dock; while the dock would admit the repair of another at the same time.

One dock at each navy yard in the United States, and one set of fixtures for hauling up at each, would probably be sufficient for some time to come.

The fixtures for hauling up, that is the cradle, composed of vertical slings, beams, &c. as particularly described in the specification and drawings, may be estimated to cost 8,000 dollars; the actual cost of the slings, beam, stirrups, and keel straps, complete, being 6,989 22

And the beams and blocks estimated at - 1,010 78

$8,000

But the whole cost of the rail-way and house should not be charged to this invention, because they furnish conveniences which must be provided, whether the rail way and house be erected or not. Among these conveniences may be enumerated a shelter for masts, spars, boats, water casks, guns, &c.; also two wharves. For these conveniences, which may fairly be estimated at one fifth the cost of the rail-way and house, the invention is justly entitled to credit.

For the preservation of ships not wanted for immediate service, the invention claims justly, it is conceived, pre-eminent advantages, by providing the most effectual means of preservation, and by reducing, many hundred per cent, the *annual* expense of taking care of them.

It will, it is presumed, be at once conceded, that no better plan of preserving ships than that of taking them out of the water, and placing them in a situation perfectly dry, under cover, protected from the sun, rain, snow, sleets, and piercing winds, yet admitting a free circulation of pure dry air, can be devised; and that no argument can be necessary to sustain a position so self evident. It is proper, then, to proceed to shew the annual saving in expense.

In estimating the value of the annual saving, we must consider:

1st. The annual expense saved in the care necessary to be taken of them.

2d. The annual deterioration avoided by placing the vessels in a situation where, like the furniture of a house, they can sustain no injury.

Suppose a navy to consist of twelve ships of the line, twenty heavy frigates, and twenty sloops of war: that, of this navy, two ships of the line, six frigates, and ten sloops, are all that is required for active service; leaving ten ships of the line, fourteen frigates, and ten sloops, to be laid up in ordinary, and preserved until they shall be wanted for service.

The following table shews the cost, at this time, in the United States, of keeping in ordinary, afloat, one ship of the line, one 44, and one sloop. It also presents an estimate of the annual deterioration, which is confirmed by experience. It then shews the annual expense to which, if laid up in ordinary, under cover, as is provided for by the invention, they would be subject; and, deducting the amount of these expenses from the amount accruing, if in ordinary afloat, the annual saving is shewn in each class of vessels.

Rate of vessel.	AFLOAT IN ORDINARY.					UNDER COVER, &c.			
	No. of men required.	Pay, rations, repairs, & contingent expenses.	Medicines and hospital stores.	Whole annual expense.	Annual deterioration.	Number of watches.	Annual expense.	Annual deterioration.	Whole annual saving.
74	25	$8,932 50	250	9,182 50	10,000	3	900	0	$18,282 50
44	18	6,802 75	200	7,002 75	6,000	2	600	0	12,402 75
Sloop	10	3,564 50	100	3,684 50	2,500	1	300	0	5,864 50

The number of men, as stated in the above table, is the number at this time allowed. Some of them are, however, occasionally employed on objects not justly chargeable to the ships. We will therefore make a deduction from the expenses above stated, proportioned to the services rendered on objects other than the ships—twenty men for a ship of the line, fifteen for a forty four, and seven for a sloop, would probably be sufficient to ventilate, and to keep the ships clean, dry, and tight. On this ground, instead of the annual saving, as above exhibited in the table, a reduction in the saving is admitted, so as to bring down the annual saving in a 74 to - - 16,000

In a 44 to - - 11,000

In a sloop to - - 4,500

Then the saving annually in keeping ten ships of the line, fourteen frigates, and ten sloops, under covers, such as are provided on the marine rail-way, would be

10 ships of the line, at	16,000,	-	160,000
14 frigates	11,000,	-	154,000
10 sloops	4,500,	-	45,000
			$359,000

In making this estimate, the temporary sheds erected over vessels afloat in ordinary, for the preservation of their upper works, the wear of cables, &c. have not been taken into consideration. These would form a considerable item, for which the invention should have credit, because it provides a much more effectual covering for the whole body of the vessels, than temporary sheds, which protect only their upper works, and renders the use of cables utterly unnecessary.

It has been stated above, that one dock at each Navy Yard in the United States, would, probably, be sufficient for some time to come. But economy would probably suggest the having three docks at each yard; one for the largest size ships; one for frigates, and one for sloops of war: so that a vessel of each class might be repairing at each yard, at one and the same time.

A dock, as heretofore observed, with an extent of rail-way, admitting one ship of the line to be laid up under cover, and another to be repaired at the same, together with a house over the whole, and all the fixtures for hauling up, would not cost exceeding $100,000.

A dock, &c. adapted to a frigate, would cost considerably less; and one adapted to a sloop of war, would cost still less. Though in one for the largest size ship, any vessel of inferior size may be repaired.

Docks with rail-ways, &c. of size adapted to vessels still smaller than sloops of war, would, probably, be found advisable. Their expense, compared to the value of the vessels, would be inconsiderable.

By a system of docks for repairing, connected with rail-ways and houses for building, and for hauling up and preserving vessels in ordinary, adapted in their dimensions to the several classes of vessels, you would, at all times, be enabled to build to every advantage; to repair most effectually and economically, and to keep in a state of perfect preservation, and constant readiness for service, all vessels not required for immediate service, together with their masts, spars, boats, water-casks, guns, &c. all under the same cover, ready to be put on board at a moment's warning. You may thus calculate your actual naval force, with as much precision, as you could count your muskets in an armoury.

Advantages of "Rodgers Marine rail-way, dock, and fixtures, for hauling up," briefly enumerated.

In building Ships—A saving in labor of at least 32½ per cent. a durability so much greater, as to be equal in 20 years to at least 75 per cent. and a great gain in point of time.

In repairing—When contrasted with the plan of heaving down—every risk avoided, 33⅓ per cent. gained in the labor—a more perfect examination, repair, and greater despatch also gained.

In ordinary—When contrasted with vessels in ordinary afloat; decay effectually guarded against. Ships kept in a state of perfect preservation, so as to be prepared for service at the shortest notice, and so great a reduction in the actual annual expenses, that they would not be more than one-twentieth part of what they are at present.

In launching—Hogging and every possible risk effectually guarded against.

The inventor, after having made every inquiry in his power, as to the expenses of the Navies of other countries, and examining minutely the expenses of our own Navy, has no hesitation in expressing, in the most decisive terms, his opinion, that, by adopting in its full extent the proposed system, the United States would save, annually, in time of peace, a sum fully equal to one-fourth of the annual expense now incurred in building, and repairing ships of war; and that the expense of keeping them in ordinary afloat, would be reduced so far, that they would not exceed one-twentieth part of the expenses at this time incurred.

With a plane having the inclination of the ways on which ships are ordinarily built, 140 men with three three-fold purchases, (falls of ten inch rope,) would be sufficient to haul up, at the rate of four feet in a minute, the largest three-decker in the world, and this too, without straining her in the slightest degree.

From the best estimate that can be formed at this time, it is believed that a dock can be attached to the rail-way and house, as now constructed in this yard, and completed, so as to give all the advantages of a wet and dry dock, for the sum of $50,000, as shewn in the estimate herewith, prepared by Mr. Doughty, the Naval Constructor. It is, however, believed that this estimate is too high, as labor and materials of every description appear to be estimated at from five to seven per cent. higher than will be found to be the actual cost.

ESTIMATE of the cost of the materials and workmanship of a Dry Dock, to be built within the "Inclined Plane," as per draught and model. Prepared by WILLIAM DOUGHTY.

WHARVES.	26,400	cubic feet of logs,	a 25 cts.	$6,600 00	
	2,250	do. do. for ties,	25	550 00	
	800	feet of eight inch plank,	24	192 00	
	360	do. three do. do.	9	32 40	
	14,970	lbs. of square iron for bolts,	7	1,047 90	
	2,000	treenails,	30	60 00	
	1,400	days of workmanship,	1 50	2,100 00	
	200	perches of stone, for sinking wharf,	1 00	200 00	
					10,782 30
COFFER DAM.	39,480	feet of 8 inch plank,	a 24 cts.	$9,475 20	
	798	cubic feet of logs,	25	199 50	
	3,000	lbs. square iron bolts,	7	210 00	
	6,533	feet of 4 inch plank,	12	783 96	
	1,000	lbs. spikes,	10	100 00	
	150	perches stone, for sinking boxes,	1 00	150 00	
	400	cubic yards of earth, for filling between coffer and wharves,	25	100 00	
	2,070	days workmanship,	1 50	3,105 00	
					14,123 66
DOCK.	23,798	cubic feet of logs,	a 25 cts.	$5,949 50	
	21,499	lbs. of iron,	7	1,504 93	
	7,550	feet of 8 inch plank,	24	1,812 00	
	400	do. 4 do. do.	12	48 00	
	9,000	do. 3 do. do. platform and steps,	9	810 00	
	3,000	do. 3 do. do. for stages,	9	270 00	
	5,200	do. 6 do. do. for bottom,	18	2,736 00	
	5,875	lbs. of spikes,	10	587 50	
	2,200	days work,	1 50	3,300 00	
	400	do. caulking,	1 50	600 00	
		Oakum, &c.		300	
		Composition metal, &c. for gate,		300	
					18,217 93
	Contingencies.—Moving timber, making platforms, tallow, &c. &c.;				
	1,340,509	gallons of water to be pumped out,		4,600 61	
	9,102	cubic yards of excavation,	a 25 cts.	2,275 50	
					6,876 11
					$50,000 00