AMADOR SAWMILL & MINING ASSOCIATION

PO BOX 1062, PLYMOUTH, CA 95669 ♦ PH 209.245.3448 ♦ FAX 209.245.5097
EMAIL: INFO@AMADORSAWMILL.ORG ♦ WEBSITE: WWW.AMADORSAWMILL.ORG
A 501(C)3 TAX EXEMPT NON-PROFIT CALIFORNIA CORPORATION

Fall, 2010
Volume 10, Issue 1

Where Was Steam When We Really Needed It?

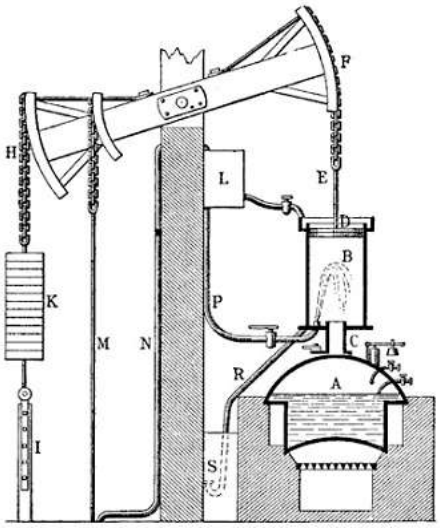
By Tom Innes

Hero or Heron of Alexandria lived during the first century AD. He was a member of a group of fairly literate engineers in Alexandria. He described what was called an aeolipile, a rotating ball driven by two steam jets. As you can imagine, there was little practical use for a device such as this except for demonstrating the ability of steam doing something interesting.

From then through the 17th century, many ideas using steam to perform various functions were tried and many found wanting. Many of these devices used steam to pump water by condensing steam inside a primitive boiler, causing a partial vacuum, that would draw water. By alternately opening and closing valves, the process could be repeated. It was soon discovered, however, that the maximum lift of water was about 30 feet.

There was a great interest in pumping water, particularly in coal mines in England. Some mines had upwards of 500 horses to mechanically pump the water. Edward Somerset built several water pumps using the principle of condensing steam to form a partial vacuum. He added cooling around the steam containers forcing the steam to condense. Water could be lifted by the resulting suction. Valves were needed to control the water and steam. This was done by manual labor.

Thomas Savery, in 1698 improved on this device by spraying cold water directly inside the chamber or container. Note, however, this was still limited to a 30 foot water lift. There were designs that stacked the boilers but a fear of an explosion convinced many mine owners that this wasn't too practical. So far, none of these devices could provide motion that would be useful to operate a mechanical pump. Valves controlling the steam and water were done by hand so there was a lot of coordination and effort.



Around 1705, Thomas Newcomen built what he called an atmospheric engine. Here he used a cylinder and a piston. Once you have a piston, connection to additional mechanical devices can be made. In this case, steam was introduced into the cylinder when the piston was at the top of the cylinder. The steam pressure only needed to be slightly above the atmospheric pressure. There was no worry about high pressure steam. The cylinder was open at the top so the piston saw atmospheric pressure. Cold water was sprayed into the cylinder condensing the steam and the atmospheric pressure pushed the piston down, creating mechanical work. This was a slow process. The hot cylinder was cooled by water each stroke and had to be reheated.

Using a walking beam, the linear motion was able to be used in a variety of applications. Now, water could be lifted to greater heights than that possible with the suction pump. The first Newcomen pump was installed in 1712. Newcomen had this engine patented and the patent lasted until 1733. There were about 100 engines installed when the patent expired.

Similar to the Savery device, there was a lot of motion opening and closing valves. Shortly after the first installation, an automatic system was developed to open and close the valves. The operator only needed to watch

Inside This Issue:

the fire.

Refined Newcomen engines developed up to 60 horsepower. Cylinder diameters were on the order of six feet. A crank system was added in the 1770s. By this time about 600 engines had been installed. At the end of the 18th century, around 1000 engines were in operation in England. They found wide application at the mines but also in mills and factories.

The industrial revolution started during the 18th century. So prime power sources were in demand. As it is today, more power was desired.

So watt's next? ♦

Bells in the Bat-Free (A Semi-serious Article)

By Ken McCoy

There has always been a need for the various sections of the mill to communicate. That is, the sawyer might need to tell the engineer that he needs more power. In the past this was accomplished with hand signs, since verbal communication was not possible. These gestures were quite remarkable in their simplicity; a single one hand sign conveying the message: Excuse me my good fellow, but your puny machine does not meet the needs of my saw. To this the engineer might reply, with an equally elegant hand signal: I understand your concern, but the rotating machinery will not feel very nice when it is placed.....well you get the idea.

To solve this problem, the mill is now equipped with a bell system. A single bell is located in the engine room and will be operated by three independent pull cords. One is at the sawyer's position, one by the engineer and the last by the fireman.

The bell is solid brass and was purchased by Bill from an old line company on the east coast. Installation was accomplished by Dick Hansen and the operating system was designed and installed by the firm of Bishop and McCoy.

At the time of the fair, a signal cord had not been extended to the boiler room as the permanent structure has not been completed. It might also be argued there is really no need for the boiler room to communicate. All they need to do is produce steam on demand and any really important message from that region usually consists of a large bang, no bell required. Stay tuned for further developments.

Now for a small contest:

To the first person who can explain the title of this article.....an extra ration of grog.

To the first person who can explain the origin of the word "grog "an extra ration of rum.

Entries will be accepted at the potluck. Ken and Steve are ineligible to participate.♦

Safety Zone

By Ken McCoy

We have finished another year at the fair and I think it can be scored as a success. Ok, we did have to come back on a Saturday for a "do over" and a formal union grievance has been filed on account of the "Queen Mary" cedar log. But all in all, the audiences were larger and no one was hurt on the job.

The purpose of this short article and ones that will appear in following issues is to review procedures that make the mill as safe as possible for crew and spectators alike.

When we talk about safety at the mill, we generally think only about the crew. However spectators are open to certain risks, especially if they enter the work area.

And while the crew understands and accepts the risks associated with the operation, guests/spectators rely on us to assure their safety.

We are asking crew members to watch for spectators who may be in a hazardous place or position and to help them move to a safe place. We must be especially watchful for those who enter our work zone during operation. Frequently they may know one of the volunteers or as sometimes happens, they know somebody who is a friend of..... ? As a general rule: "Crew Only" inside the ropes whenever steam is up.

We also want to remind all that safety equipment (hard hats, hearing protection etc.) can prevent many injuries, but it is only effective when it is used. Hard hats and ear plugs are provided. We are investigating the cost of personalized hard hats with a mill logo of some type. We hope to have more information at the pot luck.

Speaking of which: what would the crew prefer as a main dish? All suggestions appreciated.♦

President's Report

By Bill Braun

The past year has been another one of progress and achievement by the ASMA volunteers. The biggest news is the successful installation of the boiler adjacent to the sawmill engine room. With a permanent steam supply now available on site, the sawmill is self contained and much easier to prepare for operation.

The boiler was mfg. by Dutton Boiler Works of Kalamazoo, Michigan in May of 1945. It was originally fitted to the Clyde Iron Works steam winch which was the power source for the Port of San Francisco's pile driver #2.

After the ASMA purchased the #2 and #3 pile drivers from S. F. in 2004 the steam equipment was dismantled and transported to Plymouth. The winch from #2 Driver was reassembled with the boiler from #3 Driver to become our Steam Logging Donkey #2. It is currently mounted on a low bed heavy equipment trailer for mobile exhibition.

The original boiler for #2 Driver was extensively corroded externally from its years of service as a pile driver. During 2008 ASMA raised money to have the necessary code repairs done at Bay City Boiler in S. F. The repairs were completed in late 2008. Starting in late 2009 and thru the first half of 2010 the volunteers made plans, raised funds, excavated, poured concrete, hoisted (courtesy of Amador Crane) the boiler into place and piped in the steam and water lines. One change made to the boiler for the sawmill installation was converting the firebox from oil burning to wood burning. That conversion required making wood patterns which were used to cast grates for the fire box. A steel box foundation was fabricated to support the

boiler and provide for an ash pit. A 10 foot high stack was fabricated and fitted with a lifting mechanism so the stack can be rotated out of the way for cleaning the boiler tubes. Again lots of planning and "on the go engineering" went into the construction process. The volunteers donated equipment, labor, expertise, materials and dedication.

The last item on the progress report is the installation of a single cylinder, horizontal, double acting air compressor by Sullivan Mfg. Co. of Claremont, New Hampshire, bore & stroke 10" x 10". The vintage is not known exactly, but the construction details indicate it was mfg. in the 1890 – 1920 time period. It is belt driven from the sawmill line shaft. When the Corliss steam engine is not being used to power the sawmill, the compressor belt is connected to the 12" pulley on the end of the line shaft and the engine restarted to power the compressor. An air receiver will be installed and connected to the compressor in the near future to supply compressed air for other exhibits in the area. The compressor was overhauled in the shop over the 2009-2010 winter season and is on loan from Jay C. Springer.

Our 2010 Amador Fair has been good with lots of camaraderie with the public welcoming our efforts with enthusiasm. Thank you volunteers and see you at the November 6 sawmill day and appreciation dinner.♦

Mill crew cutting a 24" Ponderosa Pine log at the Amador County Fair, July 30, 2010.

Rob Bobrow working the lumber tailoff line.

L to R: Richard Hansen, Dave Bibby, Bill Braun, Jim Headd, John Tower.

L to R: Frank Tower, John Tower, Richard Hansen, Bill Braun, Tom Innes, Ken McCoy, Steve Bishop.

Jim Headd trimming first cut of the "Queen Mary" cedar log.

AMADOR SAWMILL & MINING ASSOCIATION

Upcoming Events:

DATE	TIME	EVENT
NOV 06, 2010	Sawmill event 11:00am to 2:00pm Cleanup 2:00pm to 3:00pm Board of Directors meeting 3:00pm to 4:00pm Dinner 4:00pm to 7:00pm followed by cleanup.	SAWMILL DAY AND APPRECIATION DINNER. Where: Amador Fairgrounds, Spur building. This event is held for all volunteers/families and invited guests. The main dish will be cooked by Ken. Please bring salads and desserts. RSVP Ken how many are attending, your suggestion for a main dish, and what you will bring: (209) 245-3448 or email: info@amadorsawmill.org .

Photos Courtesy: Page 3, 4, 6: Barbara Kreiss. Page 4, 5: Alan Langmuir.
Contributing Editors: Tom Innes, Bill Braun, Ken McCoy. Production: Barbara Kreiss.

Amador Sawmill & Mining Assoc.
PO BOX 1062, PLYMOUTH, CA 95669
PH 209.245.3448 ♦ FAX 209.245.5097
EMAIL: INFO@AMADORSAWMILL.ORG
WEBSITE: WWW.AMADORSAWMILL.ORG
A 501(C)3 TAX EXEMPT NON-PROFIT CA CORP

AMADOR COUNTY SAWMILL HISTORY:
ALIVE AND WELL FOR THE FUTURE.