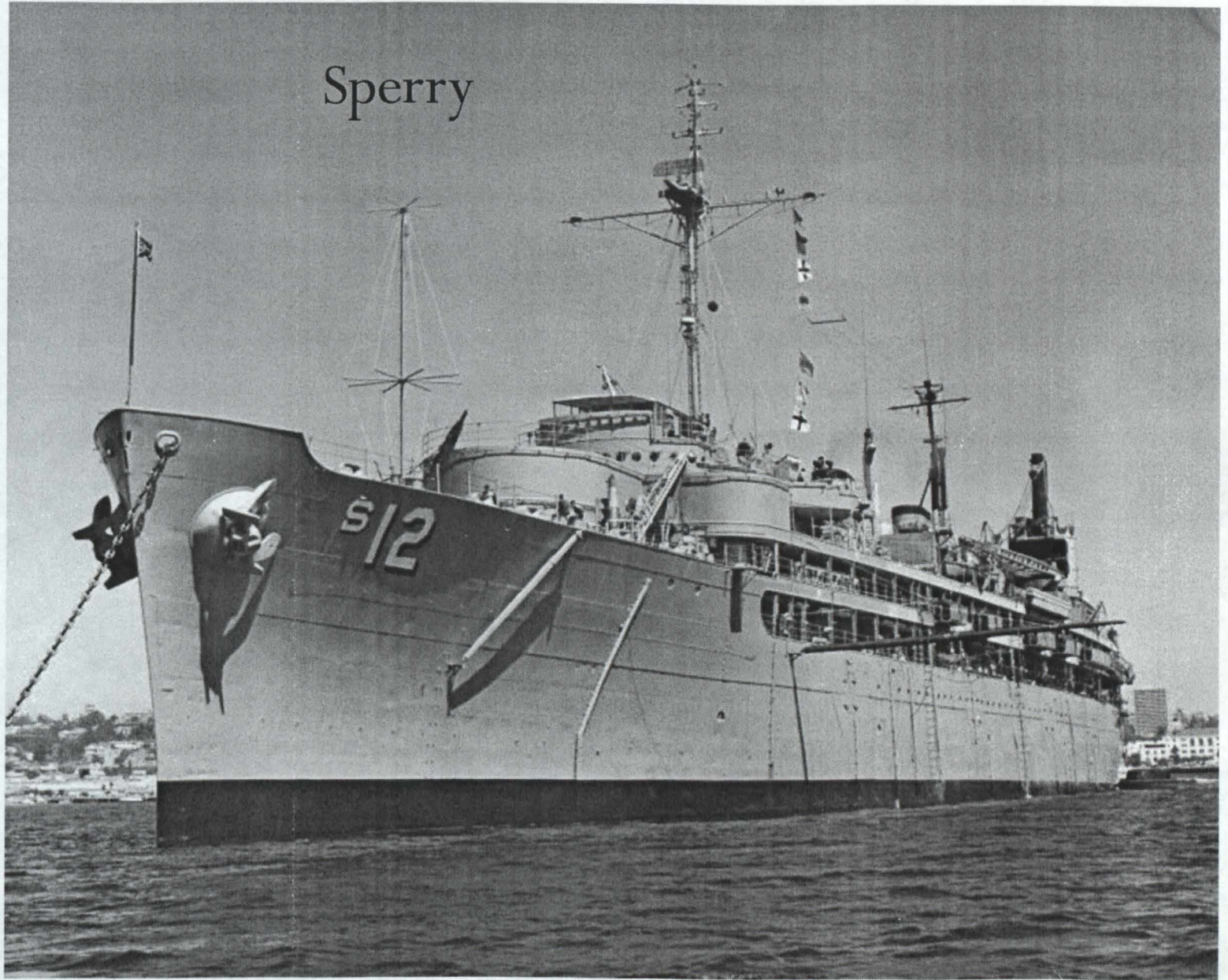


Sperry



SPERRY  
(AS-12)  
Suisun Bay Reserve Fleet  
Benicia vicinity  
Solano County  
California

HAER CA-342  
HAER CA-342

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD  
National Park Service  
U.S. Department of the Interior  
1849 C Street NW  
Washington, DC 20240-0001

## HISTORIC AMERICAN ENGINEERING RECORD

### *SPERRY* (AS-12)

HAER No. CA-342

**Location:** Suisun Bay Reserve Fleet, Benicia vicinity, Solano County, California

**Type of Craft:** Auxiliary

**Trade:** Submarine tender

**Class:** *Fulton*

**Hull No.:** AS-12

**Principal Dimensions:** Length (oa): 530'-7"  
Beam: 73'-4"  
Draft: 22'-5"  
Displacement: 9,250 tons  
Service speed: 15 knots  
(The listed dimensions are as built, but it should be noted that draft, displacement, and tonnages were subject to alteration over time as well as variations in measurement.)

**Dates of Construction:** Keel laying: 1 February 1941  
Launching: 17 December 1941  
Commissioning: 1 May 1942

**Designer:** U.S. Navy-Bureau of Construction and Repair

**Builder:** Mare Island Navy Yard, Vallejo, California

**Present Owner:** U.S. Maritime Administration

**Disposition:** Inactive, National Defense Reserve Fleet

**Significance:** The *Sperry* is significant as an example of a submarine tender built during World War II. The ship was in service from 1941 until 1982. After upgrades completed as part of the second Fleet Rehabilitation and Modernization Program (FRAM II), the *Sperry's* primary duties shifted from repairing and replenishing diesel-powered submarines to performing similar tasks on nuclear-powered ballistic missile submarines (SSBN) and attack submarines (SSN).

**Historian:** Brian Clayton, winter 2009

**Project Information:** This project is part of the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering and industrial works in the United States. The Heritage Documentation Programs of the National Park Service, U.S. Department of the Interior, administers the HAER program.

The project was prepared under the direction of Todd Croteau (HAER Maritime Program Coordinator). Ashley T. Walker (HAER Contract Architect) generated the vessel drawings. Brian Grogan (Photography + Preservation Associates) produced the large-format photographs. Special thanks to Erhard Koehler (U.S. Maritime Administration) for his help with the project.

**Note:** Drawings of the ship are available in Record Group 19 at the National Archives and Records Administration-College Park, but good quality scans could not be made of them for use as measured drawings.

## BACKGROUND

The auxiliary fleet to the U.S. Navy, of which the *Sperry* was a part, provides the essential services of repairing and resupplying naval ships. The U.S. Navy first conceived of the idea of a “fleet train” after reviewing and analyzing the fight between Japanese and Russian forces during the 1905 Battle of Tsushima. Studying this battle helped the U.S. Navy develop its own war strategy against Japan. Due to the large expanse of the Pacific Ocean that had to be covered by U.S. naval ships, the senior naval advisory group, called the General Board, advocated for the establishment of an auxiliary force that would operate in the forward areas at advanced bases conducting repairs and replenishing the fighting warships.<sup>1</sup>

The U.S. Navy included submarine tenders like the *Sperry* in the advanced base concept rather than permanent submarine bases because the tenders offered “flexibility and mobility.” The unique design of the tenders allowed them to refurbish and supply submarines operating in forward areas. The tenders also served as a mother ship by relieving crews and providing refuge from the confines of the submarine.<sup>2</sup>

The U.S. Navy successfully applied its advanced base plan during World War I, and it became a model for future strategies. The navy implemented a Base Force following the war that included a large number of auxiliaries: “tankers, fresh and frozen food ships, repair ships, target repair ships, and tubs; ammunition ships were controlled separately, as were the tenders.” The navy also developed a universal hull for a destroyer tender, repair ship, and submarine tender, but with the onset of the Great Depression, Congress withdrew funding.<sup>3</sup>

The interwar years proved challenging for the U.S. Navy, but economic and treaty constraints encouraged innovation. President Warren Harding’s administration initiated the Washington Naval Conference in 1921 to limit naval construction among the world’s leading powers, including England, France, Italy, Japan, and the United States. In 1922, the five nations agreed to the treaty’s provisions and signed it. The Five Power Treaty, also known as the Washington Naval Treaty, set in place a number of rules regarding naval construction but centered on a preset ratio of capital ship tonnages for each nation.<sup>4</sup> To appease Japan’s concerns about its small ratio vis-à-vis the United States, Article XIX limited American naval base construction. The fortification clause within the treaty had the biggest impact on U.S. naval planning in the Pacific and “contributed to innovation by forcing the navy to consider how to apply sea power at very long ranges in the absence of pre-existing bases.”<sup>5</sup> The second problem faced by the U.S. Navy was “how to build a navy ‘second to none’ when neither Congress nor the President allocated or authorized money for construction.”<sup>6</sup>

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<sup>1</sup> Robert Gardiner, ed., *Conway’s History of the Ship The Eclipse of the Big Gun, The Warship 1906-45* (London: Conway Maritime Press, 1992), pp. 165-166.

<sup>2</sup> Gardiner, p. 167.

<sup>3</sup> Gardiner, p. 167.

<sup>4</sup> The ratio followed the numbers 5:5:3:1.75:1.75—United Kingdom, United States, Japan, France, and Italy.

<sup>5</sup> John T. Kuehn, “The Influence of Naval Arms Limitations on U.S. Naval Innovation during the Interwar Period, 1921-1937” (Ph.D. diss., Kansas State University, 2007), p. 83.

<sup>6</sup> Kuehn, p. 90. See Kuehn, pp. 77-83, as well as Appendix I for a transcript of The Five Power Treaty.

The U.S. Navy's solution to its problems resulted in a "balanced" fleet utilizing a mobile basing strategy. The navy's definition of "balance" was a broad selection of vessels rather than quotas, but it still focused on battleships as the centerpiece of American naval strategy. Submarines figured prominently in the new war plans directed against Japan (Plan Orange) and were to be used as the "eyes" of the fleet. The navy included submarine tenders as well due to the intensive upkeep required of the submarines. The *Fulton* class, of which the *Sperry* is a part, was a direct outgrowth of this planning during the interwar years.<sup>7</sup>

When the United States entered World War II, one of the first priorities became the construction of ships. The global experience and ferocity of World War I taught the United States that World War II would be on a grander scale, in more places, involving more people, and requiring more equipment—total war.<sup>8</sup> During World War II, the U.S. Maritime Commission became a pivotal force in the development and construction of ships, much like the U.S. Shipping Board had been in World War I. Created in 1936, the Maritime Commission succeeded the Shipping Board, but generally followed the same directive: the promotion of U.S. shipping interests. After the United States entered World War II, the Maritime Commission created the "Emergency Program," a massive ship construction plan that utilized new and existing shipyards across the United States.<sup>9</sup>

## CONSTRUCTION

The *Sperry* was built as part of the *Fulton* class submarine tenders, which the U.S. Navy's Bureau of Construction and Repair designed in the late 1930s. The *Fulton* class consisted of seven ships equipped to deal with increasingly complex submarines.<sup>10</sup> Mare Island Navy Yard laid the keel of the *Sperry* on 1 February 1941 and launched it on 17 December 1941.<sup>11</sup> The shipyard completed the *Sperry* five months ahead of schedule as part of a sped-up production

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<sup>7</sup> Gardiner, p. 167; Kuehn, pp. 82-83, 107-109, 113, 130, 184, 231, 241, 255-256.

<sup>8</sup> Russell F. Weigley, *The American Way of War: A History of United States Military Strategy and Policy* (New York, NY: Macmillan Publishing Co. Inc., 1973), pp. xxi-xxiii.

<sup>9</sup> Frederick C. Lane, *Ships for Victory: A History of Shipbuilding Under the U.S. Maritime Commission in World War II* (Baltimore, MD: Johns Hopkins Press, 1951), pp. 1-12; René De La Pedraja, *A Historical Dictionary of the U.S. Merchant Marine and Shipping Industry since the Introduction of Steam* (Westport, CT: Greenwood Press, 1994), pp. 563-566, 629-631. During World War II, 5,777 ships were delivered to the Maritime Commission. Contracts were issued by the commission for 5,601 vessels, and private firms built 111 ships while foreign firms built sixty-five.

<sup>10</sup> Other *Fulton* class ships include the *Bushnell* (AS-15), *Howard W. Gilmore* (AS-16), *Nereus* (AS-17), *Orion* (AS-18), and *Proteus* (AS-19).

Lane, p. 31; Randall Guttery, "The Submarine's Secret Weapon...A Tender Tale," *Undersea Warfare*, Summer 2001, available online at <http://www.tendertale.com/ttp10.html>, accessed December 8, 2008.

<sup>11</sup> There is a discrepancy regarding which shipyard built the *Sperry*. The U.S. Navy, *Ship's Data, U.S. Vessels*, vol. III (Washington, DC: Government Printing Office, 1946) attributes the construction to Moore Shipbuilding & Dry Dock Company of Oakland, California, as does the U.S. Navy, *Dictionary of American Naval Fighting Ships*, Vol. VI (Washington, DC: Naval Historical Center, 1991). However, the digitized version of the *Dictionary of American Naval Fighting Ships* states Mare Island Navy Yard built it (see <http://www.history.navy.mil/danfs/s16/sperry.htm>, accessed 2009), while contemporary media accounts state the ship was launched from Mare Island Navy Yard. See, for example, "Light Cruiser is Launched at Camden Yards," *Chicago Daily Tribune*, December 18, 1941, p. 12 and "Tender Launching Sets Record," *New York Times*, December 18, 1941, p. 22.

schedule to meet wartime demand.<sup>12</sup> The submarine tender was named for famed engineer and inventor Elmer A. Sperry, whose daughter, Mrs. Helen Sperry Lea, sponsored the ship during the launching. Sperry founded Sperry Electric Company, Sperry Electric Mining Machine Company, and Sperry Electric Railway Company from 1880 to 1890. In 1910, he established the Sperry Gyroscope Company in Brooklyn, New York. The U.S. Navy utilized his compasses and stabilizers during both world wars. Prior to his death on 12 June 1930, Sperry had obtained over 400 patents.<sup>13</sup>

Mare Island Navy Yard produced a significant number of ships under the Maritime Commission's Emergency Program.<sup>14</sup> The U.S. Navy had formally established Mare Island as its first base on the Pacific Coast in 1854 with Commander David Farragut at its head. Located 25 miles northeast of San Francisco, California, the shipyard originally encompassed more than 900 acres. From 1872 to 1891, a dry dock was under construction that had the distinction of being the first on the Pacific Coast. During World War II, shipyard employees produced thirty-two destroyer escorts, over 300 landing craft, thirty-three small craft, seventeen submarines, and four submarine tenders. Over the course of operations, the shipyard was responsible for building 512 ships and refurbishing hundreds of vessels. The shipyard remained in operation until its closure in 1996 as part of the Base Realignment and Closure (BRAC) assessment. It is listed in the National Register of Historic Places and has been designated a National Historic Landmark.<sup>15</sup>

## DESCRIPTION

The *Sperry* measured 530'-7" long overall and 73'-4" amidships with a limiting draft of 25'-6". It had a light displacement of 9,250 tons and speed of 15 knots. The vessel was equipped with numerous tanks in the inner bottom, bow, and stern spaces that held diesel oil and water and also served as ballast. The ship held 26,600 barrels of fuel oil, which gave it a 15,000-nautical mile cruising radius. As the ship consumed fuel, pumps within the machinery room transferred seawater into the empty tanks to maintain the correct stability and trim. To achieve the design speed of 15 knots, the ship required two power plants rated at 11,800-shaft horsepower (shp) to turn two screws. The machinery compartments were divided in two, one located forward of the auxiliary machine room and one aft. Inside each of the two spaces were four General Motor diesel generators (16-248) supplying power to a General Motors electric motor.<sup>16</sup>

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<sup>12</sup> "Light Cruiser," p. 12; "Tender Launching Sets Record," p. 22; Lawrence E. Davies, "Shelters Picked at San Francisco," *New York Times*, December 18, 1941, p. 25.

<sup>13</sup> U.S. Navy, *Dictionary of American Naval Fighting Ships*, Vol. VI (Washington, DC: Naval Historical Center, 1991): pp. 580-581.

<sup>14</sup> The shipyard's name was changed to Mare Island Naval Shipyard in July 1945.

<sup>15</sup> Historic American Engineering Record (HAER), National Park Service, U.S. Department of the Interior, "Mare Island Naval Shipyard," HAER No. CA-3; "Mare Island Naval Shipyard," available at [http://www.fas.org/man/company/shipyard/mare\\_island.htm](http://www.fas.org/man/company/shipyard/mare_island.htm), accessed 26 January 2009; George R. Adams, "Mare Island Naval Shipyard," National Register of Historic Places Inventory—Nomination Form, December 1, 1974.

<sup>16</sup> U.S. Navy, Ship's Plan, USS *Sperry*, in Record Group 19, National Archives and Records Administration—College Park, Maryland (hereafter cited as NARA-College Park); U.S. Navy, *Ship's Data, U.S. Naval Vessels*, Vol. III (Washington, DC: Government Printing Office, 1946), pp. 372-375.

Navigation of the ship primarily took place on the bridge deck. The pilothouse was in the forward section of the superstructure and contained a compass, engine order telegraph, and a helm to control the ship's movement. The helm sent electric signals to a hydraulic steering rudder mounted in the lazaretto. Two bridge wings extended off the wheelhouse and were equipped with peloruses and searchlights. Located at the aft end of the bridge were two compartments: a chartroom on the port side and a command information center (CIC) and radar station on the starboard side. The communication equipment compartments were located in the aft section of the bridge deck, while offices and working spaces were in the rear.<sup>17</sup>

There were six generators in the machine rooms supplying power to both the ship and any submarines moored alongside. Two 500-kilowatt diesel generators were located inside the forward machine room on the port side. In the auxiliary machine room on the starboard side, there were two 250-kilowatt diesel generators supplying auxiliary power to submarines. An 850-kilowatt motor generator used to convert AC power to DC power sat opposite of the submarine generators. The aft machinery room contained two diesel generators: a 500-kilowatt generator on the port side and a 250-kilowatt generator on the starboard side. An emergency generator was on the second deck across the passageway from the barbershop.<sup>18</sup>

A majority of the ship was devoted to the manufacture, refurbishment, and storage of submarine equipment. The hold contained a number of spaces devoted to the storage of torpedoes and other equipment. Void spaces filled with ballast water and fuel oil in the hull protected the equipment from mines or torpedoes. The third deck included a number of repair shops and storage areas for electrical equipment, metals, and torpedoes. The second deck had a large machine shop for fabricating machine parts, a metals department, and a welding area. The machine shop office and main tool issue room were in the forward section of the ship on the same level. A large portion of the main deck was allocated for pipe fabrication (metal and rubber), as well as a foundry for the blacksmiths and a small welding room. A number of compartments dedicated to the repair of electrical equipment, mechanical instruments, and optics were located on the main deck amidships. The upper deck had spaces for carpentry and accompanying equipment. Just aft of the carpenter and pattern shop was a small gyrocompass repair shop. A calibration lab, communication and sonar repair area, and radar shop were at the stern. Finally, in the aft end of the superstructure, there was a technical repair library and printing shop, as well as a machine shop and fluid repair facility for governors, valves, and hydraulics. Above the superstructure was a small cryptographic repair shop.<sup>19</sup>

The *Sperry* carried two cranes and two derricks to hoist and position equipment and stores needed during loading and unloading operations. Two heavy duty, dual-purpose electric cranes (20-ton) were located on the stern section of the ship to move and position deck equipment and to lift and lower materials, machines, and supplies through two removable hatches on the superstructure deck. Two smaller (5-ton) derricks were aft of the bridge and moved and

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<sup>17</sup> See Ship's Plan, plates 5, 9.

<sup>18</sup> *Ship's Data*, p. 375; Ship's Plan, plate 11.

<sup>19</sup> Ship's Plan, plates 5-12.



positioned supplies and torpedoes through a removable trunk in the deck. The crew operated the derricks with the assistance of two double-drum winches off the port and starboard sides.<sup>20</sup>

Berthing space for the crew, consisting of 1,307 people (107 officers and 1,200 enlisted) occupied a sizable amount of space. Lodging for the senior offices was in the superstructure, along with private rooms for two staff members. The remaining officers lived in private rooms in the forward upper deck. The Chief Petty Officers (CPO) berthing was in the bow area on the main deck in bunks stacked three or four high. The enlisted crew's berthing was located in two areas of the ship, with a third in the stern area on the upper deck. The remaining crew lived in the stern and forward areas on the second deck in bunks stacked four or five high.<sup>21</sup>

Food service on board occurred in three areas of the ship, and there was ample storage space for the large amount of food supplies needed during long deployments. Food preparation for the enlisted crew took place in the forward area on the second deck. There were two messes, one forward and one aft of the galley. Separate compartments were allocated for a bakery, butcher shop, and vegetable preparation. Mess attendants served the crew cafeteria style from two steam tables, one serving each mess. The CPO mess was aft of their berthing quarters, and it included a small pantry. The officer's galley was aft of the CPO mess; while simple, it contained all the equipment necessary to prepare the food, and a dumbwaiter connected it to a modest pantry. The wardroom was forward of the pantry and included sizable space for the officers to eat and relax. Food reefers and dry stores were on the second platform, first platform, and third deck in the forward area near the bow. A service elevator near the food storage rooms allowed crew to transport supplies through the ship.<sup>22</sup>

To supply the physical needs of the crew, there was sufficient space for showers, heads, and washrooms around the ship and near the living quarters. A dentist and medical doctor were permanently stationed onboard with offices amidships on the upper deck. A barbershop was on the port side, forward of the crew's berthing on the second deck. Laundry facilities were on the same deck at the stern. There was a ship's service store where the crew could purchase personal items. A post office, chaplain's office, library, and a career counselor to advise the crew on future positions were also onboard.<sup>23</sup>

During World War II, defensive armament was placed on the ship. On the bow were two 5"/38 single mount guns while another two were on the stern section. The 5"/38s were dual-purpose and could target aircraft or ships through the Mark 51 gun director. On the superstructure were four twin-mount 40-millimeter anti-aircraft guns. Ammunition trunks were located on the hold level under the position of the 5"/38s and hoists lifted the power and shells upward to the gunners. Additional safety features included motor launches on the stern section and rafts off the sides on the main deck. After the war, the navy removed this defensive armament.<sup>24</sup>

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<sup>20</sup> Ship's Plan, plates 3-5.

<sup>21</sup> *Ships' Data*, p. 373; Ship's Plan, plates 5-8.

<sup>22</sup> Ship's Plan, plates 6-11.

<sup>23</sup> Ship's Plan, plates 6-8.

<sup>24</sup> *Ship's Data*, p. 376; Ship's Plan, plate 3.

## OPERATIONAL HISTORY

Capt. Robert H. Smith took command of the ship when the U.S. Navy commissioned it on 1 May 1942.<sup>25</sup> After completion of the trials and training, the *Sperry* set sail for Oahu, Territory of Hawaii, on 2 August 1942. The crew repaired eight submarines over the course of three months while in Oahu. The *Sperry* next sailed to Australia on 26 October 1942, following a circuitous route around the Solomon Islands to Noumea, New Caledonia, where the ship and crew spent three days on a layover. On 13 November, the ship arrived in Brisbane, Australia, and spent the next two months repairing eight submarines. The *Sperry* sailed out on 17 January 1943 for Pearl Harbor, arriving on 31 January and spending the next four months there conducting repairs on twenty submarines.

The *Sperry* set sail for Midway Island with a small contingent of ships on 8 June 1943, arriving four days later. The crew restored and refurbished 140 submarines for duty over a five-month period. The *Sperry* returned to Pearl Harbor in mid-November and continued repairing submarines there before shipping out for Majuro Atoll. The ship remained at that location from 15 March until 19 September 1945. The crew conducted twenty-one repairs on various submarines while in port. The crew's major accomplishment at Majuro was the construction of a permanent convalescent base (code name Myrna) for submarine crews. The *Sperry* departed the island with new orders and steamed towards Oahu, arriving on 24 September.

The *Sperry*'s orders changed, however, and the ship sailed from Oahu on 8 October as part of a small convoy of eleven ships heading to Eniwetok. From there, the *Sperry* left with the *Corbesier* (DE-438) and arrived in Guam on 20 October. While moored in Guam, the crew of the *Sperry* refurbished forty submarines over a period of four months. In addition to the normal duties, the crew built another submarine base (code name Camp Dealey) for crews operating in the forward areas. The *Sperry* left Guam on 13 February under escort and returned to Pearl Harbor on 22 February.

The *Sperry* remained in Pearl Harbor for a short time before the navy ordered the crew to sail to Mare Island for a refit. The ship arrived at the naval shipyard on 7 March 1945 and remained there until the yard completed repairs on 30 April. The *Sperry* returned to Pearl Harbor on 10 May and began normal duties repairing four submarines. New orders soon came through, however, and the *Sperry* proceeded to Guam on 30 June.

From 11 July 1945 until 11 January 1946, the *Sperry* remained in Guam. The Pacific war formally ended on 15 August 1945 while the *Sperry* was moored in Apra Harbor. From late November to early December, the ship participated in an exercise supporting six submarines that required traveling to Ulithi Atoll and Manus Island before returning to Guam on 15 December. The navy ordered the *Sperry* to the West Coast for an overhaul, and the ship departed Guam on 11 January 1946.

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<sup>25</sup> Historic photographs of the ship in operation can be found online at "USS Sperry (AS-12)," <http://www.navsourc.org/archives/09/36/3612.htm>, accessed 2008. Operational history from *Dictionary of American Naval Fighting Ships*, pp. 580-581.

On 20 February, the *Sperry* entered Long Beach Harbor and docked at Terminal Island for a comprehensive refit. The shipyard completed the overhaul in July 1947, after which the crew sailed to the new homeport of San Diego, California. Crew members spent most of their time while moored in San Diego performing missions in support of the Seventh Fleet's submarines and earned distinctions from 1948-1950 by winning the popular battle efficiency "E" award and participating in the first public tests of launching submarine missiles at sea.

When the Korean War broke out in 1950, the *Sperry* and crew were involved in overhauling and equipping numerous submarines participating in the conflict. The navy stationed the *Sperry* in Pearl Harbor and the Benin Islands from 6 August to 9 October 1952. The ship then returned to San Diego. As the war subsided, the *Sperry* generally remained in port to conduct repairs and supply the West Coast submarines but did participate in training cruises outside San Diego.

For the next twenty years, the *Sperry* continued in operation as a submarine tender in San Diego, but the missions changed in 1961 following an upgrade. The U.S. Navy modernized the ship in 1961 as part of the second Fleet Rehabilitation and Modernization program (FRAM II), which allowed it to service nuclear ballistic missile submarines (SSBNs) and defending fast attack submarines (SSNs). The ship continued operating in this capacity out of San Diego until 30 September 1982 when the navy decommissioned the vessel and removed it from the Naval Vessel Register. The Maritime Administration obtained custody of the *Sperry* on 1 February 1999, and it is currently located in the National Defense Reserve Fleet (Suisun Bay, California) awaiting disposal.

## CONCLUSION

The auxiliary fleet was critical to the success of the U.S. Navy by providing a multitude of services to keep the warships running. Since their conception in World War I, submarine tenders (auxiliaries) have been a vital component of the fleet. The *Sperry's* unique attributes and long service career (forty-one years) is a testament to the significance and value of the submarine tender. Currently, there are only two active submarine tenders in service (USS *Emory S. Land*—AS-39 and USS *Frank Cable*—AS-40).

**APPENDIX A:** Historic Photographs



**Figure 1:** *Sperry* underway, nd. From Naval Historical Center, Photographic Section, Washington, DC.



**Figure 2:** *Sperry* moored in harbor, nd. From Naval Historical Center, Photographic Section, Washington, DC.

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# HISTORIC AMERICAN ENGINEERING RECORD

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*SPERRY*

HAER CA-342

(AS-12)

Suisun Bay Reserve Fleet

Benicia vicinity

Solano County

California

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Brian Grogan, photographer, 2007

CA-342-1	Port bow view.
CA-342-2	Starboard bow view.
CA-342-3	Starboard bow and deck view.
CA-342-4	Starboard side upper deck, forward crane.
CA-342-5	Starboard side view of bridge and mast.
CA-342-6	Starboard side view, looking aft. Bridge at right.
CA-342-7	Starboard side view, looking fore.
CA-342-8	Starboard side crane.
CA-342-9	Stern deck.
CA-342-10	Starboard side, upper deck.
CA-342-11	Stern.
CA-342-12	Starboard boom.
CA-342-13	Port side, aft cable winches.
CA-342-14	Top deck amidships, starboard side.
CA-342-15	Top deck amidships. Note torpedo hatch at left.
CA-342-16	Top deck, torpedo hatch.

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CA-342-17 Bridge.

CA-342-18 Bow deck and anchor chains, looking aft.

CA-342-19 Compression hatch, port side.

CA-342-20 Compression hatch, port side.

CA-342-21 Port side, crane controls.

CA-342-22 Port side, aft hull loading doors.

CA-342-23 Port side stern.

CA-342-24 Stern.

CA-342-25 Machine pads port side amidships main deck.

CA-342-26 Torpedo trunk main deck. Hatch in ceiling is underside of hatch seen in CA-342-16.

CA-342-27 Optical room.

CA-342-28 Ship logo in second deck mess.

CA-342-29 Torpedo trunk hatch second deck mess adjacent to ship logo. Hatch in ceiling is the underside of floor hatch seen in CA-342-17.

CA-342-30 Mess, main deck. Note hoist rails overhead and port side door at right rear.

CA-342-31 Gyro compass and IC plotting room.

CA-342-32 Torpedo work room on third deck. Note hoist rails overhead and three hatches in floor to access torpedo storage hold. Arrow on wall at left center shows access hatch to torpedo hold.

CA-342-33 Machine room second deck.

CA-342-34 Boiler room.

CA-342-35 Propeller shaft.

CA-342-36 Condensers.

CA-342-37 Aft engine room and propeller shaft.

CA-342-38 Aft engine room motor and end of prop shaft.

CA-342-39 Prop shaft, jacking gear, and motor in aft engine room.



*SPERRY*  
HAER CA-342  
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Jet Lowe, photographer, 2009

CA-342-40

Torpedo storage racks.

ARCHIVAL QUALITY  
Perma/Dur

HISTORIC AMERICAN ENGINEERING RECORD  
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HAER No. CA-342-1



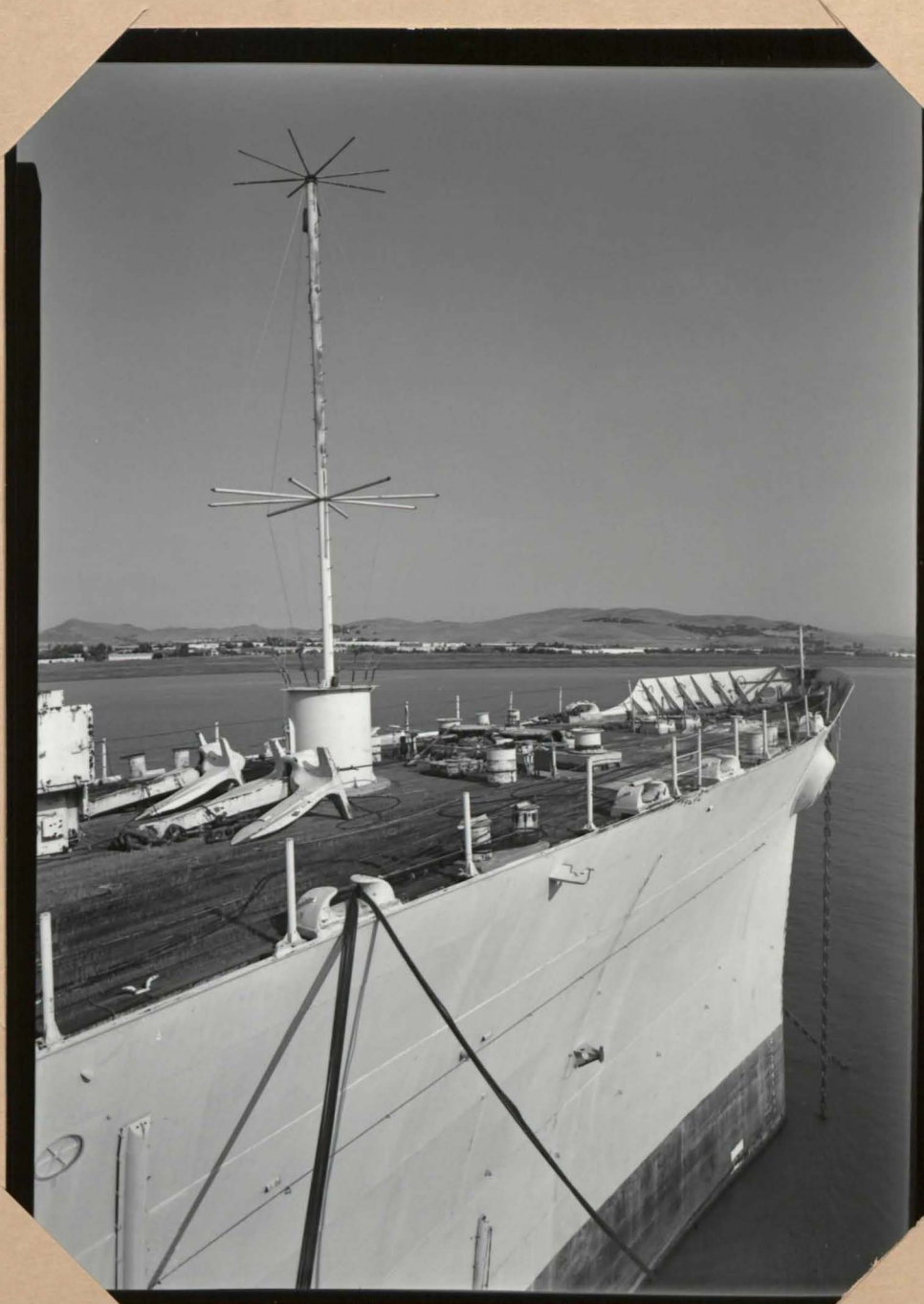
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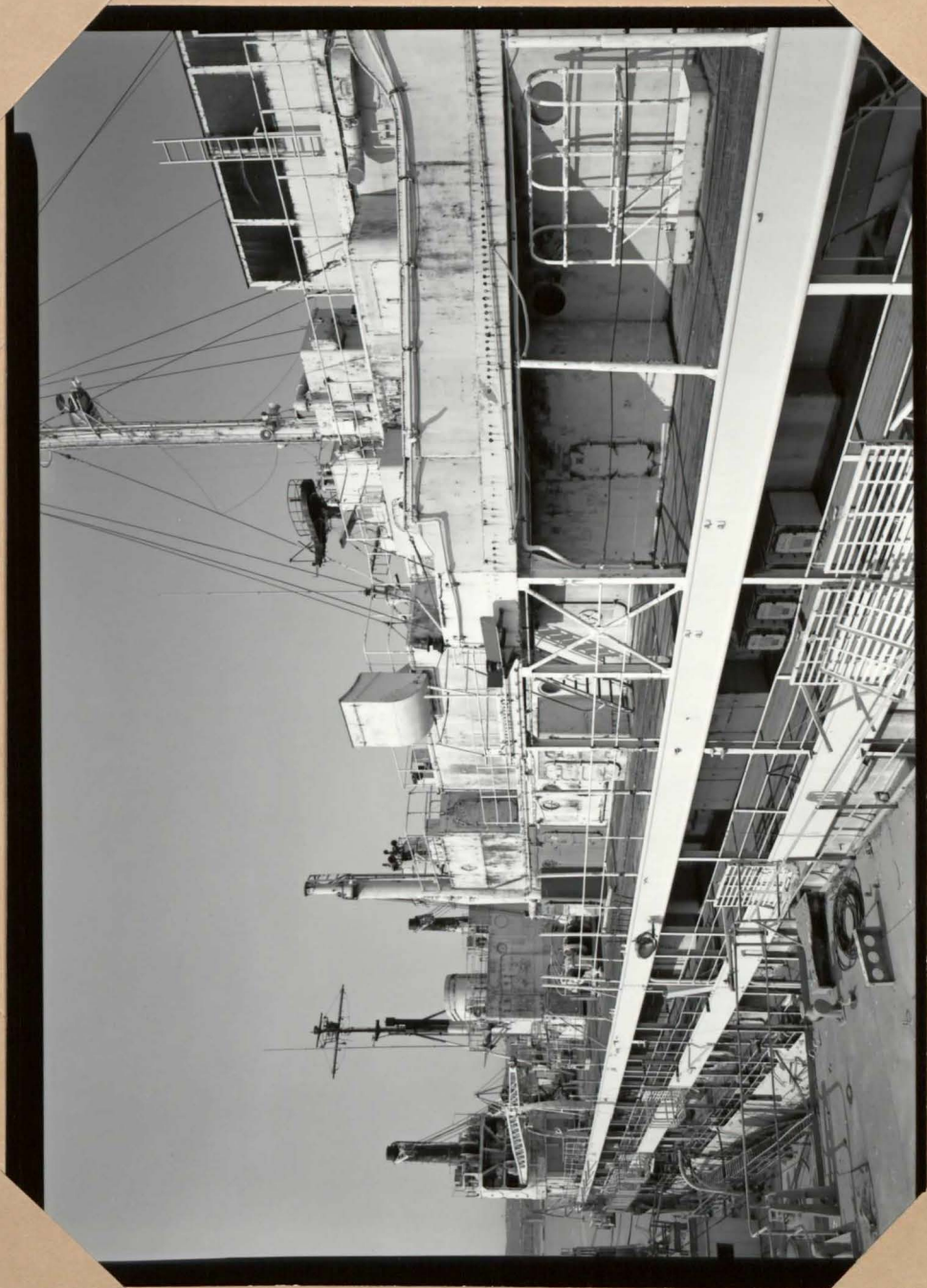
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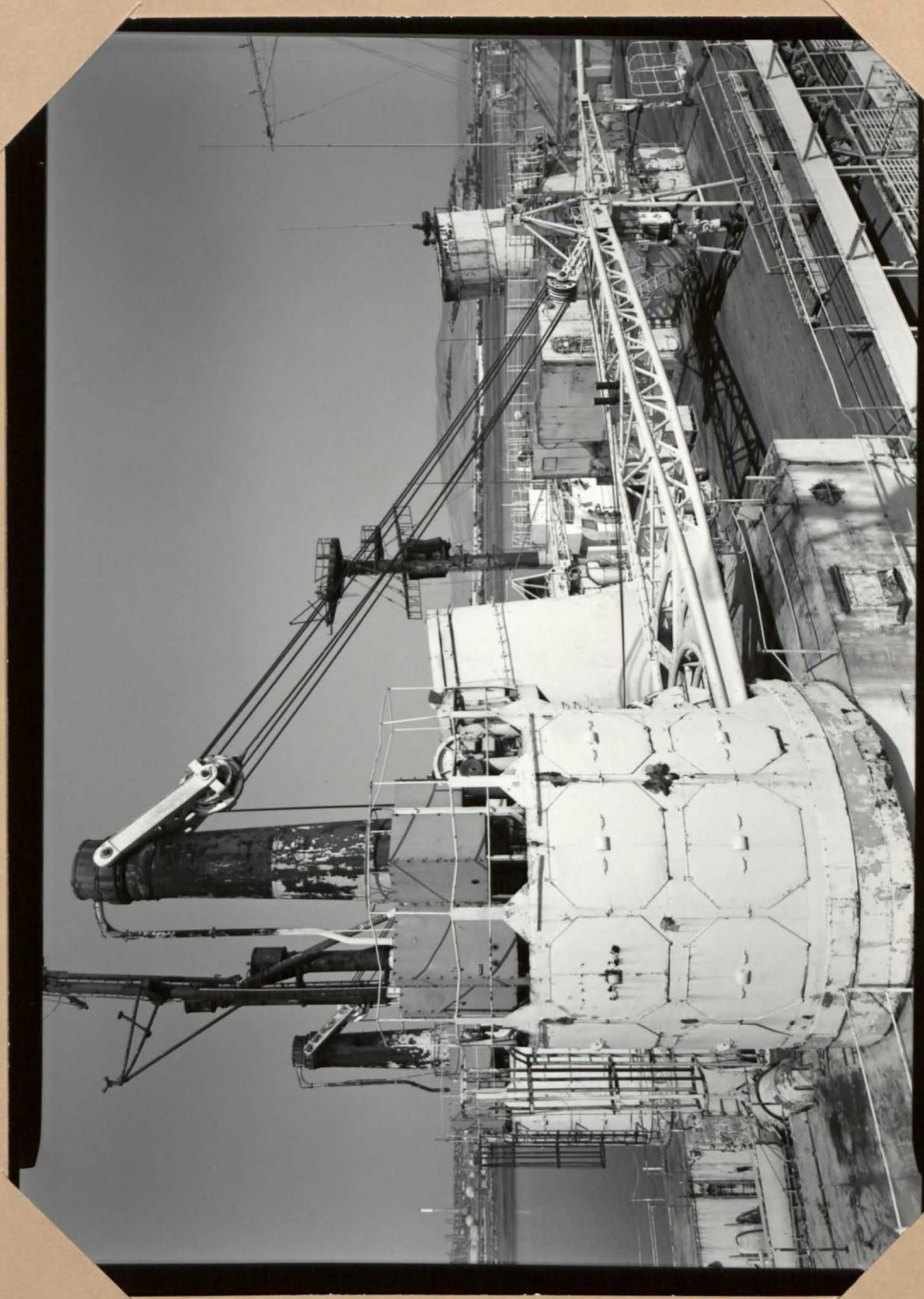
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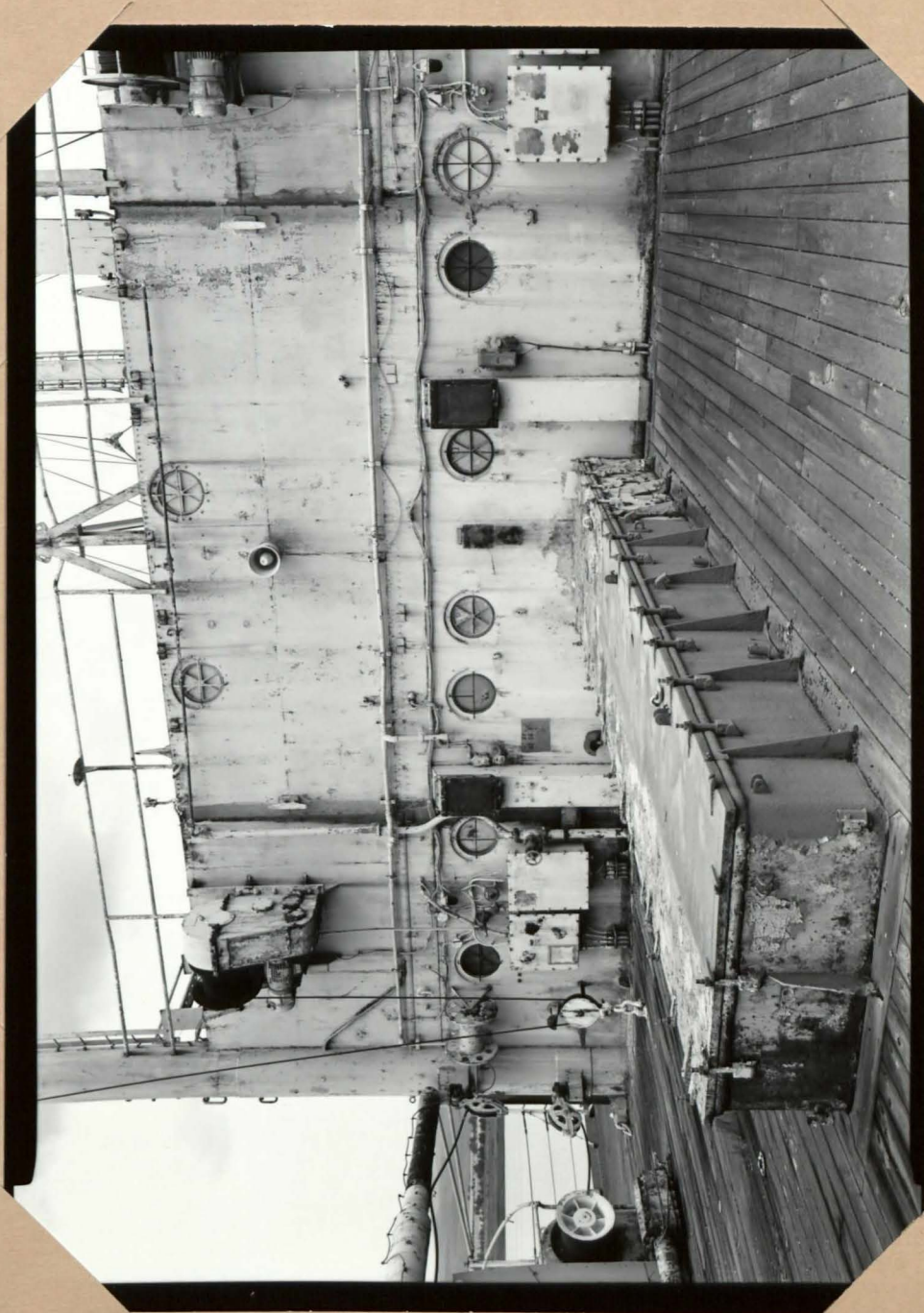
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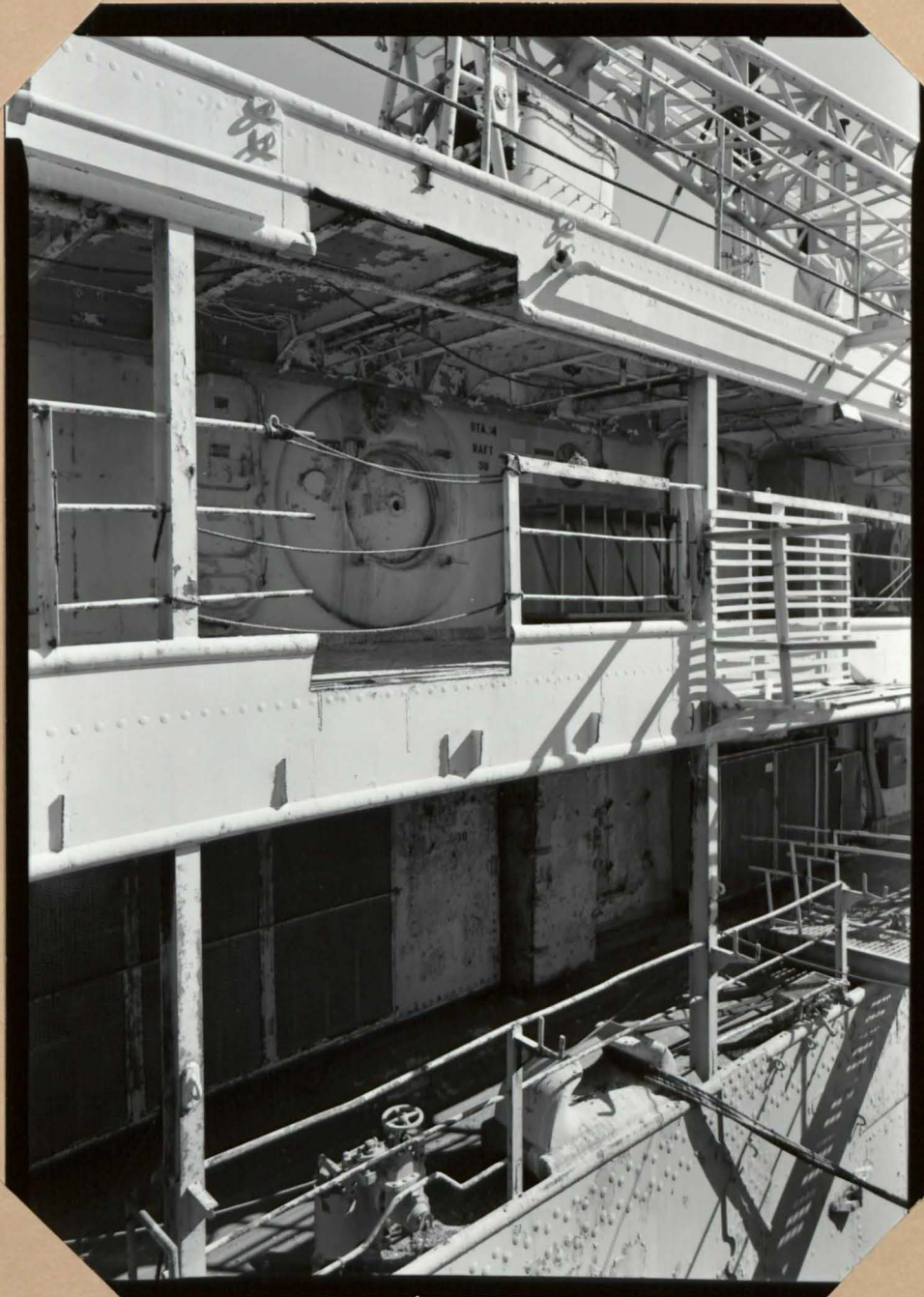
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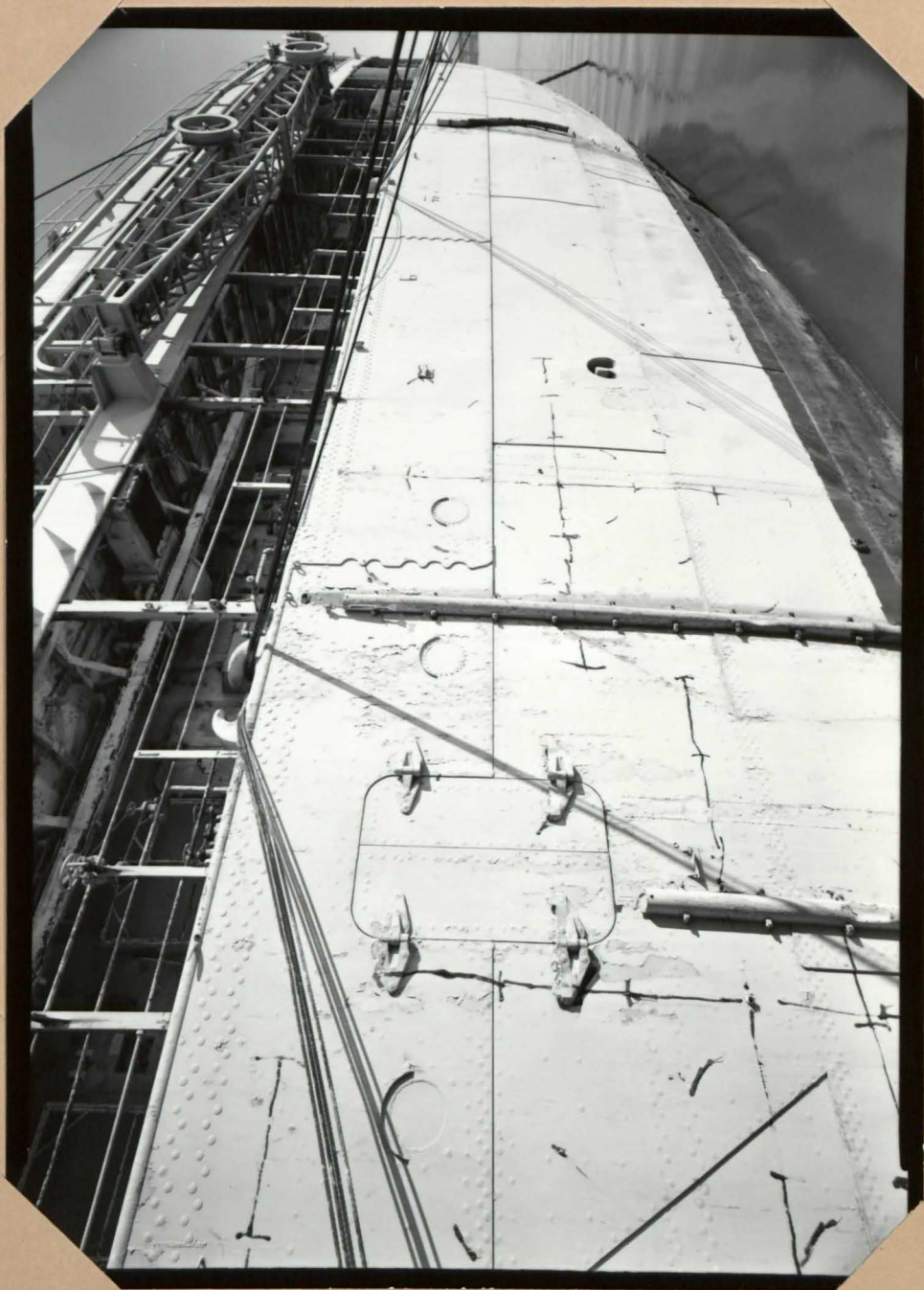
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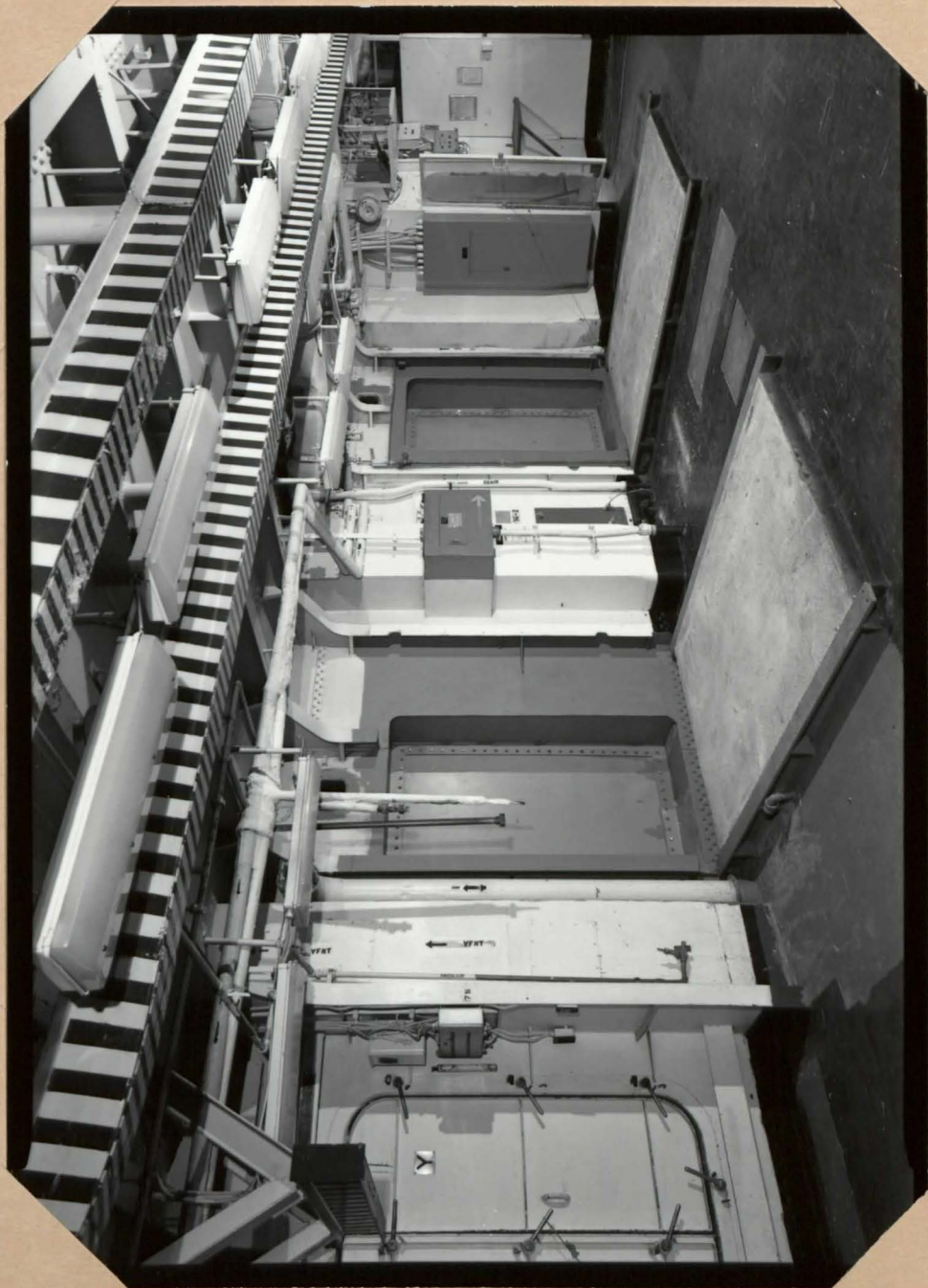
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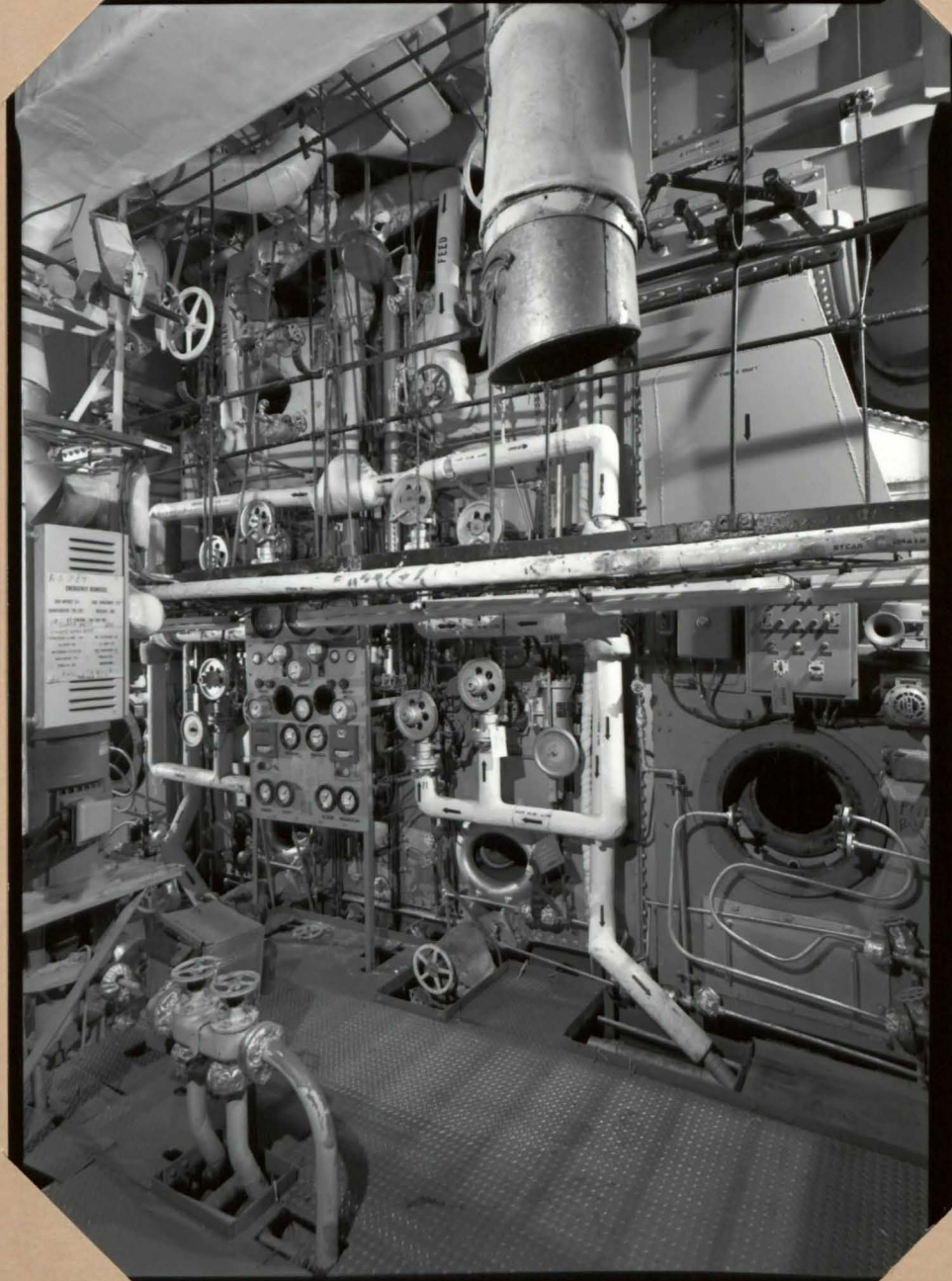
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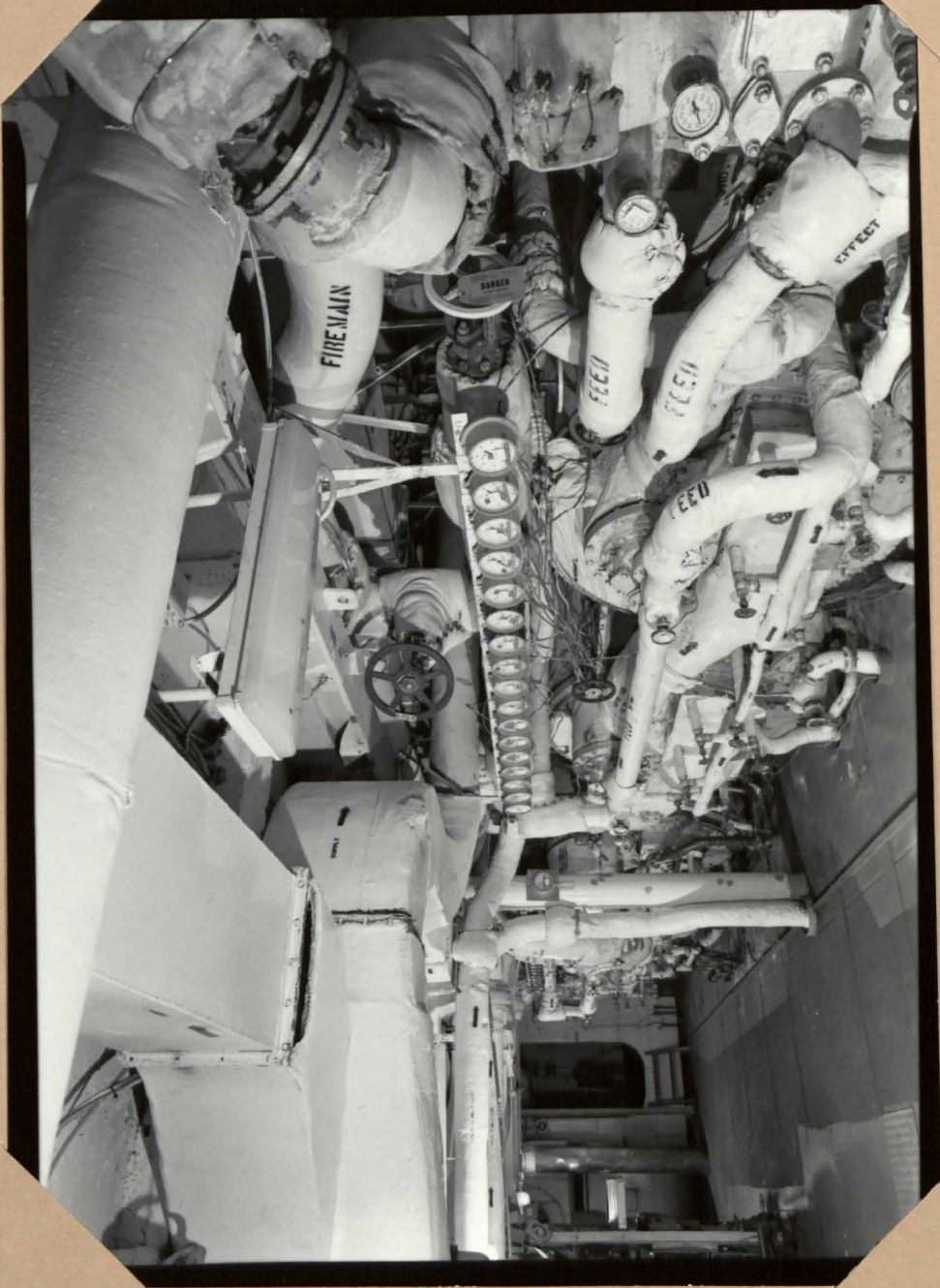
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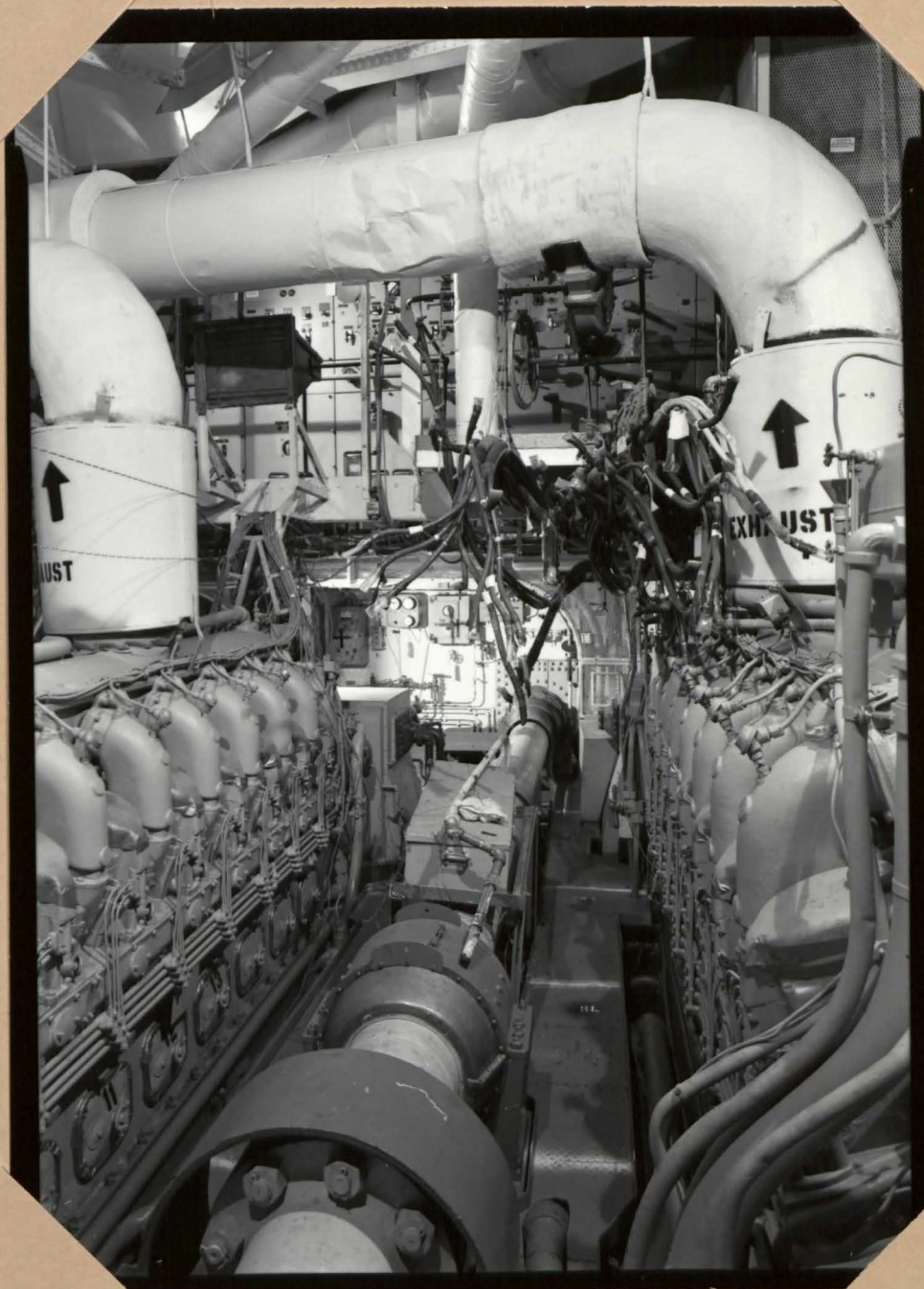
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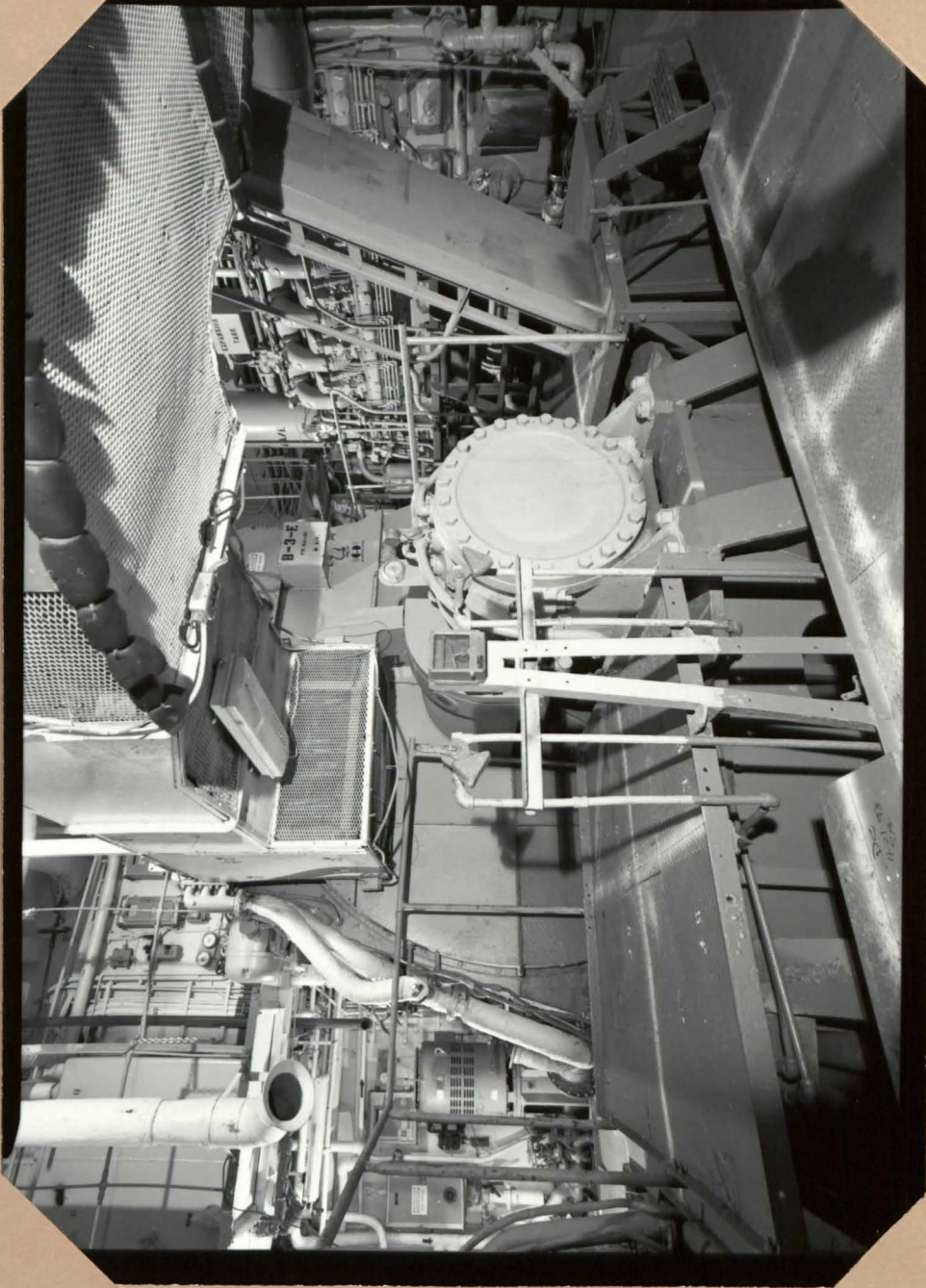
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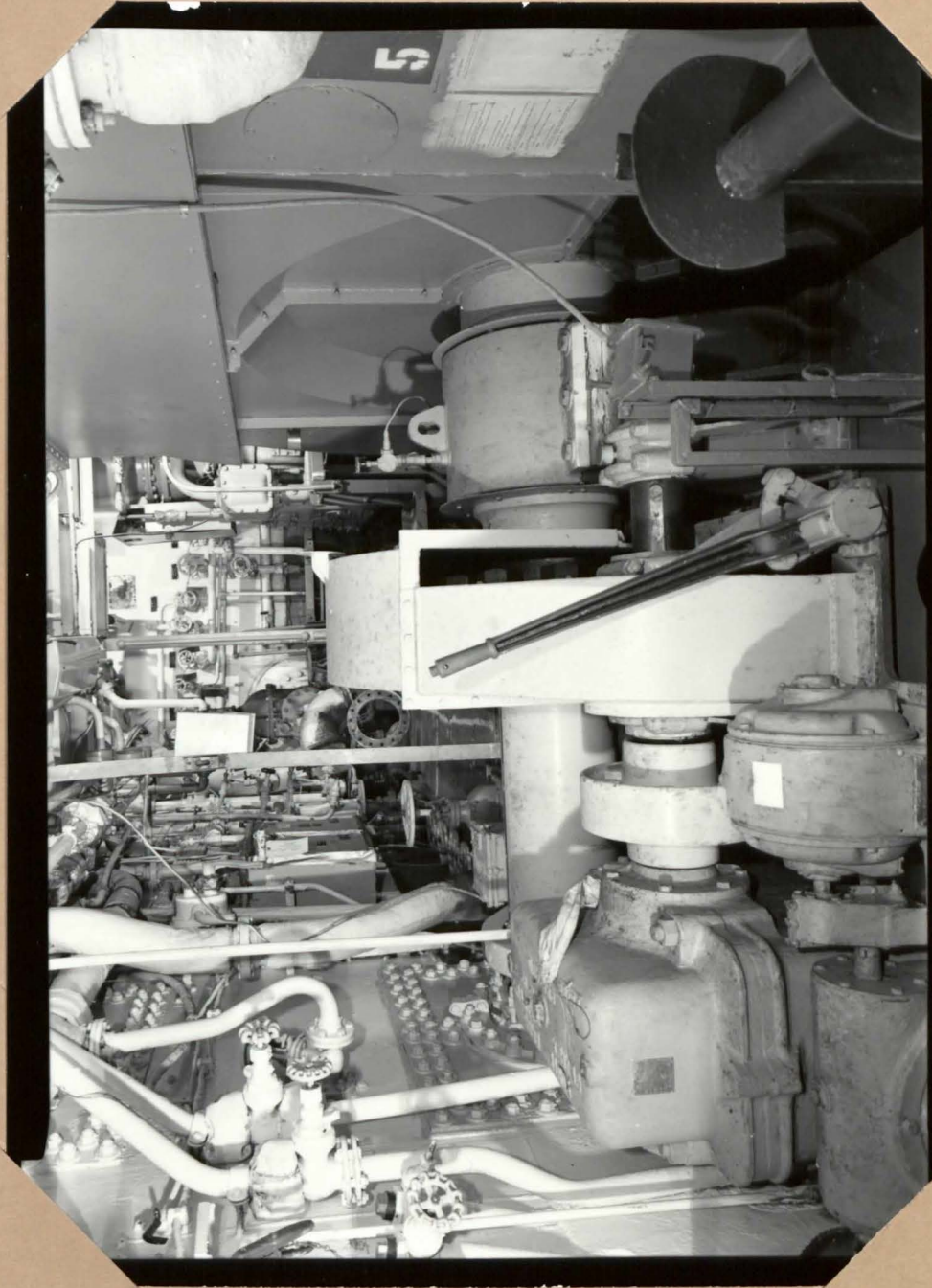
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