

# Hagley

MAGAZINE

SPRING 2021



Smithsonian  
Affiliate

*The Birkenhead's  
New Beauty!*



**MID-MARCH** • HAGLEY REOPENS

**APRIL 24** • HAGLEY 5K AND FUN RUN

**THURSDAYS IN MAY** • FAMILY HAPPY HOURS





**Dear Hagley Members and Friends:**

Welcome Spring! I know many of us are breathing a collective sigh of relief that 2020 is behind us and we have hope for a brighter 2021. Spring is a time of renewal, and I encourage you to visit us for a refreshing walk along the Brandywine. We're finishing up several maintenance projects in the museum, so please check our website for March reopening dates.

We have an exciting year ahead with the return of our Hagley 5K in April (with a new 1K Fun Run for families), Fireworks at Hagley, Family Field Trips, family-friendly happy hours, and (finally!) the opening of our "Nation of Inventors" exhibition. Mark your calendars now for the return of Hagley Summer Camp in July and August! The museum property provides the perfect location for an immersive week focusing on Life Long Ago or STEM. While we have dates selected for each of these events, due to COVID, we will confirm them on our website. I'm sure you understand, because for now, this is our reality.

As you know, Hagley's history contains fascinating stories of what it was like to live and work here in the nineteenth century. Hagley and children's book author Ilona E. Holland, Ed.D., have recently published *The Great Explosion, A Powder Mill Chronicle*, that depicts the 1818 explosion in the powder yard from a child's perspective. Though the book is fiction, it is based on one of the du Pont children's personal accounts of the explosion. This richly illustrated book is now available at the Hagley Store.

**We have hope for a brighter 2021.**

This past year has brought into focus the importance of our telling multicultural stories related to business history. We've had the pleasure of interviewing Dr. Wesley Memeger, Jr., for a new series Hagley is producing on Black STEM Pioneers. While the project delves into his pathbreaking work at DuPont, Dr. Memeger is also a noted artist with numerous exhibitions in the Wilmington area. We are honored to be working with Dr. Memeger and Dr. Jeanne Nutter on this long-term project. Our iconic Birkenhead Waterwheel has been restored and will be back in action once the museum reopens. As one of the workers who was installing the restored wheel said, "It's a beauty." I look forward to seeing you on the Hagley property this spring and summer.

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Hagley Magazine welcomes your feedback. Contact Hagley at askhagley@hagley.org.

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# Birkenhead Back in Action

**T**HE **BIRKENHEAD WATERWHEEL**, the Hagley icon that inspired its logo, is running for the first time in a year. It's a new wheel, made from the original drawings and modern materials.

"It's such an important part of our landscape," said John McCoy, who started working at Hagley in 1987. He was curator of mechanical exhibitions until semi-retiring, agreeing to handle the new wheel as his last assignment, after having rebuilt it twice. "And it's been part of me for so long."

The project also includes a gear that will transmit power into the mill, which has been motionless for many years. Free water power was a key reason for the siting of the mill.

The 13,000-pound wheel is mainly white oak, with some stainless steel and southern yellow pine. Galvanized coatings, modern adhesives and treated wood are intended to promote longevity.

Wooden waterwheels generally have a lifespan of ten to fifteen years, with Hagley's abraded by the fast-moving and sediment-laden Brandywine.

The old wheel had been maintained for more than forty years by replacing deteriorated portions as needed, including a complete replacement of all elements excluding the main shaft. But that shaft had failed.

The Lancaster County Timber Frame Company of York, Pennsylvania, needed seven months to craft the wheel, starting by reproducing computer-aided design versions of the original plans, which will be kept for future reference. The company also took out the old wheel.

The 5,000-pound octagonal main shaft is of southern yellow pine and measures over twenty feet long and two feet wide. The original stub shafts, also called gudgeons, were removed from the ends of the deteriorated shaft, re-machined and fitted to the new shaft. This allowed for the original pillow block bronze bearings to be reused. Also added was a 1,500-pound cast iron pinion gear, which will mesh with the existing large bull gear, originally used to transmit power into the mill.

Twenty-four spokes, or arms, support the sixteen-foot diameter rims, which are mortised to receive ninety-six buckets, which one at a time receive the water, causing the wheel to rotate.



- 1) BIRKENHEAD REPAIR WITH OLD WHEEL SHAFT IN THE FOREGROUND
- 2) NEW WHEEL SHAFT IN THE SHOP
- 3) NEW WHEEL IN PLACE

# Family Field Trips at Hagley

**S**TARTING IN APRIL, Hagley is offering another series of Family Field Trips. Composed of elements of our popular school field trip programs, Family Field Trips address history and STEM curriculum standards in a family-oriented approach. Programs are conducted with household units of no more than five or six people. Each program lasts two hours, and participants are invited to make a day of it by arriving early or staying later to experience Hagley's other attractions.

**LIFE IN A POWDER MILL:** Discover what it was like to live and work in a nineteenth-century powder mill. Families will rotate between four engaging activities: Sunday School, Laundry, Gee Haws, and Powderman. During the program, families will write with a quill pen, wash socks, make a nineteenth-century toy, and experience how gunpowder is tested using an eprovette.

**STEM EXPLORATIONS:** Explore a variety of STEM topics and solve engineering challenges together as a family. In four hands-on workshops you can learn about alternative energy and materials science, light and sound waves, chemistry, and forces and motion. Each program includes an age-appropriate science lesson, demonstrations, and materials for completing an engineering design challenge.

**WATER POWER WALKING TOUR:** Build your knowledge of water power and how it was used to operate the many mills along the Brandywine River. Families will see the components of a functioning water power system in action and learn how Hagley used it to manufacture black powder in the nineteenth century. Science concepts explored include gravity; renewable resources; and potential, kinetic, and mechanical energy.



KERRY HARRISON PHOTOGRAPHY

[WWW.HAGLEY.ORG/FAMILY-FIELD-TRIPS](http://WWW.HAGLEY.ORG/FAMILY-FIELD-TRIPS)



# Congratulations!

Hagley congratulates the winners of Hagley's Third Annual Gingerbread House Contest! The theme this year was Hometown Heroes. (Winners are shown top to bottom on the left)

Adult/Family: **Wample Family**

Youth: **Alex & Henrik Jacobson**

People's Choice Adult/Family: **Schatz Family**

People's Choice Youth: **Rebecca Mack-Weber**

Winners received a \$100 Amazon gift card and a Hagley membership.

Thank you to all the participants for their wonderful entries and thank you to Hometown Heroes for keeping us safe!





# 1K Fun Run Added to Hagley 5K



FANTAIL PHOTOGRAPHY



**A**FTER BEING SIDELINED BY COVID-19 in 2020, Hagley's 5K Run/Walk Along the Brandywine is back on April 24. New this year is a 1K Fun Run for families. This shorter loop is on the upper property and is open to everyone although it is ideal for younger runners 5 years old and above. The 5K course starts near the barn on the upper property and takes participants through the lower property, past the mills and returns to the du Pont residence.

Check-in starts at 7:30 a.m., with the 5K beginning at 8:30 a.m. The 1K will start an hour later at 9:30 a.m. Awards will be given to overall winners and age category winners following the conclusion of both runs. If the current pandemic makes it difficult to run the 5K/1K in person, the event will be converted to virtual races. Decisions will be made by early April, and further instructions will be given at that time.

To register, visit [hagley.org/5k2021](http://hagley.org/5k2021)

and you'll be redirected to Hagley's page on

[runsignup.com](http://runsignup.com). Get your friends and colleagues together to form community or corporate teams. Proceeds from the 5K will go to the Hagley Scholarship Fund, which enables underserved students to participate in field trips to Hagley. For every \$7.50 raised, one student gets to enjoy one of the school programs offered on site. Since the first 5K in 2018, participants have raised nearly \$3,100, which supported 412 students. This year's goal is to raise more than \$2,000 for scholarships.

## HAGLEY'S 5K ALONG THE BRANDYWINE

SATURDAY, APRIL 24 • 7:30 A.M. - CHECK-IN  
8:30 A.M. - 5K • 9:30 A.M. - 1K FUN RUN  
\$20 BEFORE APRIL 3 • \$25 AFTER APRIL 4 • \$10 FOR 1K  
REGISTER AT [HAGLEY.ORG/5K2021](http://HAGLEY.ORG/5K2021)  
USE HAGLEY'S BUCK ROAD ENTRANCE



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# Happy Hours for the Whole Family

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**T**HE BEAUTY OF HAGLEY in the springtime is showcased in a new series of family-friendly happy hours held behind the E.I. du Pont Barn. Each Thursday evening in May, a food truck will be on hand as well as a local brewery to purchase food and drink. While enjoying the sounds of local bands, visitors will be encouraged to explore the area around the Eleutherian Mills Residence and Garden. Activities for children of all ages will be included. Please check [www.hagley.org/happyhour](http://www.hagley.org/happyhour) for additional information and to make a reservation after March 15. Admission is \$5 for non-members, free for Hagley members.

## HAGLEY FAMILY HAPPY HOURS

THURSDAYS IN MAY • 5 TO 7:30 P.M.  
BEHIND THE E. I. DU PONT BARN  
USE BUCK ROAD ENTRANCE  
FREE FOR HAGLEY MEMBERS, \$5 FOR NON-MEMBERS  
[HAGLEY.ORG/HAPPYHOUR](http://HAGLEY.ORG/HAPPYHOUR)





# Summer Camps at Hagley

**T**HIS YEAR, TWO WEEKS OF SUMMER CAMP provide families with science and history offerings for campers ages 7-12. The themes are Life Long Ago and STEM. The July 12-16 camp week features STEM Camp for ages 7-9 and Life Long Ago for ages 10-12. The August 2-6 camp week features Life Long Ago for ages 7-9 and STEM Camp for ages 10-12. Camp registration is at [www.hagley.org/camp](http://www.hagley.org/camp).

Life Long Ago Camp immerses campers into life in a nineteenth-century black powder factory and workers' village. Each day campers explore different activities common during the 1800s, such as gardening, cooking, making toys, and dancing. Campers also participate in tasks specific to a powder factory, like firing off charges of powder, making barrels, and constructing waterwheels. The camp week culminates in a carnival when campers can share what they have learned with their families.

During STEM Camp, campers investigate scientific and engineering concepts and complete hands-on challenges. Each camp day will focus on a

different topic in science and include subjects in life science, physical science, coding, and engineering. At a Science Expo at the end of the week, campers can show off their projects and favorite demonstrations for their families.

Hagley incorporates Delaware COVID guidelines into the summer camps. Camp groups will be small, with masking and sanitizing procedures in place. Camps are staffed by adult camp instructors and teenage camp counselors. Teens interested in volunteering can sign up to be counselors at [hagley.org/volunteer](http://hagley.org/volunteer). Training is provided.

## HAGLEY SUMMER CAMPS

JULY 12-16 • STEM CAMP (AGES 7-9), LIFE LONG AGO CAMP (AGES 10-12)  
AUGUST 2-6 • LIFE LONG AGO CAMP (AGES 7-9) • STEM CAMP (AGES 10-12)  
9 A.M. TO 4 P.M.

HAGLEY MEMBERS: \$250 • NON-MEMBERS: \$330

MULTI-CAMP DISCOUNT AVAILABLE

INFO/REGISTRATION AT [WWW.HAGLEY.ORG/CAMP](http://WWW.HAGLEY.ORG/CAMP)



# Videos Capture Invention

**V**IDEOS MADE AT HAGLEY in November will be an interactive component of the “Nation of Inventors” exhibition, which opens to the public this fall. “How Invention Happens” explores three ways that invention can come about: by accident, by solving a problem, and through improvement. Viewers will be transported into the lives of three nineteenth-century inventors in the videos by the Glass Entertainment Group.

Charles Goodyear, inventor of vulcanized rubber, came about the process by accident. Elijah McCoy, a Black railroad worker, came up with an ingenious solution to the laborious action of lubricating locomotives. And Mary Potts, a 19-year old woman, created and marketed an immensely improved iron.

The First Office, Gibbons House, Steam Engine, Machine Shop, and the railroad tracks were transformed into environments where Goodyear, McCoy, and Potts lived, worked, and innovated.



1) AN ACTOR PORTRAYING CHARLES GOODYEAR IS READY FOR “ACTION!”

2) A DRAMATIC SUNSET SHOT OF MCCOY AND EXTRAS ON HAGLEY’S RAILROAD TRACKS.

3) THE EXTERIOR OF THE FIRST OFFICE IS TRANSFORMED INTO A GENERAL STORE.

4) CHRIS CORBIN, HAGLEY’S MECHANICAL EXHIBITS SUPERVISOR, SHOVELS COAL FOR AN ELIJAH MCCOY SCENE.



# Air-Gas Machine Patent Models

by Chris Cascio, assistant curator, patent models

**O**F THE HUNDRED OR SO PATENT MODELS I have cataloged, the most common type I encounter are carbureting or “air-gas machines.” What’s an air-gas machine and why were so many inventors submitting them for patents? Like many inventions, its genesis lies at that intersection of a public need, potential for profit, and making something out of some useless stuff just lying around.

For centuries, folks depended upon lamps and candles for illumination. These methods were dim, unreliable, and dangerous. As the industrial economy spurred the growth of factories and concentrated the population into cities, the need for artificial light skyrocketed. With such a demand, and big contracts to supply lighting to entire cities, inventors competed to find a better solution.

The original solution was gas (the kind you cook with.) Factories called “gas works” burned coal in enclosed ovens to create “coal gas” or “town gas.” This illuminating gas was piped into street lamps and lighting devices in homes and businesses.

But building gas works and laying all the piping was slow and expensive. Highly-populated areas, business and shopping districts, and affluent neighborhoods were the first to receive gas service. What about working class neighborhoods, side streets, and rural areas outside the big cities? Inventors explored how to make gas cheaply in one stand-alone machine—sort of like a gas generator.

The first obstacle was finding a fuel source. Inventors could not scale down the process of burning coal to produce gas. They began experimenting with new and inexpensive alternatives.

THIS PATENT MODEL FOR AN AIR-GAS MACHINE HAS A SUPPLY VALVE FOR AIR, AN OUTLET VALVE FOR THE ILLUMINATING GAS ON THE TOP AND VALVES FOR FILLING AND DRAINING THE NAPHTHA AT SIDE AND BOTTOM. A CLEAR GLASS PANEL AT THE TOP ALLOWS THE VIEWER TO SEE THE ROTATING GLOBES IN ACTION.

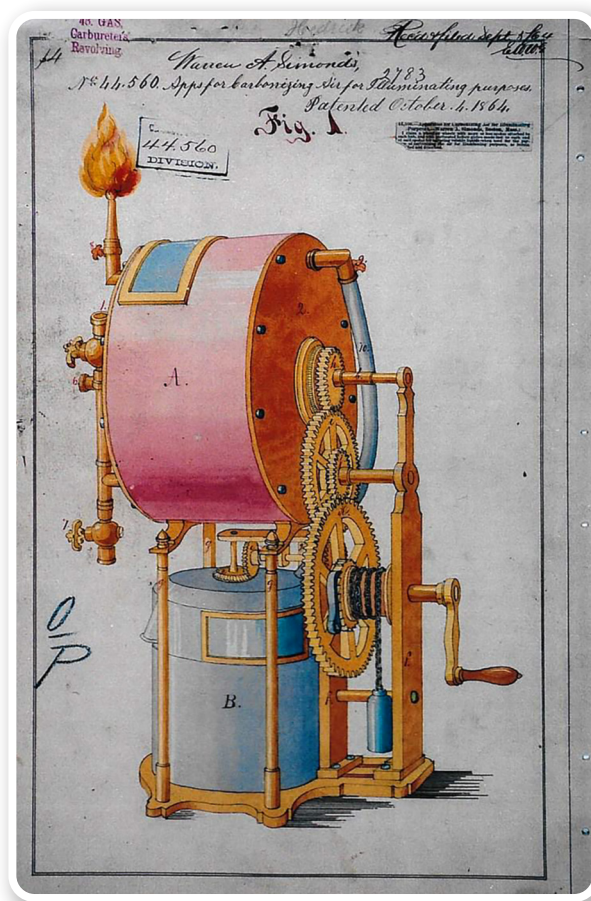


By the 1860s, kerosene derived from oil recently discovered in Pennsylvania became widely used as a fuel for lamps and lanterns. But there were other distillates from the process of making kerosene for which no one could find a use. Two of these were naphtha and gasoline. If kerosene produced light, what about gasoline or naphtha?

This is where air-gas machines enter our story. Inventors discovered that if volatile liquids like naphtha or gasoline were mixed with air, the result was an illuminating gas. By the 1870s, more than a hundred companies in America were working on bringing this process to the marketplace. The resulting technology provided artificial lighting for streets, buildings, and even some homes until electricity became widely available.

Of the handful of machines I cataloged, two stand out. They were submitted a year apart by Boston inventor Warren A. Simonds, and they are beautiful machines! One used rotating pierced metal globes to spray naphtha in the air. The other used tiny buckets attached to a rotating conveyor belt. Simonds must have believed his process would be highly profitable as he spared no expense in producing two attractive and elaborate models.

IN THIS LESS ELABORATE MODEL FOR AN AIR-GAS MACHINE, THE MECHANISM FOR AERATING THE NAPHTHA INSIDE THE TANK IS NOT VISIBLE, BUT THE MODEL IS STILL AN ATTRACTIVE, DETAILED, AND COSTLY ILLUSTRATION OF THE INVENTION.



THIS COLORFUL AND DRAMATIC ILLUSTRATION SHOWS THE MACHINE ON THE PREVIOUS PAGE AT WORK.

LEARN MORE BEGINNING THIS FALL IN THE “NATION OF INVENTORS” EXHIBITION!  
[HAGLEY.ORG/INVENTORS](http://HAGLEY.ORG/INVENTORS)

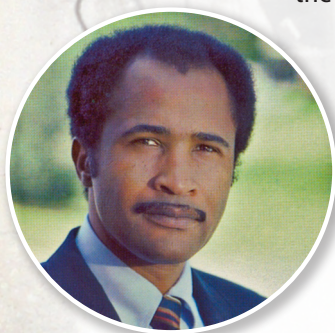


# Science Pioneer Shares Career Highlights

**D**ELAWARE HUMANITIES HAS AWARDED HAGLEY \$3,000 to support a video oral history and digital exhibition project on the work and art of Dr. Wesley Memeger, Jr. Memeger is one of the earliest African Americans with a doctorate in the sciences (organic chemistry) to work at the DuPont Company, starting his career at DuPont's Pioneering Research Laboratory in 1964 and working there continuously until his retirement in 1997. He helped DuPont advance Stephanie Kwolek's creation of Kevlar by developing a chemistry that could be scaled to industrial production, shaping a career in which he earned fourteen patents. In his art, Memeger explored geometries that resemble molecular structures. He and his wife Harriet, a fiber artist, have exhibited their work in local institutions.

Memeger was born into a family of farmers in Florida, and his interest in science was sparked in the eighth grade. He credits much of his success as a scientist to his two African American chemistry professors at Clark College, a historically Black institution. He speaks candidly about the challenges of being a Black pioneer in the sciences during the civil rights era. His reflections on his remarkable career are the first of what Hagley hopes will be a number of oral history interviews with Black pioneers in the STEM professions (science, technology, engineering, mathematics) in the Delaware area. As these stories are collected, they will be added to Hagley's website.

The envisioned Black STEM Pioneers oral history project marks a reunion for Hagley and Dr. Jeanne Nutter, professor of media communications at Bloomfield College and an award-winning oral historian who worked with Hagley in the late 1990s to produce *A Separate Place: The Schools that P. S. du Pont Built*. Nutter will undertake the research and interviews and lead the production of programs involving the new oral histories.



IMAGES OF DR. WESLEY MEMEGER, JR., COURTESY OF WESLEY AND HARRIET MEMEGER

THIS PROGRAM IS PARTIALLY FUNDED BY A GRANT FROM DELAWARE HUMANITIES, A STATE PROGRAM OF THE NATIONAL ENDOWMENT FOR THE HUMANITIES.

DELAWARE  
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# For Enjoying the Outdoors

**NATURE ALL AROUND: BUGS** - \$17.99/\$16.19 members

A beautifully illustrated introduction to bugs is sure to encourage the naturalist in every child. It covers body parts, life cycles and habitats, and it teaches how to tell them apart from common insect impostors like spiders. This book has strong STEAM curriculum applications covering life science and earth science. Other books in the *Nature All Around* series are also available.



**GEMSTONES SIDEWALK CHALK** - \$16.00/\$14.40 members

Diamonds, ovals, and emeralds ... oh, my! Have your little ones be the envy of the playground with these handmade chalk gemstones. Set includes twelve pieces, with two of each color. All chinks are non-toxic with biodegradable and recyclable packaging.



**SEED CARDS** - \$5.00/\$4.50 members

Give or send a card that lives beyond the initial greeting. These greeting cards feature lovely pen and watercolor drawings and are printed on plantable post-consumer paper, which is embedded with wildflower seeds. To plant the paper, cover with soil in full to partial sun and keep moist until the seeds establish. An assortment of greeting card styles are available.



**SERVING BOWLS AND SALAD SPOONS** - \$12.00-\$48.00/\$10.80-\$43.20 members

Made from sustainable mango wood and featuring floral decals, these bowls and salad servers are perfect for entertaining. Add a splash of color to your dining table with bowls in three sizes, ranging from 4"-10".



**SMALL WORLD WATER BOTTLE** - \$30.00/\$27.00 members

Ditch single-use plastic water bottles for this whimsical stainless steel bottle instead. Featuring flora and fauna of the natural world, this double-walled stainless steel bottle keeps liquids hot for 12 hours and cold for 24 hours.



CHECK HAGLEY.ORG FOR STORE HOURS OR SHOP ONLINE AT STORE.HAGLEY.ORG





FANTAIL PHOTOGRAPHY

**T**HANKS TO OUR 2020 CORPORATE PARTNERS!  
 We look forward to your continued support in 2021. It is with their support that Hagley is able to offer events such as Hagley's 5K Along the Brandywine, Science Saturdays, Bike & Hike & Brews, Walking Tours, and more. Visit [hagley.org](http://hagley.org) for the current events schedule.

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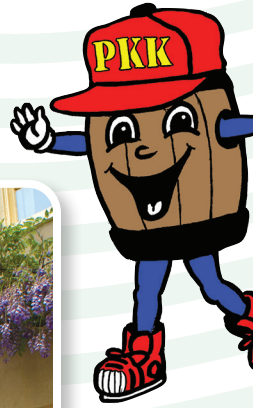
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**SPOT THE DIFFERENCES** — The Powder Keg Kid has a spot-the-differences challenge for you! Can you find ten differences in the photos below? Answers are at the bottom of the page.



**SEARCH-A-WORD** — Spring at Hagley rivals fall as the most colorful time of year! Find the names of the various flowers and trees that you might see at Hagley in the spring.

**WORD LIST**

- BLUEBELL
- BLUE STAR
- BUTTERCUP
- CHERRY BLOSSOM
- DOGWOOD
- DUPONT BUCKEYE
- EASTERN BEE BALM
- GLORY OF THE SNOW
- KENILWORTH IVY
- LILAC
- POPPY
- REDBUD
- STAR FLOWER
- SUNFLOWER
- TRILLIUM
- TULIP
- VIOLET
- YELLOW YARROW

L C R Y S I Q D W O R R A Y W O L L E Y K O P M M  
 I Z H R J Q H U T L B S N T F V T L B E O U D L Q  
 E I W E U A H P O K A L R Q V K N U N A C Y A E Z  
 V I C W R I T O X K A I U S W C U I L R Y B J G G  
 U M I O E R W N V D L R P E R S L O E I E Y E W N  
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 F U N C L A N Y J V C Y O S U N F L O W E R E L E  
 B R M J C H K E Y F V R A M W K Q C G T S N V J S  
 E T G L O R Y O F T H E S N O W A P O P P Y M T T  
 P H U A D O L Y D T R H I R U L P O V C R Q T S A  
 Q P R Y C W E V P C J U J A I F U F M C S A R P R  
 U G W G F B J H U M Z Z I L G R I I M Z L Y Y D

**PHOTO PUZZLE ANSWERS:** 1) CANDLE IS MISSING 2) RIGHT BENCH BACK IS DIFFERENT 3) SHUTTER HINGE IS MISSING 4) SIGN BELOW KNOCKER IS MISSING 5) DOORBELL IS MISSING 6) LEFT LAMP POST BASE IS DIFFERENT 7) LEFT BENCH IS MISSING 8) MIDDLE PANEL OF DOOR FRAME IS MISSING 9) DOORMAT PETALES ARE MISSING 10) LEFT SHUTTER IS DIFFERENT





# Hagley

MAGAZINE

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