A solar heat powered system has at least one solar collector and a feed line for solar fluid leading away from the solar collector. The feed line is divided into at least two partial lines in sections. There is at least one heat exchanger arranged in each partial line. By dividing the feed line for the solar fluid, the plurality of heat exchangers can each be embodied to be more compact.
SOLAR HEAT POWERED SYSTEM
COMPRISING AT LEAST ONE SOLAR
COLLECTOR

CROSS REFERENCE TO RELATED
APPLICATIONS

[0001] Applicants claim priority under 35 U.S.C. §119 of
German Application No. 20 2008 007 796.6 filed Jun. 11,
2008.

BACKGROUND OF THE INVENTION

[0002] The invention relates to a solar heat powered system
comprising at least one solar collector, to which lines for a
solar fluid are connected.

[0003] Solar heat powered systems are used to heat second-
ary heat carriers (heating circuit water, potable water, cooling
brine). A solar fluid is heated for this purpose in thermal solar
collectors. The heated solar fluid is brought into operative
heat-transfering connection with the secondary heat carrier
via lines in heat exchangers so as to heat the secondary heat
carrier.

[0004] Due to the increasing costs for primary energy, solar
collector fields are designed to be increasingly larger. Solar
collector surfaces leading to a large volume of solar fluid, which
is heated in midsummer, is available in particular for
industrial users. To be able to process these large volumes of
solar fluid, accordingly large heat exchangers are required
within or outside of accordingly dimensioned accumulators.
The size can lead to space problems. Components, such as
pumps and the like, which are required, in the heat exchangers
or in the area of accumulators, must furthermore likewise be
embodied to be increasingly larger.

SUMMARY OF THE INVENTION

[0005] The invention is based on the object of specifying a
solar heat powered system of the afore-mentioned species,
which can also be used for expanded solar collector fields
using justifiable efforts and costs.

[0006] This object is solved according to the invention in
that the feed line for the solar fluid leading away from the
solar collector is divided into at least two partial lines in
sections and in that at least one heat exchanger is arranged in
each partial line.

[0007] With the solar heat powered system according to
the invention, provision is not made for a heat exchanger, which
would have to be embodied in each case to be larger in
response to a larger volume of solar fluid, but a division into
a plurality of heat exchangers takes place. The plurality of
heat exchangers is arranged in partial lines, which are differ-
ent from one another and which are designed like a cascade.
The partial lines run parallel to one another so that the solar
fluid is in each case only guided through one heat exchanger.
The heat exchangers can thereby be arranged within an accu-
mulator or can also be arranged outside of an accumulator.
A secondary heat carrier is then supplied to said heat exchangers
from the accumulator via corresponding lines.

[0008] By dividing the feed line for the solar fluid, the
plurality of heat exchangers can each be embodied to be more
compact. Standard heat exchangers, which are arranged in a
modular manner depending on the requirements, can be used.
Standard heat exchangers are available quickly; advanta-
geously, a respective special custom production for a certain
solar heat powered system is not necessary. The same parts
provide for a minimized storage.

[0009] According to a first development of the invention,
provision is made for the line lengths from the division point
of the feed line to each heat exchanger to be approximately
the same. In so doing, a piping according to “Tichelmann”
takes place, which provides for an equal energetic yield of the
solar fluid, which is fed to the heat exchangers.

[0010] The solar heat powered system according to the
invention can be used for a potable water network, a heating
water network or for a combination of these two networks.
When the heat exchangers are removed from the accumula-
tors and when they are arranged in so-called transfer stations,
in which control units are still present, an inexpensive mass
storage can then be used for the respective secondary heat
carrier.

[0011] Pumps comprising alert outlets are inserted into the
lines for the solar fluid according to a development of the
invention, preferably in the area of the transfer stations.
High-efficiency pumps are preferably used. If these pumps have
an alert outlet, they can display an occurring malfunction. When
a flow is made possible in a partial line, for example, through
functional pumps, this flow of the solar fluid through a defec-
tive pump can have come to a standstill in a parallel partial
line. The solar fluid would then stagnate in this partial line.
A pump is regularly used for the solar fluid and a pump is used
for the secondary heat carrier in response to an external heat
exchanger. Both pumps preferably encompass alert outlets so
that the functionally reliable operation of the solar heat pow-
ered system can also be monitored remotely.

[0012] Preferably, the heat exchangers are arranged in a
vertical orientation of their media flow ducts. This arrange-
mant has proven to be advantageous for an optimal transfer of
the heat.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] An exemplary embodiment of the invention, which
results in further inventive features, is illustrated in the draw-
ing.

[0014] FIG. 1 shows a diagrammatic perspective view of a
solar heat powered system according to the invention and
FIG. 2 shows a side view of components of the solar heat
powered system according to FIG. 1.

DETAILED DESCRIPTION OF THE
EMBODIMENTS

[0016] The solar heat powered system in FIG. 1 encompasses
solar collectors 1, which are arranged on a roof, for
example. A solar fluid is guided to heat transfer stations 3 via
lines 2. A heat exchanger 4 is arranged in each heat transfer
station 3. The solar fluid is conveyed by a pump 5; it flows
through the heat exchanger 4 and back again to the solar
collector 1 via the line 2.

[0017] The solar heat powered system furthermore encom-
passes an accumulator 6. A secondary heat carrier is guided
out of this accumulator 6 to the heat transfer stations 3 via
lines 7 and is likewise guided through the heat exchanger 4 by
means of pumps 8.

[0018] Provision is made according to the invention for the
line 2 from the solar collectors 1 to the heat exchangers 4 to be
divided into two partial lines 9. Both heat exchangers 4 are
arranged parallel to one another; standardized heat transfer
stations 3 can be used thereby. The line 7 for the industrial
water is necessarily also divided into partial lines 10.

[0019] The heat transfer stations 3 are once again illustrated
in FIG. 2. The piping within the heat transfer stations 3 can be
seen; the solar fluid of the solar heat powered system is
introduced into the heat exchanger 4 at the primary side from below via the partial lines 2, while the secondary heat carrier is in each case introduced into the heat exchanger 4 at the secondary side via the partial lines 7.

What is claimed is:
1. A solar heat powered system comprising:
   at least one solar collector;
   a feed line for solar fluid leading away from the solar collector, said feed line being divided into at least two partial lines in sections; and
   at least one heat exchanger arranged in each partial line.

2. The solar heat powered system according to claim 1, wherein the heat exchangers are connected in a water-conductive manner to a potable water network at a secondary side.

3. The solar heat powered system according to claim 1, wherein the heat exchangers are arranged in a vertical orientation of their media flow ducts.

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