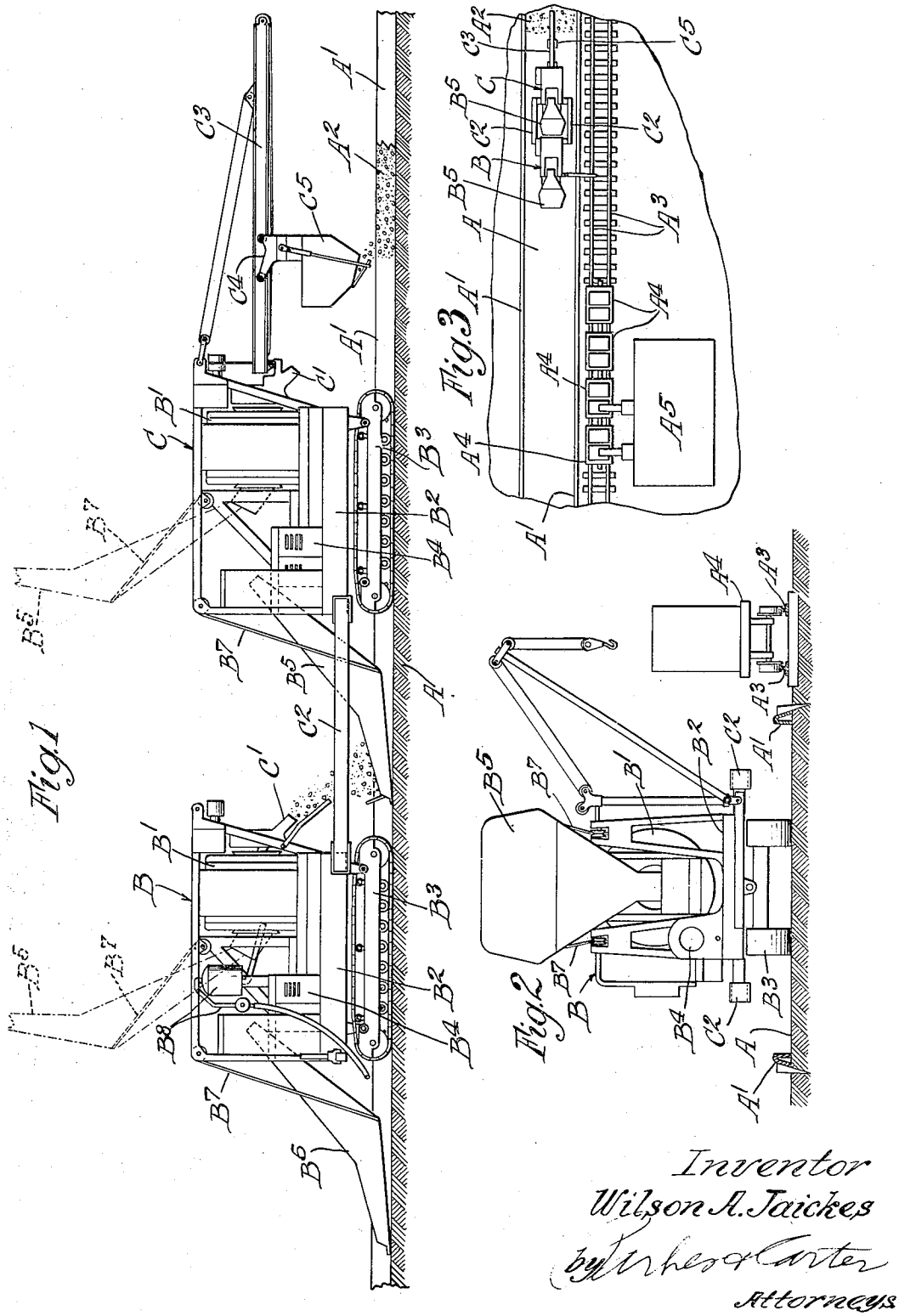
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PROCESS OF MIXING CONCRETE

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PROCESS OF MIXING CONCRETE

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My invention relates to apparatus for and process of mixing concrete. One object of my invention is to increase the amount of concrete that can be mixed in a given time without increasing the number of men working on the job. Another object of my invention is to so assemble a plurality of separate and normally independent concrete mixers in such a relation that with a minimum increase in labor, a relatively great increase in output may be obtained. Other objects will appear from time to time in the specification.

My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is a side elevation of my invention;

Figure 2 is an end elevation with the skip in the raised position; and

Figure 3 is a diagrammatic top plan view.

Like parts are indicated by like characters throughout the specification and drawings.

For the purpose of illustration I have shown my invention applied to two conventional concrete mixers tied together in a fixed and permanent relation whereby my invention may be carried out. Clearly different types of mixers might be used, or a special design of mixer might be worked out which would embody my invention. In general it will be understood that road commissions and the like, in connection with contracts for concrete roads, specify and adhere very rigidly to the time during which the concrete must be mixed before it goes on the road. For instance in the State of Illinois concrete must be mixed one minute. This means that if the mixer is entirely charged and is started up and come to speed, it must be allowed to run one minute before any more concrete can be put on the road. Meanwhile the whole crew is waiting for the machine to work. The machines are relatively large and bulky as they are, and they ordinarily extend clear across the entire width of pavement being poured, and the crew can do nothing else except operate the paving or mixing machine.

I have discovered that if I take two of the conventional types of paving machines, arrange them in tandem, tie them rigidly together by pins or stringers so that their relation remains permanent, I can greatly increase the amount of yardage that can be mixed and poured. This is done by assembling, either at a measuring station removed from the mixer or in the skip of the mixer, a predetermined proper batch of cement, sand and gravel. Then this batch is raised by the skip and discharged into the mixing drum, water being at that time added in the proper amount for the final mix. This batch is then mixed for a little more or a little less than half the time required. Then the contents of the mixing drum are discharged into the skip of the second drum, the contents flowing freely by gravity from the discharge of the first drum to the skip of the second, which skip is held in place to receive the entire contents of the first drum by the tying together of the supporting members of the two paving machines. As soon as the entire contents of the first drum has been discharged into the skip of the second and brought to rest as a batch, that batch of partially mixed concrete is, by the skip, raised and discharged into the second drum where, without the addition of any more material of any kind whatever, it is mixed a sufficient length of time such that when added to the time of mixing in the first drum will give the total mixing time required by the contract.

In one practical instance where this process has been carried out, I prefer to mix the charge in the first paver for 26 seconds and in the second paver for 34 seconds, making a total mixing time of one minute. This does not take into consideration the mixing effect resulting from the discharge of the batch from the first mixer, its flowing or falling by gravity to the skip of the second, its being arrested there violently as it impinges upon the skip, its being poured by the skip into second mixer. It is well known that pouring and arresting material of a fluid character promotes mixing, and in fact test beams show that beams made from concrete mixed by my process are stronger than beams mixed by

the conventional method, thus indicating that the transfer from one mixer to the next one is additionally useful in promoting better mixing.

Experience shows that by my method I can turn out from 65 to 70 batches of one minute mix concrete per hour, as compared with a usual output of 45 to 50 batches of one minute mix, in a single paver. Experience also shows that this can be done by simply adding one operator to the regular crew, and this addition of one operator and one paver increases the daily concrete production more than forty percent. In view of the fact that road contracts are usually let on a time basis and that the season is short, it will be at once apparent that this very great increase in output, with a very slight increase in labor, is much more than enough to compensate for the increased machinery cost.

A indicates the sub-grade upon which a road is to be laid. A^1 the forms on both sides of the road between which the concrete is to be poured. A^2 the concrete which has already been deposited and is subsequently to be treated by means forming no part of my present invention, to bring it to proper grade and level and smooth it over and make the road. A^3 are the tracks of an industrial railroad. A^4 dump cars adapted to travel along the track, each car preferably containing a premeasured batch of dry aggregate, measured out and fed to the car by the measuring means indicated diagrammatically at A^5. The cars are moved from the measuring means to the mixing means by any suitable means not indicated, and it will be understood that these cars might be used for conveying unmeasured aggregate materials which might be measured in the mixing zone if desired.

B is the first mixer which comprises a mixing drum B^1, a supporting platform B^2 carried preferably on a track laying supporting truck B^3. B^4 is an engine which may be used to operate the track laying truck to move the mixer along the ground and may also be used to rotate the drum. B^5 is a skip adapted in one position to rest on the ground and receive materials from the industrial railroad, or materials fed to it in any desired way. B^7 is a hoist controlled by the engine for raising the skip to a point above the drum and causing the contents thereof to flow, by gravity, into the mixing drum. B^8 is a water supply adapted to feed the proper amount of water to the mix as it is discharged into the drum. It will be noted that this mixer is almost as wide as the road. There is no room for another mixer alongside of it.

C is the second mixer. In detail it is the same as the first one and the indicating characters applied to it are equally applicable to this as to the first mixer B. It will be noted, however, that there are no means for supplying water to the second mixer. The entire amount of water is fed to the mix as it goes into the first mixer. C^1 is an unloading chute associated with the first mixer B. It will be noted that this unloading chute is spotted over the skip of the second mixer so that material from the first mixer is discharged from the first mixer and falls freely, under the influence of gravity, into the skip of the second mixer, which skip may be manipulated, when filled with the partially mixed batch from the first mixer, to discharge this partially mixed batch into the second. C^2 C^2 are tie rods joining the trucks of the two mixers together so as to maintain them in fixed relation, and especially so as to insure that the skip of the second mixer will always be spotted beneath the discharge from the first and thereby wastage and spilling of material will not take place. C^3 is a crane arm associated with the second mixer and the carriage C^4 travels along it. The arm is free to swing back and forth in a horizontal plane above the road. A bucket C^5 is supported on the carriage C^4. This bucket is adapted to be spotted beneath the discharge chute of the second mixer and to be then run out along the crane arm to drop its load in any suitable point on the road, thereby making it unnecessary to move the mixers for every batch that is mixed.

While I have shown in my drawings and described in the specifications a structure having but two mixing drums or zones with an intermediate or receiving or storage zone or means between them, it will be obvious that under some circumstances the mixing might be done in more than two steps, and if that were the case my claims would apply to any two of said mixing steps or zones with their intermediate receiving and holding zone.

I claim:

1. The process of mixing concrete and the like which consists in first preparing a properly proportioned batch of material, then conveying it to and discharging it into a mixing zone in the presence of the proper amount of water, then mixing such batch as a unit in the zone for a length of time too short to complete the mixing process, then discharging the batch from the mixing zone into a receiving zone, allowing it to fall freely under the influence of gravity thereto, then conveying and discharging such batch as a unit to a second mixing zone, there mixing it for such additional time as will complete the mixing process, and then discharging it to the work.

2. The process of mixing concrete and the like which consists in first preparing a properly proportioned batch of material, then conveying it to and discharging it into a mixing zone in the presence of the proper amount of water, then mixing such batch as a unit in the zone for a length of time too short to complete the mixing process, then discharging the batch from the mixing zone into a receiv-

ing zone, the capacity of which is great enough to contain the entire batch, holding the batch as a unit in said zone, then conveying and discharging such batch as a unit to a second mixing zone, there mixing it for such additional time as will complete the mixing process, and then discharging it to the work.

3. The process of mixing concrete and the like which consists in feeding to a mixing zone a properly proportioned batch of aggregate in the presence of the proper amount of water, then mixing such batch as a unit in the zone for a length of time too short to complete the mixing process, then discharging the batch from the mixing zone into a receiving zone, allowing it to fall freely under the influence of gravity thereto, then conveying and discharging such batch as a unit to a second mixing zone, there mixing it for such additional time as will complete the mixing process, and then discharging it to the work.

4. The process of mixing concrete and the like which consists in feeding to a mixing zone a properly proportioned batch of aggregate in the presence of the proper amount of water, then mixing such batch as a unit in the zone for a length of time too short to complete the mixing process, then discharging the batch from the mixing zone into a receiving zone, the capacity of which is great enough to contain the entire batch, holding the batch as a unit in said zone, then conveying and discharging such batch as a unit to a second mixing zone, there mixing it for such additional time as will complete the mixing process, and then discharging it to the work.

5. The process of mixing concrete and the like which consists in mixing a properly proportioned batch of material in a mixing zone for a time insufficient to complete the mixing operation, discharging it from such zone, conveying the batch to and discharging it into a second mixing zone without the addition of any material other than that treated in the first zone, there mixing it to completion and then discharging it, the length of time the material remains in each of the two zones being different.

6. The process of mixing concrete and the like which consists in agitating a properly proportioned batch of material in a mixing zone until it is partially mixed, then discharging such material from the mixing zone, into a receiving zone, then feeding such material to a second mixing zone and there agitating and mixing it until the mixing process is completed, the length of time the material remains in each of the two mixing zones being different.

7. The process of mixing concrete and the like which consists in agitating a properly proportioned batch of material in a mixing zone until it is partially mixed, then discharging such material from the mixing zone, then feeding such material to a second mixing zone and there agitating and mixing it until the mixing process is completed, the length of time the material remains in each of the two mixing zones being different.

8. The process of mixing concrete and the like which consists in mixing a properly proportioned batch of material in a mixing zone for a time insufficient to complete the mixing operation, discharging it from such zone, conveying the batch to and discharging it into a second mixing zone without the addition of any material other than that treated in the first zone, there mixing it to completion and then discharging it, the material being caused to remain in the first mixing zone a shorter time than in the second zone.

9. The process of mixing concrete and the like which consists in agitating a properly proportioned batch of material in a mixing zone for a length of time insufficient to complete the mixing operation, discharging it therefrom, and after the entire batch has been discharged from the first zone feeding it into a second mixing zone and there mixing it to completion.

10. The process of mixing concrete and the like which consists in agitating a properly proportioned batch of material in a mixing zone for a length of time insufficient to complete the mixing operation, discharging it therefrom, and after the entire batch has been discharged from the first zone feeding it into a second mixing zone and there mixing it to completion the length of time the material is mixed in each zone being different.

11. The process of mixing concrete and the like which consists in agitating a properly proportioned batch of material in a mixing zone for a length of time insufficient to complete the mixing operation, discharging it therefrom, and after the entire batch has been discharged from the first zone feeding it into a second mixing zone and there mixing it to completion, the material being mixed in the first zone for a shorter length of time than in the second zone.

Signed at Chicago, county of Cook, and State of Illinois, this 17th day of March, 1931.

WILSON A. JAICKS.